

LIHEAP Home Energy Notebook

For Fiscal Year 2014



**U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES
Administration for Children and Families
Office of Community Services
Division of Energy Assistance
June 2016**

LIHEAP Home Energy Notebook

For Fiscal Year 2014

This document has been prepared for the Office of Community Services' Division of Energy Assistance by APPRISE Incorporated under contract #HHSP233201450049A. The statements, findings, conclusions, and recommendations are solely those of analysts from APPRISE and do not necessarily reflect the views of HHS.

Copies of this document can be obtained by contacting Peter Edelman of the Division of Energy Assistance at the following address:

Administration for Children and Families
Office of Community Services
Division of Energy Assistance
333 C Street, SW
Washington, DC 20201

E-mail: peter.edelman@acf.hhs.gov

Web site: <http://www.acf.hhs.gov/programs/ocs/liheap/>

June 2016

Table of Contents

Figures and Tables	iii
List of Acronyms and Abbreviations	vii
Executive Summary.....	1
Home energy data	1
Low income home energy trends	4
Trends in LIHEAP.....	10
Federal LIHEAP targeting performance.....	11
Special Study of LIHEAP Assurance 16.....	14
I. Introduction.....	17
Purpose of Notebook.....	17
Organization of Notebook	18
II. Home Energy Data	19
Residential energy data	19
Home heating data	22
Home cooling data.....	25
III. Low Income Home Energy Trends.....	27
Trends in energy use, consumption, expenditures, and burden	29
Analysis of energy price and energy efficiency trends	41
Trends in LIHEAP.....	46
Analysis of LIHEAP benefits	50
IV. Federal LIHEAP Targeting Performance.....	52
LIHEAP program goals and performance goals	52
Targeting index performance measures	53
Outcome performance measures	55
Performance measurement research.....	56
Uses of LIHEAP performance data.....	62
Targeting performance measurement issues.....	63
V. Special Study of LIHEAP Assurance 16	64
Background	64
Study Goals.....	64
Methodology	65
Assurance 16 Program Design and Implementation	66
Investments in Assurance 16 Activities.....	72
Grantee Perceptions of Assurance 16 Program Outcomes	76
Reporting on Assurance 16 Program Outcomes.....	82
Interface of Performance Management Framework with Measurement of Assurance 16	
Outcomes	84
Recommendations for Additional Research.....	85
Appendix A: Home Energy Estimates	87
Description of RECS.....	87
Strengths and limitations of RECS data.....	88
Average home energy consumption and expenditures.....	89
Energy burden.....	89

Projecting energy consumption and expenditures..... 93
Appendix B: Income Eligible Household Estimates 105

Figures and Tables

Figure 1. Percent of U.S. residential energy expenditures by low income households, by end use, FY 2014.....	2
Figure 2. Mean home heating and home cooling expenditures by all households, non-low income households, low income households, and LIHEAP recipient households, FY 2014.....	3
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 2014.....	4
Figure 4. Percent of low income households using electricity and fuel oil as main heating fuels, 1979 to 2009.....	5
Figure 5. Percent of low income households using central air-conditioning, 1979 to 2009	5
Figure 6. Mean residential energy consumption (in MMBtus) per low income household, 1979 to FY 2014.....	6
Figure 7. Mean residential energy expenditures for low income households, 1979 to FY 2014	7
Figure 8. Mean group residential energy burden by end use for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014	8
Figure 9. Shifts in composite energy price index and Consumer Price Index (CPI), 1979 to FY 2014.....	9
Figure 10. Index of heating degree days (HDD), average heating consumption for low income households per HDD, cooling degree days (CDD), and average cooling consumption for low income households per CDD, 1979 to FY 2014.....	10
Figure 11. Number of LIHEAP/LIHEAP income eligible and heating and/or winter crisis assistance recipient households, FY 1981 to FY 2014.....	11
Table 2-1a. Residential energy: Average annual household consumption, expenditures, and burden by all households, by main heating fuel type, United States, FY 2014 (See also Tables A-3a – A-3c, Appendix A).....	20
Table 2-1b. Residential energy: Average annual household consumption, expenditures, and burden by non-low income households, by main heating fuel type, United States, FY 2014 (See also Tables A-3a – A-3c, Appendix A).....	20
Table 2-1c. Residential energy: Average annual household consumption, expenditures, and burden by low income households, by main heating fuel type, United States, FY 2014 (See also Tables A-3a – A-3c, Appendix A).....	20
Table 2-1d. Residential energy: Average annual household consumption, expenditures, and burden by LIHEAP recipient households, by main heating fuel type, United States, FY 2014 (See also Tables A-3a – A-3c, Appendix A).....	21
Table 2-2. 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 2014	21
Table 2-3. 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 (See also Table A-4, Appendix A).....	22
Table 2-4a. Home heating: Average annual household consumption, expenditures, and burden by all households, by fuel type, United States, FY 2014 ¹ (See also Tables A-5, A-6a, A-6b, and A-6c, Appendix A).....	23
Table 2-4b. Home heating: Average annual household consumption, expenditures, and burden by non-low income households, by fuel type, United States, FY 2014 (See also Tables A-5, A-6a, A-6b, and A-6c, Appendix A).....	23
Table 2-4c. Home heating: Average annual household consumption, expenditures, and burden by low income households, by fuel type, United States, FY 2014 (See also Tables A-5, A-6a, A-6b, and A-6c, Appendix A).....	24
Table 2-4d. Home heating: Average annual household consumption, expenditures, and burden by LIHEAP recipient households, by fuel type, United States, FY 2014 (See also Tables A-5, A-6a, A-6b, and A-6c, Appendix A).....	24
Table 2-5. Home cooling: Percent of households with home cooling by all, non-low income, low income, and LIHEAP recipient households, United States, 2009 (See also Table A-7, Appendix A).....	25
Table 2-6. 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 2014 (See also Table A-7, Appendix A)	26
Table 3-1. Definition of special terms.....	28

LIHEAP Home Energy Notebook for FY 2014: Table of Contents

Table 3-2. Data used for the study of low income home energy trends	29
Figure 3-1. Main heating fuel for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to 2009	30
Figure 3-2. Air-conditioning type for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to 2009	30
Figure 3-3. Mean residential energy consumption per household in MMBtus by end use for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014	31
Figure 3-4. Mean residential energy expenditures by end use for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014	32
Figure 3-5. Mean group residential energy burden by end use for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014	33
Figure 3-6. Comparison of mean group, mean individual, and median individual residential energy burden for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014.....	34
Figure 3-7. Comparison of mean group, mean individual, and median individual home energy burden for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014	35
Figure 3-8. Number of low income households (in millions) spending over 5 percent and 10 percent of income on home energy, 1979 to FY 2014	36
Figure 3-9. Percent of low income households spending over 5 percent and 10 percent of income on home energy, 1979 to FY 2014	36
Figure 3-10. Total fuel assistance dollars (in billions) needed to reduce low income household spending on home energy to 5 percent and 10 percent of income, 1979 to FY 2014.....	37
Figure 3-11. Number of low income households (in millions) spending over 15 percent and 25 percent of income on residential energy, 1979 to FY 2014.....	38
Figure 3-12. Total fuel assistance dollars (in billions) needed to reduce low income household spending on residential energy to 15 percent and 25 percent of income, 1979 to FY 2014	39
Figure 3-13. Aggregated residential energy expenditures (in billions of dollars) by end use for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014	40
Figure 3-14. Percentage of LIHEAP income eligible households with heat interruptions of two hours or more caused by an inability to pay for energy to run the household's main heating system, 1981-82 heating season to calendar year 2009	41
Figure 3-15. Index of dollar prices for fuel oil, natural gas, electricity, and a composite compared to the Consumer Price Index (CPI), 1979 to FY 2014	42
Figure 3-16. Index of heating consumption, heating degree days, and heating consumption per heating degree day for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014.....	43
Figure 3-17. Index of cooling consumption, cooling degree days, and cooling consumption per cooling degree day for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014.....	44
Figure 3-18. Mean group home energy burden for all households and for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014	45
Figure 3-19. Mean group residential energy burden for all households and for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014	45
Figure 3-20. Percentage of LIEAP/LIHEAP federally income eligible households receiving LIEAP/LIHEAP heating and/or winter crisis assistance, FY 1981 to FY 2014.....	46
Figure 3-21. Number of households receiving LIEAP/LIHEAP heating and/or winter crisis assistance or cooling and/or summer crisis assistance, FY 1981 to FY 2014	47
Figure 3-22. Funds used for LIEAP/LIHEAP fuel assistance, FY 1981 to FY 2014.....	48
Figure 3-23. Mean combined LIEAP/LIHEAP heating and/or winter crisis benefits and mean cooling and/or summer crisis benefits, in nominal dollars, FY 1981 to FY 2014.....	49
Figure 3-24. Mean combined LIEAP/LIHEAP heating and/or winter crisis benefits and mean cooling benefits, in real 1981 dollars, FY 1981 to FY 2014	49
Figure 3-25. Amount and percentage of total home heating billed amounts for LIEAP/LIHEAP income eligible households covered by LIEAP/LIHEAP heating and winter crisis benefits, FY 1981 to FY 2014.....	50
Figure 3-26. Mean group home heating burden for all households and LIEAP/LIHEAP heating and winter crisis recipient households, FY 1981 to FY 2014	51

LIHEAP Home Energy Notebook for FY 2014: Table of Contents

Table 4-1a. LIHEAP reciprocity targeting performance measure 1A: Increase the reciprocity targeting index score of LIHEAP households having at least one member 60 years or older (reported for FY 2003 – FY 2014)	59
Table 4-1b. LIHEAP reciprocity targeting performance measure 1A: Increase the reciprocity targeting index score of LIHEAP households having at least one member five years or younger (reported for FY 2003 – FY 2014)	60
Table 4-2. LIHEAP reciprocity targeting index of high-burden households by region for FY 2001 from the 2001 RECS and the 2001 RECS LIHEAP Supplement, for FY 2005 from the 2005 RECS, and for FY 2010 from the 2009 RECS.....	61
Table 4-3. LIHEAP benefit targeting index of high-burden households by region for FY 2001 from the 2001 RECS and the 2001 RECS LIHEAP Supplement, for FY 2005 from the 2005 RECS, and for FY 2010 from the 2009 RECS	61
Table 4-4. LIHEAP burden reduction targeting of high-burden households by region for FY 2001 from the 2001 RECS and the 2001 RECS LIHEAP Supplement, for FY 2005 from the 2005 RECS, and for FY 2010 from the 2009 RECS.....	61
Table 5-1. Types of Assurance 16 activities planned for FY 2015 by state and territory grantees.....	67
Table 5-2. Types of Assurance 16 activities funded in FY 2014 and planned for continuation in FY 2015	69
Table 5-3. State-level information on Assurance 16 activities planned for FY 2015	70
Table 5-4. Delivery of Assurance 16 activities based on grantee interviews.....	72
Table 5-5. State-Level information on investments in Assurance 16 (A16) activities per household (HH) for FY 2014.....	74
Table 5-6. State-Level availability of data for reporting Assurance 16 activities based on grantee interviews	77
Table 5-7. Subgrantee-Level Assurance 16 activities, leveraged funding sources and availability of data based on grantee interviews	79
Figure A-1. Distribution of LIHEAP income eligible households by home energy burden, 2009	91
Table A-1. National price factors for FY 2014	93
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 2014.....	95
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 2014.....	96
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 2014.....	97
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 2014.....	98
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.....	99
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 2014.....	100
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 2014.....	101
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 2014.....	102
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 2014.....	103
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 2014	104

LIHEAP Home Energy Notebook for FY 2014: Table of Contents

Table B-1. State-level estimates of the number of LIHEAP income eligible households using the federal maximum LIHEAP income standard by vulnerability category	106
Table B-2. State-level estimates of the number of LIHEAP income eligible households using state maximum LIHEAP income standards by vulnerability category.....	107
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	109
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	110

List of Acronyms and Abbreviations

ACF	HHS' Administration for Children and Families
ACS	American Community Survey
ASEC	CPS Annual Social and Economic Supplement
A16	Assurance 16
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
EMEU	EIA's Office of Energy Markets and End Use
FY	Fiscal Year
GPRA	Government Performances and Results Act of 1993 (Public Law 103-62)
HDD	Heating Degree Day
HH	Household
HHS	U.S. Department of Health and Human Services
LIEAP	Low Income Energy Assistance Program
LIHEAP	Low Income Home Energy Assistance Program
MMBtus	Million British thermal units
NC	No cases in sample
NEADA	National Energy Assistance Directors' Association
NEUAC	National Energy and Utility Affordability Coalition
NOAA	National Oceanographic and Atmospheric Administration
OCS	ACF's Office of Community Services
RECS	Residential Energy Consumption Survey

Executive Summary

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.

In 1994, Congress amended the purpose of LIHEAP to clarify that LIHEAP is “to assist low income households, particularly those with the lowest income, 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, Public Law 103-252, Sec. 2602(a) as amended.) The Energy Policy Act of 2005 (Public Law 109-58) reauthorized LIHEAP through Fiscal Year (FY) 2007 without substantive changes. LIHEAP’s reauthorization is currently pending.

The *LIHEAP Home Energy Notebook* 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; low income home energy trends; and the LIHEAP performance measurement system. This summary highlights information presented in the *Notebook*.

Home energy 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 FY 2014 residential energy consumption and expenditures figures for this report have been derived from the 2009 RECS data that were adjusted to reflect FY 2014 weather and fuel prices.

Residential energy data

In FY 2014, average residential energy expenditures for all households were \$2,199, and the mean individual energy burden was 8.6 percent of income.¹ Low income households had average energy expenditures of \$1,894, about 14 percent lower than the average for all households.² The mean individual energy burden for low income households was 18.4 percent, over twice the mean individual energy burden of all households. LIHEAP recipient households had average residential energy expenditures of \$2,137, about 13 percent higher than the average for all low income households. The mean individual energy burden for LIHEAP recipients was 18.8 percent, 10.2 percentage points higher than the mean individual energy burden for all households and 0.4 percentage points higher than the mean individual energy burden for low income households.

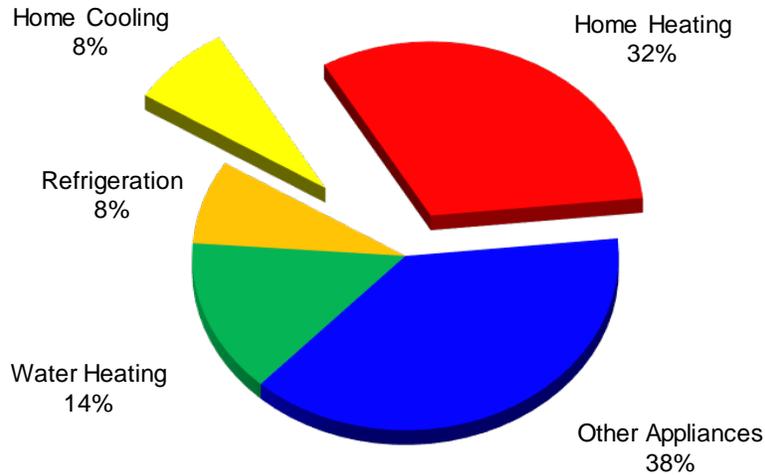
LIHEAP assists households with only that portion of residential energy costs that goes for home energy, i.e., home heating and home cooling. As shown in Figure 1, home heating and home cooling represented about 40 percent of residential energy expenditures for low income households in FY

¹ The mean is the sum of all values divided by the number of values. The mean is also referred to as the average. See Appendix A for a discussion of the computation of energy burden statistics.

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.

2014. Refrigerators and freezers represented about 8 percent of residential energy expenditures, water heating represented about 14 percent of residential energy expenditures, and other appliances represented about 38 percent of residential energy expenditures.

Figure 1. Percent of U.S. residential energy expenditures by low income households, by end use, FY 2014



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.

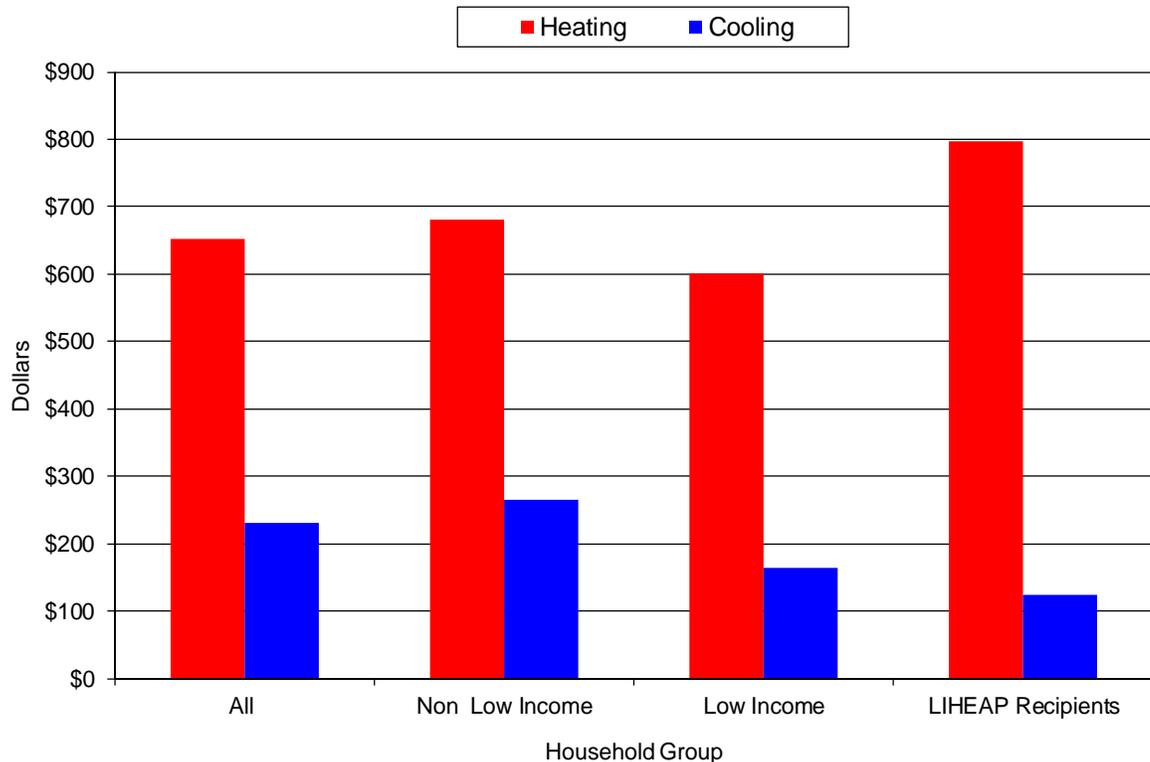
In FY 2014, as shown in Figures 2 and 3, average home heating expenditures for all households were \$652, and the mean individual home heating burden was 3.2 percent. Low income households had average home heating expenditures of \$601; this average was about 8 percent lower than that for all households. The mean individual home heating burden for low income households was 7.3 percent, over twice as much as the mean individual home heating burden for all households. The average home heating expenditures for LIHEAP recipient households was \$797, about 33 percent higher than the average for low income households and about 22 percent higher than the average for all households. Mean individual home heating burden for LIHEAP recipient households was 8.5 percent, more than two and a half times the average for all households, and more than 1.2 percentage points higher than that for 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.

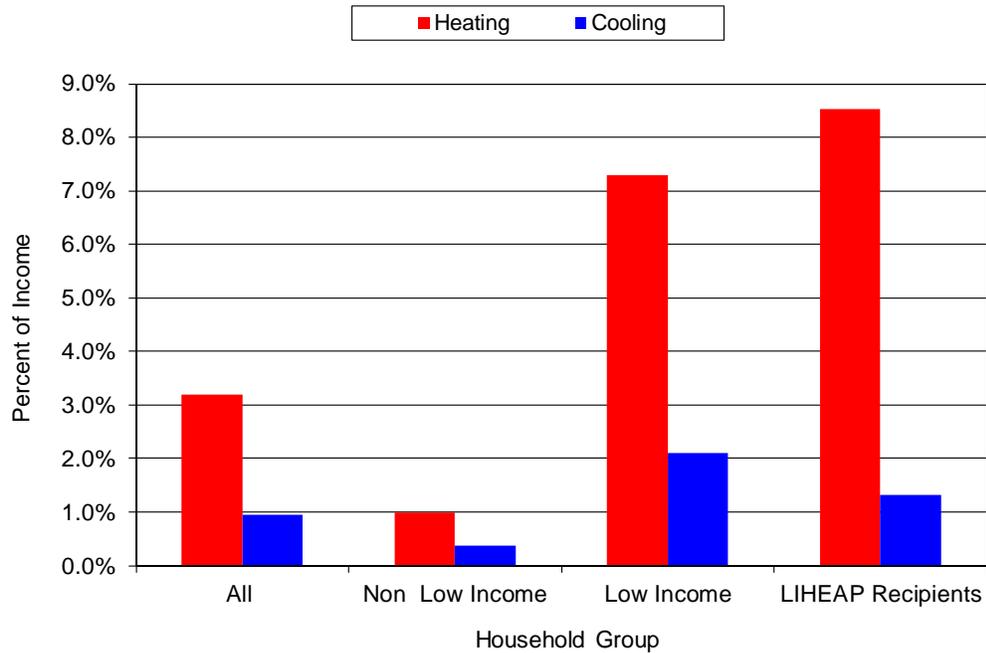
As Figures 2 and 3 show, in FY 2014, for households that cooled, average home cooling expenditures for all households were \$231, and the mean individual home cooling burden was 1.0 percent. Low income households had average home cooling expenditures of \$164; this average was about 29 percent lower than that for all households. The mean individual home cooling burden for low income households was 2.1 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 \$123, about 25 percent lower than the average for low income households and about 47 percent lower than the average for all households. The mean individual home cooling burden for LIHEAP recipient households was 1.3 percent, about 30 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 2014



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 2014



Low income home energy trends

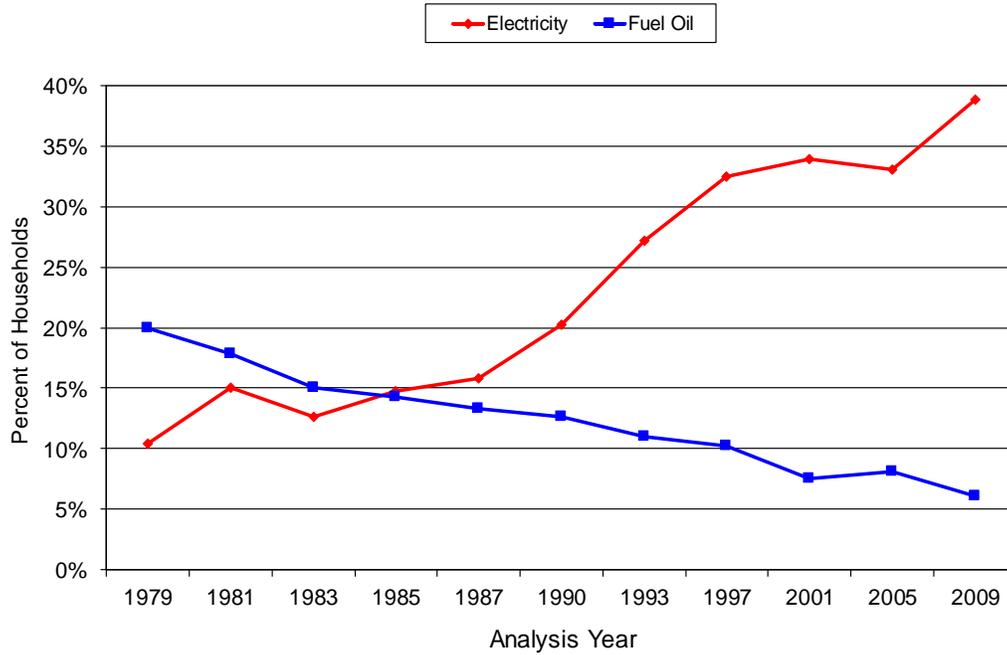
This section presents data on home energy trends for low income households from 1979 through 2009 or FY 2014, depending upon the latest year of availability.⁴ Statistics are derived from a series of national residential energy consumption surveys (including the RECS) and from HHS’s administrative statistics. The analyses show significant shifts since 1979 in the types and amounts of energy used by low income households.

Home heating and cooling trends

Figure 4 demonstrates that the share of low income households that used electricity as their main heating fuel increased from about 10 percent in 1979 to 34 percent in 2001, dropped slightly to 33 percent in 2005, and increased to almost 39 percent in 2009. In contrast, the share of low income households that used fuel oil as their main heating fuel steadily declined from 20 percent in 1979 to 6 percent in 2009. Natural gas remained the dominant type of space heating fuel used over the 30-year period.

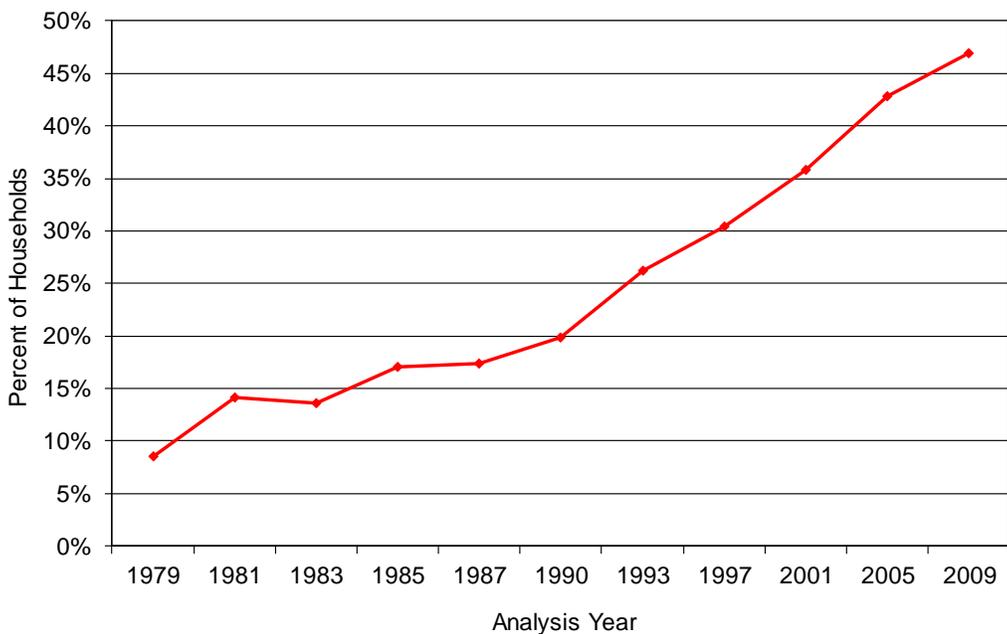
⁴In this section, low income households are defined as those households with incomes at or below 150 percent of HHS Poverty Guidelines.

Figure 4. Percent of low income households using electricity and fuel oil as main heating fuels, 1979 to 2009



As shown in Figure 5, the most important change in home cooling on the part of low income households has been in the percentage of households with central air-conditioning. The share of low income households who use central air-conditioning increased from 8.5 percent in 1979 to almost 47 percent in 2009.

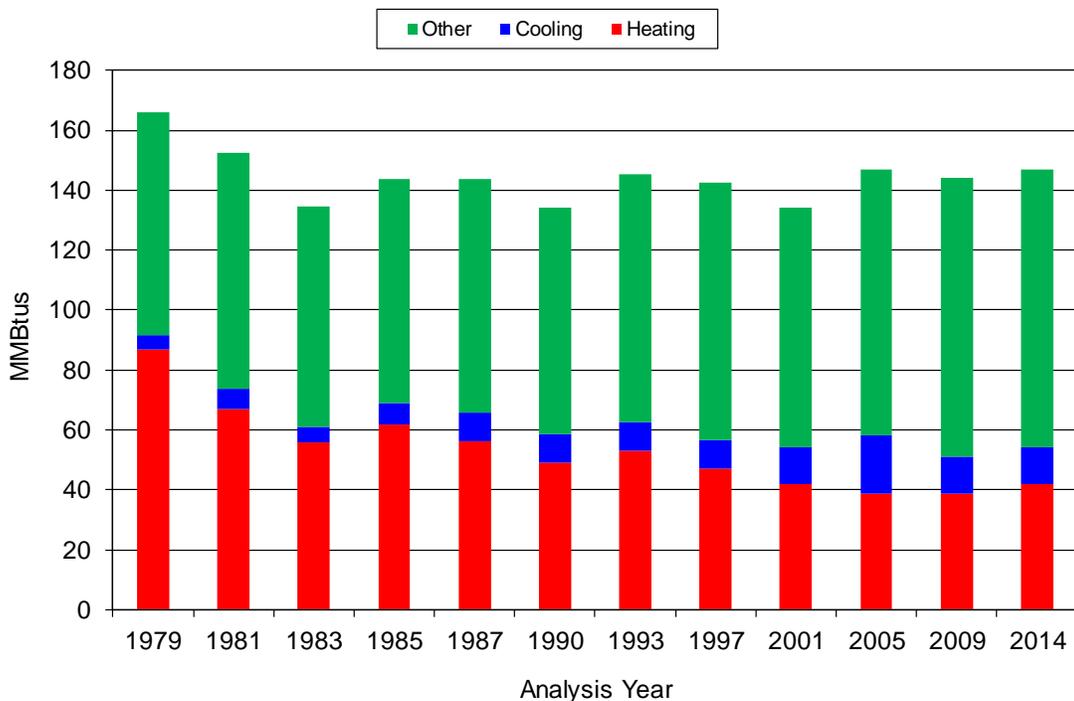
Figure 5. Percent of low income households using central air-conditioning, 1979 to 2009



Trends in mean residential consumption, expenditures, and energy burden

Low income households substantially decreased their mean residential energy consumption between 1979 and 1983, as shown in Figure 6. This suggests a significant increase in efficiency resulting from conservation measures or actions. From 1983 to 1990, mean residential energy consumption fluctuated from year to year, corresponding to expected changes in heating and cooling consumption because of changes in heating and cooling degree days. For 1993 through 2005, there appears to have been an increase in the use of energy for purposes other than home heating and home cooling. Between 2005 and 2009, the decrease in home cooling was slightly offset by higher consumption for purposes other than home cooling or heating. Between 2009 and FY 2014, the use of energy for home heating, home cooling, and for other purposes, appears to have remained fairly stable with only home heating increasing slightly in FY 2014.

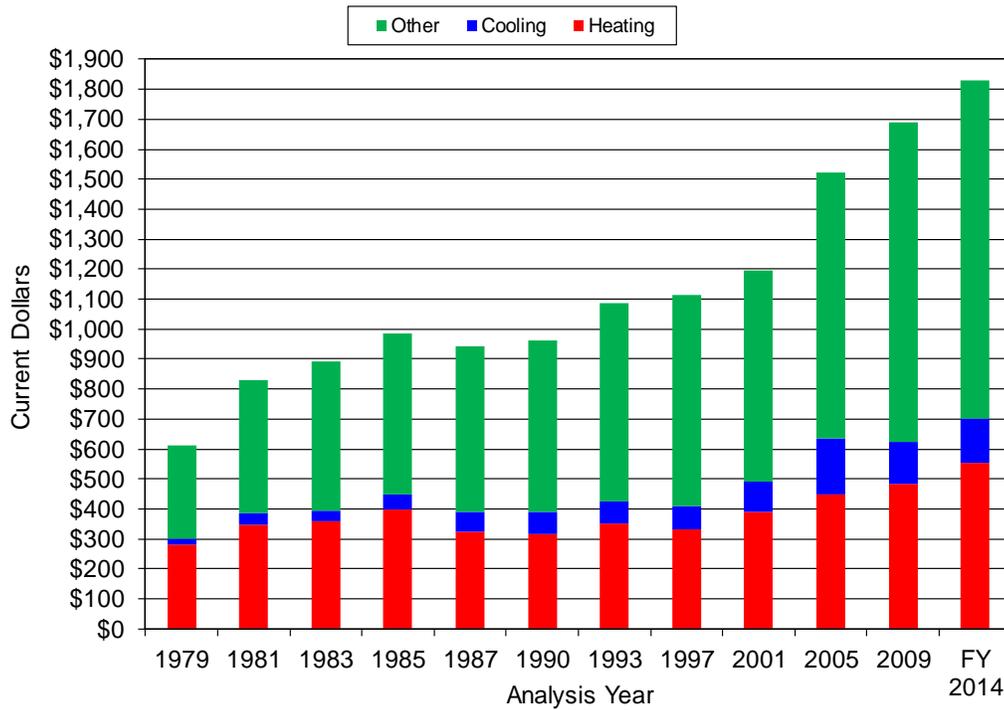
Figure 6. Mean residential energy consumption (in MMBtus) per low income household, 1979 to FY 2014^{1/}



^{1/} 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.

Mean residential energy expenditures increased rapidly between 1979 and 1985 because of fuel price increases, as shown in Figure 7. From 1987 through 1997, these expenditures rose moderately; however from 2001 through 2009, mean expenditures on heating increased steadily as the result of fuel price increases and colder winter weather. Between 2005 and FY 2014, mean expenditures for home heating fluctuated, again due to higher fuel prices and changing weather. Mean expenditures on uses other than home heating or home cooling rose continuously from 1979 to FY 2014. Mean expenditures on cooling rose from 1979 to 2005. In 2009, expenditures on cooling decreased relative to 2005 but expenditures on heating and for other purposes increased. Between 2009 and FY 2014, mean expenditures on home heating, home cooling, and other purposes all increased.

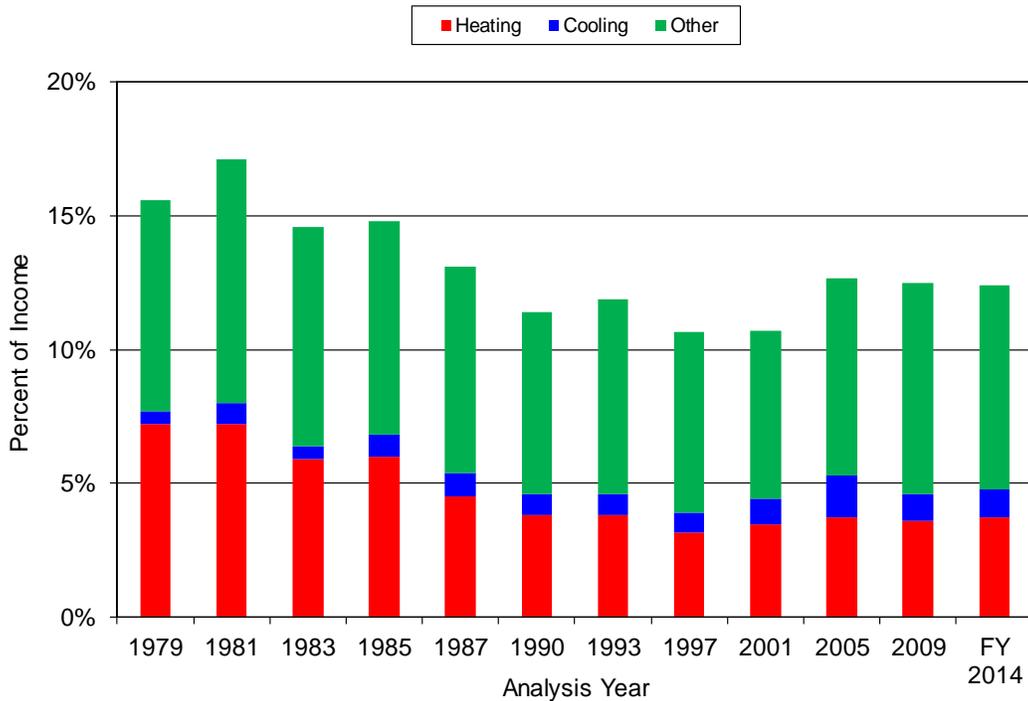
Figure 7. Mean residential energy expenditures for low income households, 1979 to FY 2014



As Figure 8 shows, the mean group home energy burden (i.e., burden associated with home heating and home cooling) declined from 7.7 percent in 1979 to 4.7 percent in FY 2014; this represented a decline of 3.0 percentage points.⁵ The decline in mean group residential energy burden from 1979 to FY 2014 was 3.2 percentage points (from 15.6 percent to 12.4 percent). Most of the decline in residential energy burden is associated with a decline in home energy burden rather than a decline in the burden associated with energy use for other purposes (i.e., water heating, appliances, and refrigeration).

⁵ Mean group burden is defined in Appendix A.

Figure 8. Mean group residential energy burden by end use for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014



Analysis of fuel price and energy efficiency trends

Trends in energy consumption and expenditures are dependent on factors such as energy prices, weather, and energy efficiency. Fuel prices outpaced the Consumer Price Index (CPI) from 1979 through 1983, as shown in Figure 9 on the next page. While the CPI increased about 37 percent, the composite average of fuel prices (a weighted average of electric, natural gas, and fuel oil prices) increased by about 81 percent between 1979 and 1983. From 1985 through 1993, fuel prices rose at a slower rate than did the CPI (i.e., at a slower rate than the cost of other goods). From 1997 to through 2013 however, fuel prices rose at a higher rate than did the prices of other goods. In 2005, the composite energy price index was 321 while the CPI was 269. The impact of energy prices on energy expenditures resulted in low income household energy expenditures surging upward until 1985 even though energy consumption for these households declined over the same period. The 19 percent growth in composite fuel prices from 1985 to 1997 explains why residential energy expenditures per low income household rose slightly during that period. In 2001, fuel prices increased by 17 percent over 1997 prices; 2005 fuel prices increased by 24 percent over 2001 prices; and 2009 fuel prices increased by nearly 15 percent over 2005 prices. In FY 2014, fuel prices increased again. FY 2014 fuel prices were about 10 percent higher than 2009 fuel prices. The increases in fuel prices from 2005 through FY 2014 contributed to the rise in expenditures during that period.

Figure 9. Shifts in composite energy price index and Consumer Price Index (CPI), 1979 to FY 2014

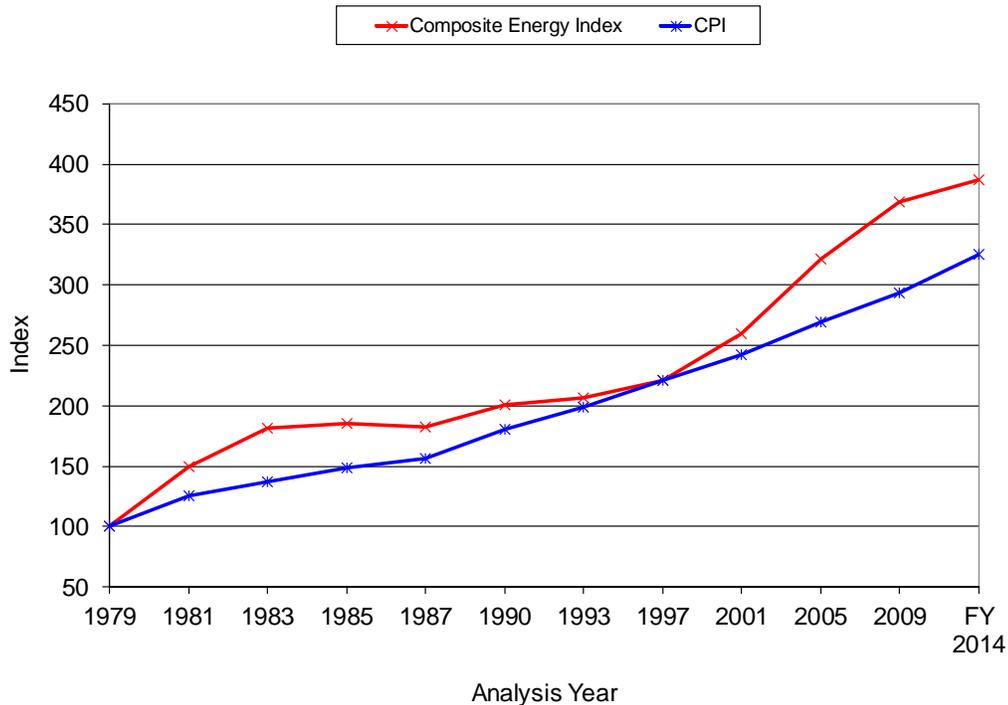
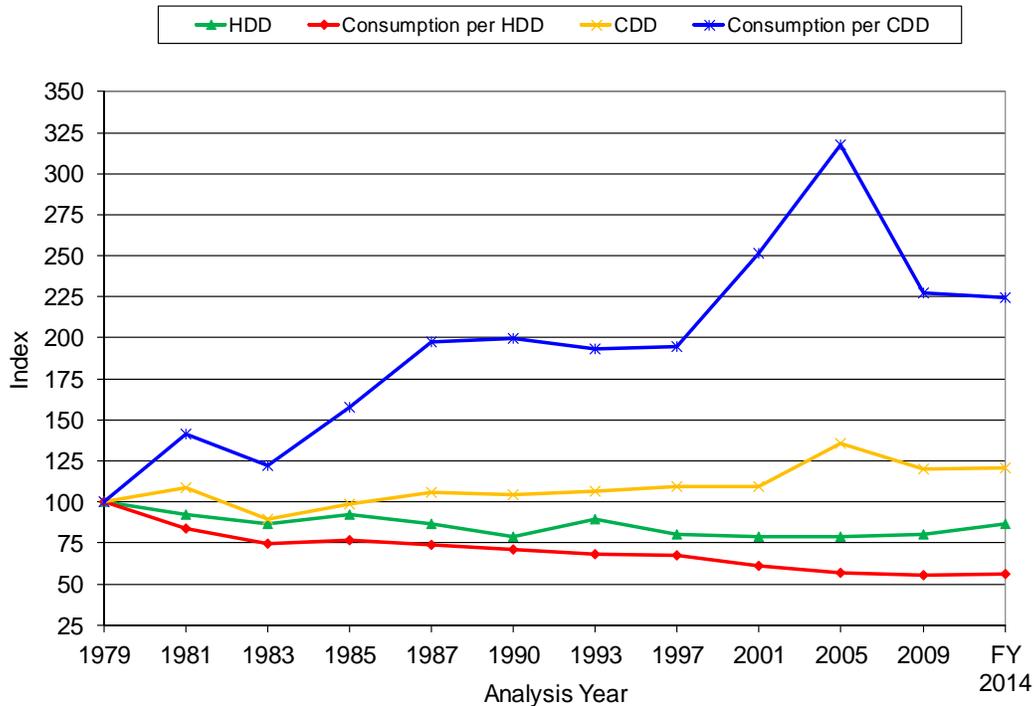


Figure 10 shows on the next page average energy consumption for heating and cooling compared to heating and cooling degree days from 1979 to FY 2014 for low income households. As shown, heating consumption per heating degree day generally declined from 1979 to FY 2014 probably at least in large part due to energy conservation efforts. In contrast, cooling consumption per cooling degree day rose through FY 2014, with a spike around 2001 and 2005, because of a large increase in the availability of air-conditioning to low income households.⁶ Only 37 percent of low income households had air-conditioning equipment in 1979, but by 2005 the number had risen to 80 percent, followed by a slight decrease in 2009 to 77 percent.

⁶Air-conditioning equipment includes central air conditioners and window or wall units, ceiling fans, and evaporative coolers. The availability of all household appliances increased for low income households over this period due to the overall increase in the wealth of the nation and to the decrease in the cost of older technologies.

Figure 10. Index of heating degree days (HDD), average heating consumption for low income households per HDD, cooling degree days (CDD), and average cooling consumption for low income households per CDD, 1979 to FY 2014



The mean group home energy burden for low income households has remained considerably higher than the burden for all households. In 1979, the mean group home energy burden was 7.7 percent for low income households, while the mean group home energy burden for all households was 1.9 percent. In FY 2014, the mean group home energy burden for all households was 1.2 percent, while the mean group home energy burden for low income households was 4.7 percent. Again, this is nearly four times higher than that for all households.

Trends in LIHEAP

Between 1981 and FY 2014, as shown in Figure 11, the number of income eligible households has risen by about 95 percent, during which time federal fuel assistance funds have increased by about 72 percent.⁷ Also during this period, the percentage of income eligible households receiving heating and/or winter crisis assistance has declined from 36 percent in 1981 to 16 percent in FY 2014 – though this figure has remained reasonably steady since 1997.⁸ Before adjusting for inflation, average winter crisis and heating benefits per household increased until 1985, fell in 1987, stayed in the same range through 1997, increased significantly in 2001, dropped by over 16 percent in 2005, rose by nearly 66 percent in 2009, and then decreased by about 23 percent FY 2014. Cooling benefits per household actually fell until 1985 and increased sharply from 1993 through 2001, and then fell by over 6 percent in 2005, rose nearly 77 percent in 2009, and then decreased by about 9 percent in FY 2014. After adjusting for inflation, the mean value of combined federal heating and winter crisis

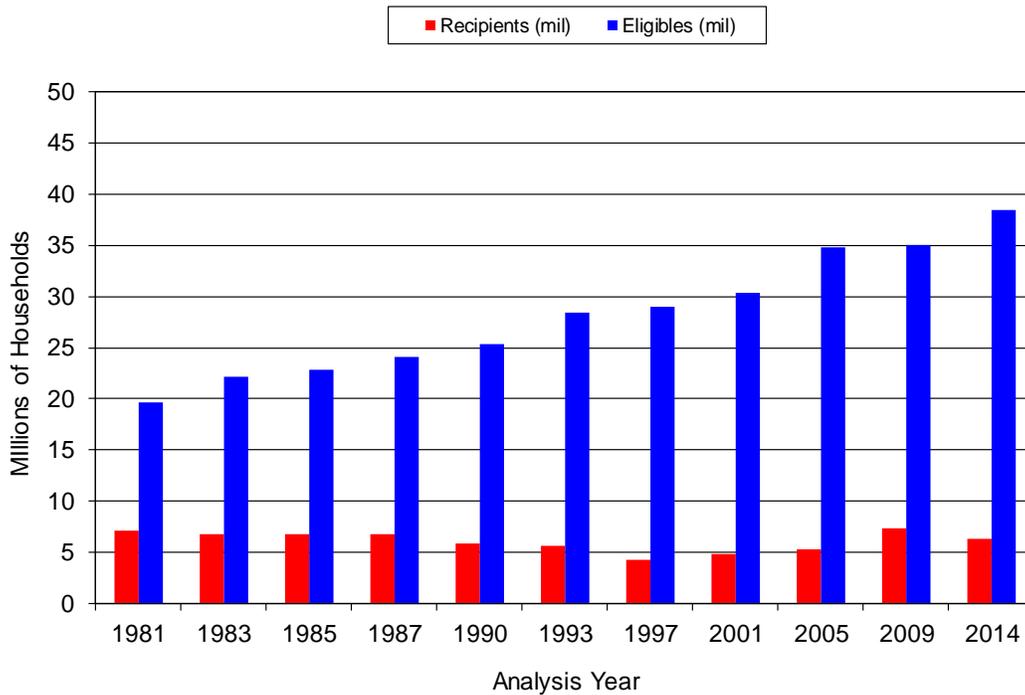
⁷ Income eligible household estimates do not include those households with incomes greater than the statutory income standards but who may still qualify for LIHEAP benefits because they are categorically eligible for LIHEAP under section 8624 (b)(2)(A) of the LIHEAP statute.

⁸ Note that The FY 1981 estimate of income eligible households are not directly comparable to those of the other years because the income eligibility guidelines for the FY 1981 program differed from those of other years.

benefits fell (in 1981 dollars) from \$213 in 1981 to \$145 in FY 2014. Cooling benefits decreased (in 1981 dollars) from \$129 in 1981 to \$118 in FY 2014.

The percentage of the total home heating bill for Low Income Energy Assistance Program/Low Income Home Energy Assistance Program (LIEAP/LIHEAP) income eligible households covered by LIEAP/LIHEAP heating and winter crisis benefits decreased from 23 percent in 1981 to 10 percent in FY 2014. The decrease resulted from the combination of higher home heating bills and a rise in the size of income eligible population.

Figure 11. Number of LIEAP/LIHEAP income eligible and heating and/or winter crisis assistance recipient households, FY 1981 to FY 2014



The mean group home heating burden for LIEAP/LIHEAP assisted households is substantially reduced because of the LIHEAP benefits, but even with the assistance, it has historically been about twice the burden of all households.

Federal LIHEAP targeting performance

The Government Performance and Results Act of 1993 (GPRA) focuses on program results to provide Congress with objective information on the achievement of statutory objectives or program goals. The resulting performance data are to be used in making decisions on budget and appropriation levels.

ACF's budget justification for Congress, which contains the LIHEAP performance plan, takes into account the fact that the federal government does not provide LIHEAP assistance to the public. Instead, the federal government provides funds to states, federal- or state-recognized Indian tribes and tribal organizations, and insular areas to administer LIHEAP at the local level. The LIHEAP performance plan also takes into account the fact that LIHEAP is a block grant whereby LIHEAP grantees have broad flexibility to design their programs, within very broad federal guidelines, to meet the needs of their citizens.

LIHEAP program goals and performance goals

In FY 2014, 16 percent of federally income eligible households received assistance with their heating costs. Given that limitation, the LIHEAP statute requires LIHEAP grantees to provide, in a timely manner, that the highest level of assistance will be furnished to those households that have the lowest incomes and the highest energy costs or needs in relation to income, taking into account family size. The LIHEAP statute identifies two groups of low income households as having the highest needs:

- *Vulnerable Households*: Vulnerable households are those with at least one member that is a young child, an individual with disabilities, or a frail older individual.
- *High-Burden households*: High-burden households are those with the lowest incomes and highest home energy costs.

Based on the national LIHEAP program goals, ACF has focused its annual performance goals and measurement on targeting income eligible vulnerable households. In addition, ACF has established an annual efficiency goal for LIHEAP. Subject to the availability of data, ACF also is interested in the performance of LIHEAP with respect to targeting households with the highest home energy burden.

Targeting Index performance measures

Performance goals must be measurable in order to determine if the goals are being achieved. ACF has developed a set of performance measures (i.e., targeting indexes) that show the extent to which LIHEAP meets its performance goals. These measures, which are presented below, show LIHEAP's performance in targeting vulnerable and high-burden households:

- The *reciprocity targeting index* quantifies targeting with respect to receipt of LIHEAP benefits.
- The *benefit targeting index* quantifies targeting with respect to the level of LIHEAP benefits.
- The *burden reduction targeting index* quantifies targeting with respect to the burden reduction resulting from LIHEAP benefits.

The development of these indexes facilitates tracking of reciprocity, benefit, and burden reduction performance for vulnerable and high-burden households. Using these indexes, ACF established the following LIHEAP performance measures

- Increase the reciprocity targeting index score of LIHEAP households having at least one member 60 years or older.
- Maintain the reciprocity targeting index score of LIHEAP households having at least one member five years or younger.

There are no annual measures for the benefit targeting or burden reduction targeting indexes because the data that enter into these indexes are not available annually.

Outcome performance measures

ACF seeks to improve the way in which it measures LIHEAP's performance. The indicators that ACF uses to measure LIHEAP's performance, the young child and elderly reciprocity targeting

indexes, serve only as proxies for LIHEAP's outcomes. ACF intended these proxies to be replaced by more outcome-focused measures.

In June 2008, ACF established the LIHEAP Performance Measures Planning Work Group, consisting of state LIHEAP directors and ACF staff. The Work Group drafted a set of potential LIHEAP performance measures that could be useful to both the states and ACF.

In April 2010, ACF established a follow-up group, the LIHEAP Performance Measures Implementation Work Group, consisting of state LIHEAP directors and ACF staff. The Work Group will be active through at least September 2016 in evaluating grantees' ability to collect and report on newly established measures and also establishing definitions relating to the new measures.

Performance measurement research

ACF has funded several studies to develop a better understanding of LIHEAP targeting performance measurement. Two of these studies recommended that ACF consider making changes in the performance measurement plan for LIHEAP.

- Validation Study – The performance measurement validation study examined the available data sources for estimating the targeting indexes required by the performance measurement plan for LIHEAP and identified the data sources that furnished the most reliable data.⁹
- Energy Burden Study – The energy burden evaluation study used the 2001 RECS LIHEAP Supplement to measure the baseline performance of LIHEAP in serving high-burden households and to examine the competing demands associated with targeting vulnerable and high-burden households.¹⁰

ACF has implemented the recommendations from the Validation Study. Additional resources would be required to implement the recommendations from the Energy Burden Study.

Performance measurement statistics

HHS's *Fiscal Year 2016 Annual Performance Report and Performance Plan* furnished measurements of targeting performance. The performance report showed the LIHEAP targets and performance results for FY 2014.

⁹ *LIHEAP Targeting Performance Measurement Statistics: GPRA Validation of Estimation Procedures*, September 2004, Report prepared by APPRISE Incorporated under PSC Order No. 043Y00471301D.

¹⁰ *LIHEAP Energy Burden Evaluation Study*, July 2005, Report prepared by APPRISE Incorporated under PSC Order No. 043Y00471301D.

Special Study of LIHEAP Assurance 16

LIHEAP Grantees have the option to use Assurance 16 program funds to deliver services that help households to reduce their home energy needs and the reliance on energy assistance.¹¹ Almost one-half of state and territory grantees reported that they allocated funds to Assurance 16 activities in fiscal year (FY) 2014. The purpose of this study is to furnish in-depth information on how LIHEAP funds are invested in Assurance 16 activities, to document how the outcomes of Assurance 16 are currently being measured, and to identify options and alternatives for Assurance 16 performance measurement.

The data collection and analysis procedures for the study included: review and analysis of the annual plans and reports for 56 state and territory grantees; review and analysis of the annual plans and reports for the 23 tribal grantees that received \$500,000 or more in LIHEAP funding in FY 2014; in-depth interviews with eight grantees that focused on delivering energy education services with their Assurance 16 funds; in-depth interviews with nine grantees that focused on delivering other types of services designed to reduce home energy needs; and in-depth interviews with eight subgrantees that were reported to have innovative Assurance 16 program models. The researchers found that the grantee reports furnished good quality data on grantee Assurance 16 funding and activities, and that grantees and subgrantees were forthcoming with information on their Assurance 16 programs.

The review and analysis of the annual plans and reports furnished by grantees found that there is considerable variation in the types of programs funded by Assurance 16. The research found that 25 of the 56 state and territory grantees funded Assurance 16 activities in FY 2014. The most common programs included:

- Needs Assessment - In-depth review of the client's status to assess the need for other services. (15 grantees)
- Referrals - Development of referral database and identification of relevant referrals for individual clients. (16 grantees)
- Crisis Management - Working with clients in crisis to identify the resources needed to restore energy services and/or advocating on behalf of those clients with energy vendors. (15 grantees)
- Financial Counseling - Furnishing longer-term counseling services to try to prevent future energy-related crises. (15 grantees)
- Energy Education and Advocacy - Helping clients to understand how reduce energy usage and how to gain access to energy efficiency programs. (23 grantees)
- Case Management - Ongoing work with clients to ensure that they had their energy service restored and to ensure that they are able to access additional services for which they are eligible. (9 grantees)

Most grantees use these different program elements together to serve their clients. For example, it is common for a grantee to do a needs assessment for a client, make referrals for those clients where there is an opportunity to access additional benefits, and then provide financial counseling to those clients who demonstrate a need for improved money management skills.

The review and analysis for 23 tribal grantees found that six of those 23 tribal grantees invested in Assurance 16 services and that five of the six focused on energy education services.

The review and analysis of the annual plans and reports furnished by state and territory grantees also found that there is considerable variation in the amount that grantees invest in Assurance 16 program services.

- Amount of Funding for Assurance 16 - The funding levels for the 25 state and territory grantees who invested in Assurance 16 services in FY 2014 varied from as little as \$13,907 spent by Tennessee to as much as \$7,613,453 spent by California. The average amount spent was about \$1.7 million.
- Percent of Funds Allocated to Assurance 16 - State and territory grantees spent as little as 0.1% of their grant on Assurance 16 to as much as 5.0% of their grant. The average amount spent was about 3% of LIHEAP funding received by the grantee.
- Average Spending per Client Served - The average amount spent per client served was \$24. Only five state and territory grantees invested \$50 or more per client served.

It is important to note that the in-depth interviews found that LIHEAP Assurance 16 funds are often combined with other sources of program funding (e.g., Community Services Block Grant (CSBG)) to deliver services. So, the amount invested by LIHEAP may not represent the total investment in the services delivered to clients.

Grantees and subgrantees perceive that services delivered by Assurance 16 programs represent important enhancements to the LIHEAP program. Those who deliver referrals, advocacy, financial counseling, and case management report that the short-term interventions help to restore services and are sometimes life-saving, while the longer-term engagements help their clients to make more permanent changes in the way that they manage their energy bills. Those who deliver energy education services are confident that those services help many clients to better manage their energy bills and enhance their ability to maintain energy services year-round.

However, this study found that most grantees do not have information systems that track client outcomes in a way that allows grantees to measure short-term and long-term program outcomes. New Hampshire is a notable exception. They ask subgrantees to target services to households that needed LIHEAP crisis grants in the previous fiscal year and then they track those clients to see if the clients are able to avoid using LIHEAP crisis funds in the following program year. New Hampshire demonstrates an effective strategy for measuring program outcomes that could be adopted by other grantees.

The study did identify a number of subgrantees that collect data that could be used to measure outcomes. Those subgrantees are using the data systems to track outcomes for individual clients and for determining what kind of follow-up would be appropriate. However, the interviewed subgrantees have not used those data systems to develop program outcome statistics.

The research did not identify any grantee that had designed and implemented an evaluation that would measure the impact that their Assurance 16 program has on clients that are served by the program. The New Hampshire Assurance 16 tracking procedures appear to represent the most systematic analysis of Assurance 16 program outcomes. However, to truly measure program impacts, New Hampshire would need to conduct a randomized control trial (RCT) in which they would assign some clients to the treatment group (i.e., proactive outreach) and others to the control group (i.e., no proactive contact). They would then measure the program impacts by examining the difference in the use of LIHEAP regular and crisis grants, and the difference in service maintenance outcomes between the two groups.

The LIHEAP statutes requires grantees to "*report to the Secretary concerning the impact of such activities on the number of households served, the level of direct benefits provided to those households, and the number that remain unserved.*" Moreover, LIHEAP grantees spent almost \$40 million on Assurance 16 program services in FY 2014. As such, it seems appropriate for OCS to expect grantees to improve their reporting on inputs, outputs, and outcomes for their Assurance 16 programs. And, it would be valuable to all grantees if OCS furnished training and technical assistance that would help grantees to conduct evaluations to measure the impacts of their Assurance 16 programs and disseminate the findings to other grantees.

The LIHEAP program is currently engaged in a major initiative to enhance LIHEAP Performance Management through the collection, reporting, and analysis of LIHEAP Performance Measures data. As part of that process, the research team recommends that OCS work with grantees to encourage and facilitate additional research on Assurance 16 program services, including:

- Analysis of data already being collected by some subgrantees.
- Encouraging grantees to collect and analyze supplemental data to expand grantee and subgrantee reporting systems beyond tracking program inputs and outputs to also include program outcomes.
- Training and technical assistance to grantees to help them to conduct Process Evaluations of promising Assurance 16 program models to learn more about how those programs work.
- Furnishing support for Impact Evaluations of promising Assurance 16 program models.
- Working with territories and tribal grantees to examine the special considerations related to the relatively small Assurance 16 programs that they implement.

It is clear that grantees and subgrantees perceive that Assurance 16 programs are effective at delivering significant benefits to LIHEAP clients. However, research on Assurance 16 programs is needed to document which clients realize those benefits, identify which program models are most effective in delivering those benefits, and give policymakers better information on the value of those investments.

I. Introduction

The Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services (HHS) administers at the federal level the Low Income Home Energy Assistance Program (LIHEAP). 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 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.

Purpose of Notebook

ACF furnishes information and technical assistance to LIHEAP grantees. As part of that mission, ACF funded the development of this *Notebook* to assist LIHEAP grantees in meeting the requirements established by the 1994 amendments.

The *LIHEAP Home Energy Notebook* 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; low income home energy trends; and the LIHEAP performance measurement system.

The FY 2014 home energy data presented in this *Notebook* were derived from existing data sources and analytic procedures. These include the following:

- For household-level data on home energy: the national Residential Energy Consumption Surveys (RECS) for 2009, which is administered by the Department of Energy (DOE), Energy Information Administration (EIA).
- For household-level data on income: the national Current Population Survey’s (CPS’s) Annual Social and Economic Supplement (ASEC), which is administered by the Department of Commerce, Bureau of the Census (Census).
- For national- and state-level data on residential energy prices: EIA’s publication *Monthly Energy Review* for electricity price, natural gas price and consumption, and fuel oil/kerosene and liquefied petroleum gas (LPG) consumption; EIA’s publication *Electric Power Monthly* for electricity consumption; EIA website for LPG price; and the Bureau of Labor Statistics (BLS) Consumer Price Index for fuel oil/kerosene price.

- Other publicly available sources of data such as weather data from the Department of Commerce, National Oceanographic and Atmospheric Administration (NOAA).
- End use disaggregation procedures developed by EIA's Office of Energy Markets and End Use (EMEU).
- Data on states' expenditure of funds by component and numbers of households served by type: Office of Community Services (OCS) Division of Energy Assistance's (DEA's) administrative data from the *LIHEAP Household Report for Federal Fiscal Year (FFY) 2014* and the *LIHEAP Performance Data Form for Federal Fiscal Year (FFY) 2014*.¹²

Organization of Notebook

The remaining sections in this *Notebook* are organized as follows.

- Section II – Home energy data. This section presents national energy statistics and analyses for FY 2014. Tabulations are presented for all, low income, non-low income, and LIHEAP recipient households. Statistics are developed for residential energy consumption, home heating, and home cooling. Statistics include estimates of home energy consumption, expenditures, and energy burden.
- Section III – Low income home energy trends. This section furnishes data and analyses on low income home energy trends for the period from 1979 to FY 2014. Subsections include trends in consumption, expenditures, and burden; analysis of energy price and energy efficiency trends; trends in LIHEAP; and analysis of LIHEAP benefits.
- Section IV – Federal LIHEAP targeting performance. This section describes ACF's approach to LIHEAP performance measurement. It describes the performance measurement procedures and furnishes baseline data on targeting performance for LIHEAP.
- Section V – Special study of LIHEAP Assurance 16.
- Appendix A documents the procedures used to prepare the FY 2014 energy statistics; these include projecting changes in energy consumption and expenditures, disaggregating energy consumption and expenditures into end use components, and computing energy burden statistics. Appendix A also includes detailed tabulations on residential energy use, expenditures, and burden at the national and regional level by main heating fuel for all, low income, non-low income, and LIHEAP recipient households.
- Appendix B furnishes averages of state-level estimates of the numbers of households that are income eligible for LIHEAP at both the federal and state income standards. These averages are presented by vulnerability and income group.

¹² For FY 2014, the *LIHEAP Grantee Survey* was incorporated into the *LIHEAP Performance Data Form* (OMB Control No. 0970-0449).

II. Home Energy Data

Section II presents home energy consumption and expenditure data. The primary data source for this section is the 2009 RECS, which has energy consumption and expenditures data for calendar year 2009. For this *Notebook*, the 2009 space heating and cooling consumption and expenditures have been adjusted to reflect FY 2014 weather and fuel prices, as described in Appendix A.

National data on total residential energy, home heating, and home cooling are presented below. Regional variations in the national data are included in Appendix A. Home energy trend data are presented in section III.

Residential energy data

Tables 2-1a to 2-1d, on the next page, presents data on average annual residential energy consumption, expenditures, and burden by fuel type for all, non-low income, low income, and LIHEAP recipient households.¹³ In FY 2014, average residential energy consumption for all households was 92.4 million British thermal units (MMBtus) and average expenditures were \$2,199. The mean individual residential energy burden for all households was 8.6 percent of income.

Low income households had average residential energy consumption of 80.7 MMBtus (about 13 percent less than all households) and average energy expenditures of \$1,894 (about 14 percent less than all households). Their mean individual residential energy burden was 18.4 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 \$2,137, about 13 percent higher than that for all low income households. The mean individual residential energy burden was 18.8 percent, 0.4 percentage points higher than that for 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 2-2 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 2014, home heating was 32 percent of the residential energy bill for low income households, and home cooling made up 8 percent.

¹³Comparisons 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 2-1a. Residential energy: Average annual household consumption, expenditures, and burden by all households, by main heating fuel type, United States, FY 2014^{1/} (See also Tables A-3a – A-3c, Appendix A)

Main heating fuel	Fuel consumption (MMBtus) ^{2/}	Fuel expenditures	Mean individual burden ^{3/}	Median individual burden ^{4/}	Mean group burden ^{5/}
All fuels	92.4	\$2,199	8.6%	3.9%	3.0%
Natural gas	113.2	\$2,095	7.5%	3.4%	2.9%
Electricity	60.8	\$1,917	9.0%	3.9%	2.6%
Fuel oil	123.3	\$3,968	12.4%	6.3%	5.5%
Kerosene	67.8	\$2,342	15.8%	10.1%	3.2%
LPG^{6/}	114.7	\$3,623	11.9%	7.0%	5.0%

Table 2-1b. Residential energy: Average annual household consumption, expenditures, and burden by non-low income households, by main heating fuel type, United States, FY 2014^{1/} (See also Tables A-3a – A-3c, Appendix A)

Main heating fuel	Fuel consumption (MMBtus) ^{2/}	Fuel expenditures	Mean individual burden ^{3/}	Median individual burden ^{4/}	Mean group burden ^{5/}
All fuels	98.7	\$2,363	3.3%	2.8%	2.4%
Natural gas	117.4	\$2,210	2.9%	2.6%	2.3%
Electricity	66.2	\$2,099	3.2%	2.8%	2.2%
Fuel oil	131.4	\$4,282	5.1%	4.5%	4.4%
Kerosene	73.7	\$2,649	5.1%	4.4%	2.7%
LPG^{6/}	121.9	\$3,838	5.8%	5.4%	3.9%

Table 2-1c. Residential energy: Average annual household consumption, expenditures, and burden by low income households, by main heating fuel type, United States, FY 2014^{1/} (See also Tables A-3a – A-3c, Appendix A)

Main heating fuel	Fuel consumption (MMBtus) ^{2/}	Fuel expenditures	Mean individual burden ^{3/}	Median individual burden ^{4/}	Mean group burden ^{5/}
All fuels	80.7	\$1,894	18.4%	8.9%	10.0%
Natural gas	104.2	\$1,847	17.3%	8.5%	9.8%
Electricity	52.2	\$1,623	18.4%	8.3%	8.6%
Fuel oil	108.5	\$3,390	25.8%	15.4%	18.0%
Kerosene	65.4	\$2,219	20.2%	12.9%	11.8%
LPG^{6/}	99.8	\$3,178	24.4%	15.1%	16.9%

Table 2-1d. Residential energy: Average annual household consumption, expenditures, and burden by LIHEAP recipient households, by main heating fuel type, United States, FY 2014^{1/} (See also Tables A-3a – A-3c, Appendix A)

Main heating fuel	Fuel consumption (MMBtus) ^{2/}	Fuel expenditures	Mean individual burden ^{3/}	Median individual burden ^{4/}	Mean group burden ^{5/}
All fuels	94.8	\$2,137	18.8%	9.5%	13.1%
Natural gas	115.3	\$1,974	17.7%	8.4%	12.1%
Electricity	56.3	\$1,660	17.5%	8.7%	10.2%
Fuel oil	116.8	\$3,647	23.4%	15.0%	22.4%
Kerosene	85.7*	\$3,016*	19.0%	14.5%	18.5%
LPG^{6/}	102.4	\$3,312	28.9%	19.7%	20.3%

^{1/} Data are derived from the 2009 RECS, adjusted to reflect FY 2014 heating degree days, cooling degree days, and fuel prices. Data represent residential energy used from October 2013 through September 2014.

^{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 2014 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 2014 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 2014; and (3) dividing the adjusted figures by the average income for each group of households from the 2014 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 37 percent of their annual residential expenditures for space heating, 5 percentage points more than did the average low income household. LIHEAP recipient households spent 5 percent for space cooling, 3 percentage points less than did the average low income household.

Table 2-2. 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 2014^{1/}

End Use	All households	Non-low income households	Low income households	LIHEAP recipient households
Space heating	30%	29%	32%	37%
Space cooling	10%	11%	8%	5%
Water heating	13%	12%	14%	14%
Refrigeration	8%	7%	8%	7%
Appliances	40%	41%	38%	37%
All uses	100%	100%	100%	100%

^{1/} Data are derived from the 2009 RECS. Percentages may not add to 100 percent due to rounding.

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 2-3 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 2-3. 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/} (See also Table A-4, Appendix A)

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.

^{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 2009.¹⁴ 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 2-4a to 2-4d. In FY 2014, average home heating consumption for all households was 40.0 MMBtus, average expenditures were \$652, and mean individual home heating burden was 3.2 percent.

Low income households had average home heating consumption of 35.9 MMBtus (about 10 percent less than the average for all households) and average home heating expenditures of \$601 (about 8 percent less than the average for all households). The mean individual home heating burden for low income households was 7.3 percent, over twice as much as the average home heating burden for all

¹⁴Findings from the 2009 RECS, Energy Information Administration, U.S. Department of Energy.

households and more than seven times the average home heating burden for non-low income households.

Average home heating consumption for LIHEAP recipient households was 47.3 MMBtus (about 18 percent higher than the average for all households), and average home heating expenditures were \$797 (about 22 percent higher than the average for all households). Mean individual home heating burden for LIHEAP households was 8.5 percent, 1.2 percentage points higher than the average for low income households and over twice the average for all households. Average home heating consumption for LIHEAP recipient households was about 32 percent greater than that for all low income households, because LIHEAP heating assistance recipient households tend to live in colder climate regions.

Table 2-4a. Home heating: Average annual household consumption, expenditures, and burden by all households, by fuel type, United States, FY 2014^{1/} (See also Tables A-5, A-6a, A-6b, and A-6c, Appendix A)

Main heating fuel	Fuel consumption (MMBtus) ^{2/}	Fuel expenditures	Mean individual burden ^{3/}	Median individual burden ^{4/}	Mean group burden ^{5/}
All fuels	40.0	\$652	3.2%	1.0%	0.9%
Natural gas	57.0	\$612	2.9%	1.0%	0.8%
Electricity	11.8	\$378	2.5%	0.8%	0.5%
Fuel oil	78.0	\$2,105	8.0%	3.3%	2.9%
Kerosene	36.9	\$1,101	9.1%	4.1%	1.5%
LPG^{6/}	58.0	\$1,709	6.7%	3.2%	2.4%

Table 2-4b. Home heating: Average annual household consumption, expenditures, and burden by non-low income households, by fuel type, United States, FY 2014^{1/} (See also Tables A-5, A-6a, A-6b, and A-6c, Appendix A)

Main heating fuel	Fuel consumption (MMBtus) ^{2/}	Fuel expenditures	Mean individual burden ^{3/}	Median individual burden ^{4/}	Mean group burden ^{5/}
All fuels	42.2	\$680	1.0%	0.7%	0.7%
Natural gas	57.6	\$614	0.9%	0.7%	0.6%
Electricity	12.4	\$393	0.6%	0.5%	0.4%
Fuel oil	82.6	\$2,231	2.8%	2.2%	2.3%
Kerosene	37.2	\$1,086	2.0%	1.6%	1.1%
LPG^{6/}	60.9	\$1,794	2.8%	2.3%	1.8%

Table 2-4c. Home heating: Average annual household consumption, expenditures, and burden by low income households, by fuel type, United States, FY 2014^{1/} (See also Tables A-5, A-6a, A-6b, and A-6c, Appendix A)

Main heating fuel	Fuel consumption (MMBtus) ^{2/}	Fuel expenditures	Mean individual burden ^{3/}	Median individual burden ^{4/}	Mean group burden ^{5/}
All fuels	35.9	\$601	7.3%	2.4%	3.2%
Natural gas	55.7	\$608	7.4%	2.7%	3.2%
Electricity	10.9	\$353	5.6%	1.8%	1.9%
Fuel oil	69.5	\$1,874	17.5%	9.1%	9.9%
Kerosene	36.7	\$1,108	11.9%	7.0%	5.9%
LPG^{6/}	52.1	\$1,535	14.6%	7.1%	8.1%

Table 2-4d. Home heating: Average annual household consumption, expenditures, and burden by LIHEAP recipient households, by fuel type, United States, FY 2014^{1/} (See also Tables A-5, A-6a, A-6b, and A-6c, Appendix A)

Main heating fuel	Fuel consumption (MMBtus) ^{2/}	Fuel expenditures	Mean individual burden ^{3/}	Median individual burden ^{4/}	Mean group burden ^{5/}
All fuels	47.3	\$797	8.5%	3.3%	4.9%
Natural gas	64.5	\$709	8.7%	2.9%	4.4%
Electricity	12.4	\$398	5.8%	2.5%	2.4%
Fuel oil	74.0	\$2,015	14.6%	8.7%	12.4%
Kerosene	46.4*	\$1,387*	9.2%	6.1%	8.5%
LPG^{6/}	54.7	\$1,641	14.8%	10.5%	10.1%

^{1/} Data are derived from the 2009 RECS, adjusted to reflect FY 2014 heating degree days and fuel prices. Data represent home energy used from October 2013 through September 2014.

^{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 2014 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 2014 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 2014; and (3) dividing the adjusted figures by the average income for each group of households from the 2014 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.

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 2-5, 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 2-5. Home cooling: Percent of households with home cooling by all, non-low income, low income, and LIHEAP recipient households, United States, 2009^{1/} (See also Table A-7, Appendix A)

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.

^{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 2-6. In FY 2014, average home cooling consumption for all households that cooled was 6.1 MMBtus, average expenditures were \$231, and mean individual home cooling burden was 1.0 percent.

For low income households that cooled, average home cooling energy consumption was 4.4 MMBtus (about 28 percent less than the average for all households) and average home cooling expenditures were \$164 (about 29 percent less than the average for all households). The mean individual home cooling burden for low income households was 2.1 percent, more than twice the average home cooling burden of all households and five times that of non-low income households.

For households that cooled, average home cooling consumption for LIHEAP recipient households was 3.3 MMBtus (about 46 percent less than all households and 25 percent less than low income households), and average home cooling expenditures were \$123 (about 47 percent less than all households). Mean individual home cooling burden for LIHEAP recipient households was 1.3 percent, 30 percent higher than the average for all households.

Table 2-6. 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 2014^{1/} (See also Table A-7, Appendix A)

Household group	Fuel consumption (MMBtus) ^{2/}	Fuel expenditures	Mean individual burden ^{3/}	Median individual burden ^{4/}	Mean group burden ^{5/}
All households	6.1	\$231	1.0%	0.3%	0.3%
Non-low income households	7.0	\$264	0.4%	0.2%	0.3%
Low income households	4.4	\$164	2.1%	0.5%	0.9%
LIHEAP recipient households	3.3	\$123	1.3%	0.3%	0.8%

^{1/} Data are derived from the 2009 RECS, adjusted to reflect FY 2014 cooling degree days and fuel prices. Data represent residential energy used from October 2013 through September 2014.

^{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 2014 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 2014 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 2014; and (3) dividing the adjusted figures by the average income for each group of households from the 2014 CPS ASEC.

III. Low Income Home Energy Trends

Important shifts in energy prices and consumption have occurred since the 1973 oil embargo. As a result, the energy expenditures and energy burdens of low income households have changed significantly.

In the *LIHEAP Report to Congress for FY 1989*, Appendix K presented the results of a national study of residential energy consumption, expenditures, and burden for low income households from 1973 to 1989. Selected tables from that study were updated and published as a regular appendix in annual LIHEAP reports to Congress for FY 1991 through FY 1996. Beginning with the FY 1997-FY 1999 report, the tables are only published in the annual *LIHEAP Home Energy Notebook*. The tables present data for low income households and, for comparison purposes, include statistics on all households. Beginning with 1979, the year before HHS's first energy assistance program was enacted, trend data are furnished on the following:

- Home energy consumption, expenditures, and burden.
- Factors affecting consumption, expenditures, and burden.
- The impact of LIHEAP assistance on net home energy expenditures.

A number of special terms are used throughout this section. Table 3-1 on the next page defines these special terms. One such term is "low income," which is defined as having income at or below 150 percent of HHS Poverty Guidelines. Because of limitations on the availability of data, this definition is more restrictive than that used in other parts of the *Notebook*. In those sections, "low income" refers to LIHEAP income eligible households, which are households that would be income-eligible for LIHEAP if their states set the income-eligibility guidelines at the federal maximum (the greater of 150 percent of HHS Poverty Guidelines or 60 percent of the state median income). Based on estimates from the 2014 CPS ASEC, the definition based solely on 150 percent of HHS Poverty Guidelines excludes about 10.3 million households of the 38.5 million households that meet the definition of LIHEAP income eligible households. Therefore, differences in FY 2014 home energy data reported in this section and that reported in other parts of this *Notebook* are the result of the difference in the definition of "low income."¹⁵ Unless indicated otherwise, the energy data in this section are based on ten national residential energy surveys of occupied residential housing units and their fuel suppliers. Table 3-2 identifies the surveys used, the date on which household interviews began, the time period in which residential energy bills were collected from fuel suppliers, the time frame for household income, and the number of households included in the survey.

For each survey, a national sample of residential housing units was selected, and interviewers attempted personal contacts with the householder. For those housing units where an authorization form was completed, the household's fuel supplier was contacted and asked to supply fuel costs and consumption data.

The collection of income data is not a primary focus of the residential energy surveys. Income statistics from the CPS ASEC are used to improve income data.

¹⁵As noted in Table 3-2, the data files used in this study include surveys from 1979 and 1981. The variable that designates LIHEAP income eligibility was not coded for those data files.

Table 3-1. Definition of special terms

Term	Definition
Billing data	Energy cost and consumption data furnished by the household's fuel supplier.
Composite price	The weighted average price of electricity, natural gas, and fuel oil used for residential purposes.
Real dollar expenditures	Costs adjusted for changes in the price of a market basket of consumer goods between two years (i.e., adjusted for inflation or deflation).
Cooling degree days	Daily cooling degree days are computed by subtracting a base temperature (65 degrees Fahrenheit) from a day's mean temperature when it exceeds 65 degrees Fahrenheit. If the mean temperature on a day is 70, the number of cooling degree days experienced on that day is 5 (70 minus 65). In this <i>Notebook</i> , we refer to annual cooling degree days, or the sum of all cooling degree days experienced during a year.
(Nominal) Dollar expenditures	Actual costs as reported in the year of the energy survey (unadjusted for inflation or deflation). Unless noted otherwise all dollar expenditures are unadjusted.
Energy burden	The share or percentage of annual household income that is used to pay annual energy bills. ^{1/}
Energy end uses	The specific use of energy in the home for home heating, home cooling or ventilation, water heating, and appliances.
Fuel assistance	LIHEAP heating, cooling, and crisis assistance.
Heating degree days	Daily heating degree days are computed by subtracting the mean temperature for a day, when that temperature falls below 65 degrees Fahrenheit, from a base temperature (65 degrees Fahrenheit). For example, if the mean temperature on a day is 60 and the base temperature is 65, the number of heating degree days experienced on that day is 5 (65 minus 60). In this <i>Notebook</i> , we refer to annual heating degree days, or the sum of all heating degree days experienced during a year.
Home energy expenditures	Expenditures for home space heating and home space cooling.
LIHEAP burden offset	The reduction in mean group home heating burden as a result of LIHEAP benefits
LIHEAP coverage rate	The percentage of the aggregate home energy bills for low income households that is covered by LIHEAP fuel assistance.
LIHEAP income eligible households	Households with incomes at or below the federal maximum LIHEAP income standard – at or below the greater of 150 percent of HHS Poverty Guidelines or 60 percent of the state median income.
LIHEAP participation rate	The percentage of LIHEAP income eligible households that receive fuel assistance.
LIHEAP recipient households	Households that indicated receiving home heating, cooling, or energy crisis benefits during the 12 months prior to a particular household survey.
Low income households	Households with incomes at or below 150 percent of HHS Poverty Guidelines.
Mean	The mean is the sum of all values divided by the number of values, or what is commonly called the average
Median	The median is the value at the midpoint in the distribution of values
MMBtus	A British thermal unit (Btu) is the amount of energy necessary to raise the temperature of one pound of water one degree Fahrenheit. MMBtus refers to millions of Btus. An average household uses about 100 MMBtus per year.
Residential energy expenditures	Fuel expenditures for all residential uses, including home heating, home cooling or ventilation, water heating, refrigeration, clothes drying, etc.

^{1/} Three different energy burden statistics are used in this section: mean group burden, mean individual burden, and median individual burden. The definitions of these statistics are presented preceding Figure 3-5.

Table 3-2 presents information on the series of surveys that were used to prepare this *Notebook*. The reader should note that the in-home interview dates lag behind the analysis year for the years 1979 through 1985. In those years, the energy supplier survey included data from the year following the in-home interview. In all cases, the analysis year coincides with the end of the energy consumption history.

Table 3-2. Data used for the study of low income home energy trends

Analysis Year ^{1/}	1979	1981	1983	1985	1987	1990	1993	1997	2001	2005	2009	FY 2014
Survey ^{2/}	NIECS	RECS	RECS	RECS	RECS	RECS	RECS	RECS	RECS	RECS	RECS	RECS
Interview date ^{3/}	9/78	9/80	9/82	9/84	9/87	9/90	10/93	5/97	5/01	8/05	2/10	^{4/}
Billing data ^{5/}	4/78 to 3/79	4/80 to 3/81	4/82 to 3/83	4/84 to 3/85	1/87 to 12/87	1/90 to 12/90	1/93 to 12/93	1/97 to 12/97	1/01 to 12/01	1/05 to 12/05	1/09 to 12/09	1/09 to 12/09
Income data ^{6/}	1979	1981	1983	1985	1987	1990	1993	1997	2001	2005	2009	2014
Sample size	4,081	6,051	4,724	5,682	6,229	5,095	7,111	5,900	5,318	4,382	12,083	12,083

- ^{1/} Represents the year that includes the last month for which billing data were collected from fuel suppliers.
- ^{2/} Surveys include the National Interim Energy Consumption Survey (NIECS) and the RECS.
- ^{3/} Month and year in which household interviews began.
- ^{4/} Data projected from the 2009 RECS using changes in weather and prices. See Appendix A for the procedure used to calculate the projections.
- ^{5/} Time period in which residential energy bills were collected from fuel suppliers.
- ^{6/} Mean income computed using calendar year data from the CPS ASEC.

Trends in energy use, consumption, expenditures, and burden

Since 1979, there have been important changes in the fuels used by households, the amount of energy consumed for specific residential end uses (i.e., home heating, water heating, home cooling, and for other appliances), total residential energy expenditures, and the burden that residential energy expenditures represent for low income households. This section presents data that illustrate these changes.

Figures 3-1 and 3-2, on the next page, furnish information on the fuel choices by low income households. Figure 3-1 shows that low income households have increased their use of electricity as a main heating fuel, from 10.4 percent in 1979 to 38.9 percent in 2009, while they have reduced their use of fuel oil or kerosene as a main heating fuel, from 20.0 percent in 1979 to 6.0 percent in 2009.¹⁶ In addition, the use of wood or coal as a main heating fuel (included under “Other”) peaked in 1985, declined substantially through 2001, almost doubled by 2005, and fell to 3.1 percent in 2009.

Figure 3-2 shows that low income households increased their use of central air-conditioning systems from 8.5 percent in 1979 to 46.9 percent in 2009.¹⁷ The proportion of low income households with no air-conditioning fell from 62.8 percent in 1979 to 22.7 percent in 2009. Other things being equal, increased use of air-conditioning equipment among low income households can be expected to increase home cooling expenditures.

¹⁶For all households, the share using electricity as their main heating fuel grew from 15.8 percent in 1979 to 33.6 percent in 2009, and the share using fuel oil or kerosene as their main heat fell from 22.1 percent to 6.5 percent.

¹⁷For all households, the share using electric central air-conditioning grew from 23 percent in 1979 to 61 percent in 2009.

Figure 3-1. Main heating fuel for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to 2009

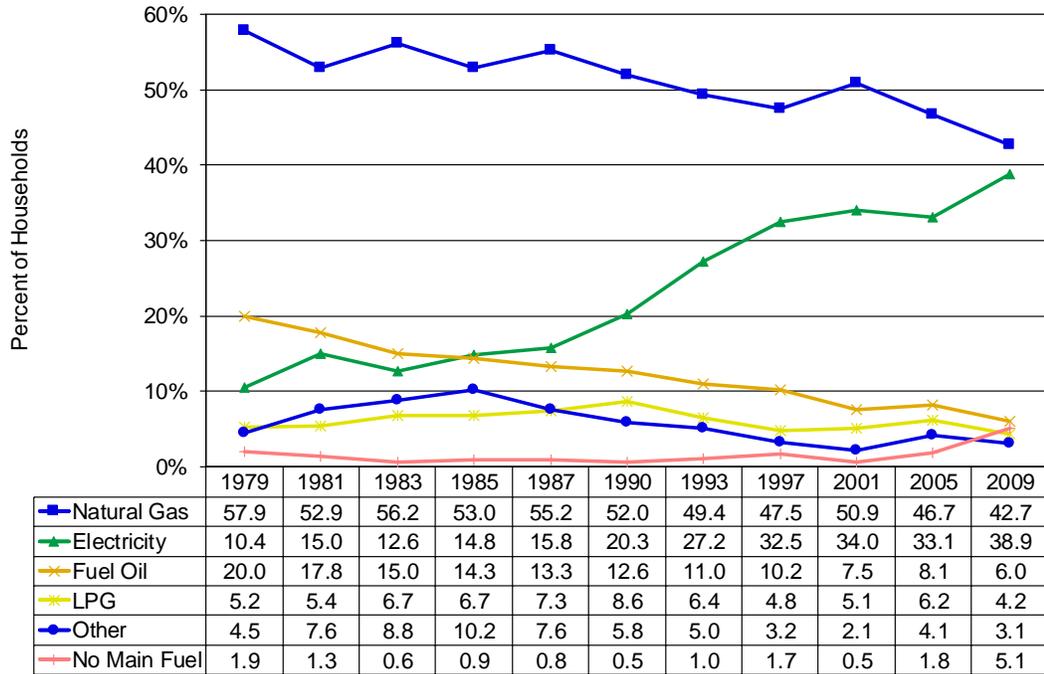
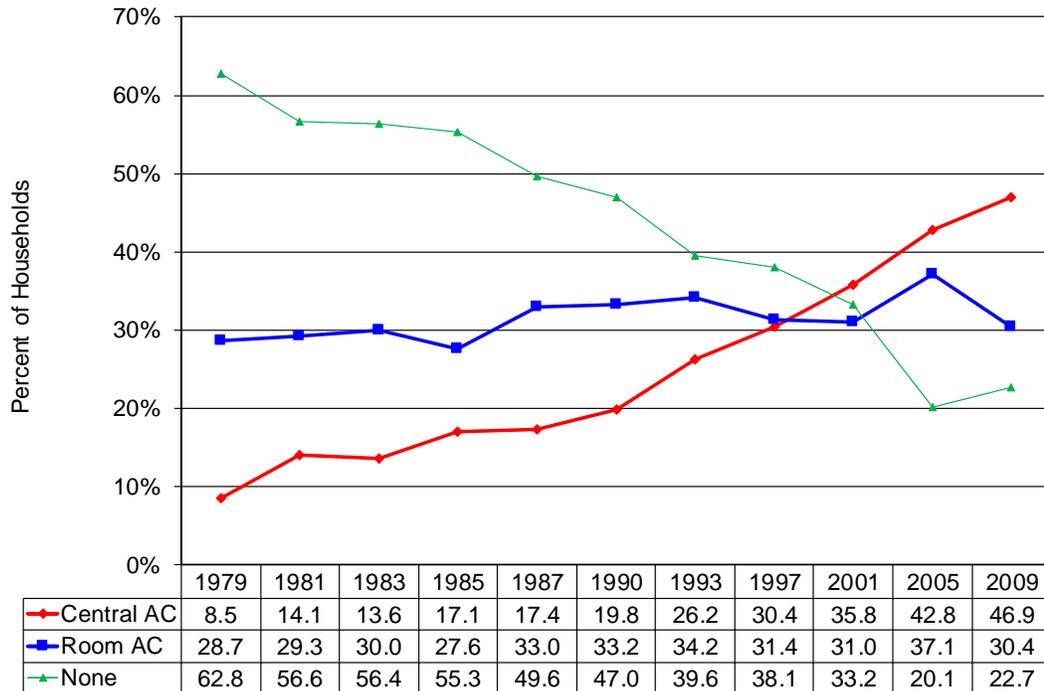


Figure 3-2. Air-conditioning type for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to 2009



Figures 3-3 and 3-4 furnish information on the trends in mean residential energy consumption and expenditures for low income households from 1979 to FY 2014. Figure 3-3 shows that low income households substantially reduced their residential energy consumption between 1979 and 1983. This suggests a significant increase in efficiency resulting from conservation measures or actions. Examination of the components of residential energy consumption indicates that the reduction was the result of reductions in home heating consumption. From 1983 to 1990, mean residential energy consumption fluctuated from year to year, corresponding to expected changes in heating and cooling consumption that resulted from changes in heating and cooling degree days.¹⁸ For 1993 through 1997, there appears to have been a significant increase in the use of energy for purposes other than home heating and home cooling. In 2001, the use of energy for purposes other than heating and cooling dropped but then increased until 2009 and stayed at the same level through FY 2014.

Figure 3-3. Mean residential energy consumption per household in MMBtus by end use for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014

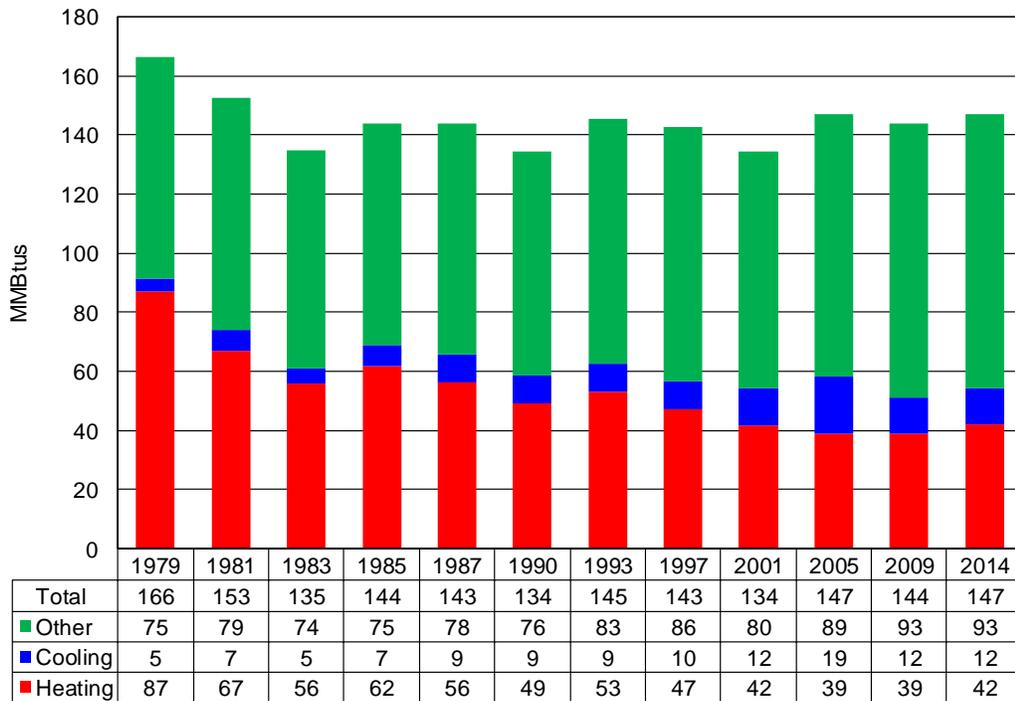
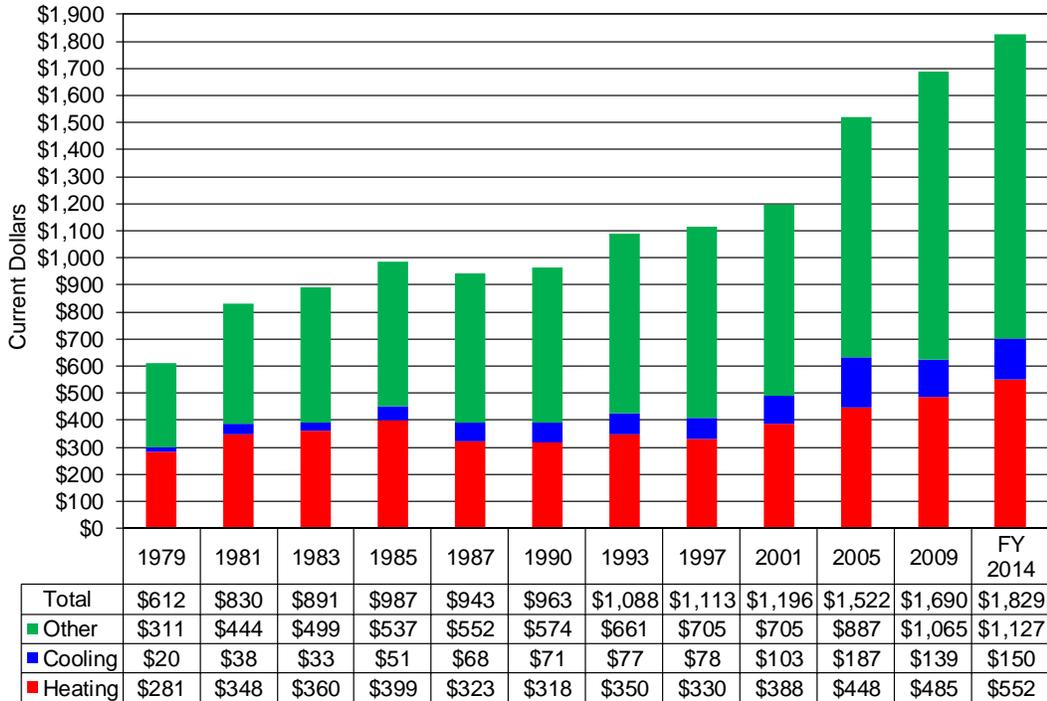


Figure 3-4, on the next page, shows that mean residential energy expenditures for low income households increased rapidly from 1979 to 1985; the increases were the result of fuel price increases. Examination of the components of energy expenditures indicates that the greatest increases were in home cooling and other residential expenditures, while increases in home heating expenditures were more moderate until a spike in 2009. Mean residential energy expenditures increased at a moderate rate from \$943 in 1987 to \$1,196 in 2001. From 2001 to 2005, mean residential energy expenditures increased by 27 percent to \$1,522, and from 2005 to 2009, mean residential energy expenditures increased by 11 percent to \$1,690. In FY 2014, mean residential energy expenditures were \$1,829, about 8 percent greater than in 2009. Mean home heating expenditures fell from \$399 in 1985 to \$318 in 1990, then rose and fell moderately until 1997. Home heating expenditures saw an 18

¹⁸The numbers presented in this table are not directly comparable to the statistics that appear in Appendix A. In this figure, electricity Btus have been adjusted to be comparable to Btus for other fuels. This adjustment procedure is used to account for Btus lost in the generation and transmission of electricity to the housing unit and to thereby furnish a better picture of changes in energy efficiency over time.

percent increase in 2001 over 1997, a 15 percent increase in 2005 over 2001, and about an 8 percent increase in 2009 over 2005. In FY 2014, home heating expenditures saw a 14 percent increase relative to 2009, a result of a colder winter and higher fuel prices. Mean home cooling expenditures rose continuously from \$51 in 1985 to \$187 in 2005. In 2009, mean home cooling expenditures fell to \$139 followed by an increase to \$150 in FY 2014.

Figure 3-4. Mean residential energy expenditures by end use for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014



The next series of Figures, 3-5 through 3-7, furnishes information on energy burden for low income households.¹⁹ Three different energy burden summary statistics are presented in the three figures: mean group energy burden, mean individual energy burden, and median individual energy burden. Each of the statistics offers somewhat different information and gives somewhat different results. All three are valid from a statistical perspective. The statistics are defined as follows.

- *Mean Group Burden:* Computed as the ratio between mean energy expenditures and mean income for a given set of households, such as low income households. Energy expenditures are computed from RECS and income is derived from the CPS ASEC.
- *Mean Individual Burden:* Computed by finding, using the RECS data, the energy burden for each individual household in a given set (such as low income households) and then taking the mean of these energy burdens for all households in that set.
- *Median Individual Burden:* Computed by finding, using the RECS data, the energy burden for each individual household in a given set (such as low income households) and finding the

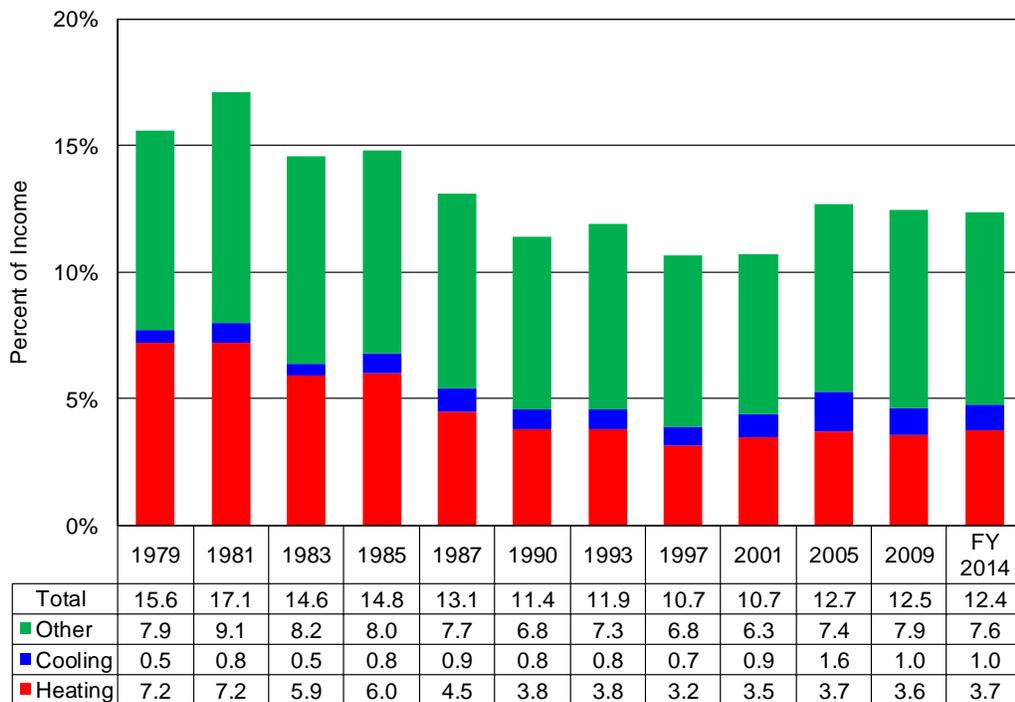
¹⁹These figures present gross burden statistics; they do not present net burden statistics, which account for the reduction in burden attributable to the receipt of LIHEAP benefits. Figure 3-26 compares gross burden and net burden for LIHEAP recipient households.

median, or middle point, of the distribution of these household-level energy burdens in the set.

Mean group burden is the burden statistic that has been used in the series of *LIHEAP Annual Reports to Congress*. Recent technical research has furnished additional insights on the range of alternative burden summary statistics.²⁰

Figure 3-5 shows the time series for mean group energy burdens by end use for low income households. Mean group home energy burden, the sum of the heating and cooling burden components of mean residential energy burden from Figure 3-5, grew from 7.7 percent of income in 1979 to 8.0 percent in 1981, and then fell considerably after 1981 to 3.9 percent in 1997. From 1981 through 1997 mean group home energy burden declined because mean home energy expenditures for low income households fell, while mean incomes for low income households rose. Mean group home energy burden rose to 4.4 percent in 2001, 5.3 percent in 2005, and fell to 4.6 in 2009 followed by 4.7 percent in FY 2014. Mean group home energy burden for FY 2014 was about 7 percent higher than in 2001, about 11 percent lower than in 2005, about 2 percent higher than in 2009, and about 41 percent below the peak level in 1981.

Figure 3-5. Mean group residential energy burden by end use for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014



Figures 3-6 and 3-7 show how the mean individual and median individual energy burden statistics compare to the group energy burden statistics. Figure 3-6 shows the trends in residential energy burden for low income households, and Figure 3-7 shows the trends in home energy burden for low income households. In 2009, the mean individual residential energy burden was 23.6 percent, significantly higher than the median individual burden of 11.7 percent and the mean group burden of 12.5 percent. For FY 2014, median individual residential energy burden was about 25 percent lower than the peak in 1981, mean group residential energy burden was about 27 percent lower than the 1981 peak, and the mean individual residential energy burden of 23.1 percent was about 2 percent

²⁰ See Appendix A for additional information on the interpretation of alternative burden statistics.

lower than the peak in 2009. In 2009, the mean individual home energy burden was 11.7 percent, the median individual home energy burden was 4.4 percent, and the mean group home energy burden was 4.6 percent. For all three summary statistics, the lowest home energy burden occurred in 1997. The highest home energy burden for the individual median and group mean occurred in 1981 while the highest individual mean occurred in 2009.

Figure 3-6. Comparison of mean group, mean individual, and median individual residential energy burden for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014

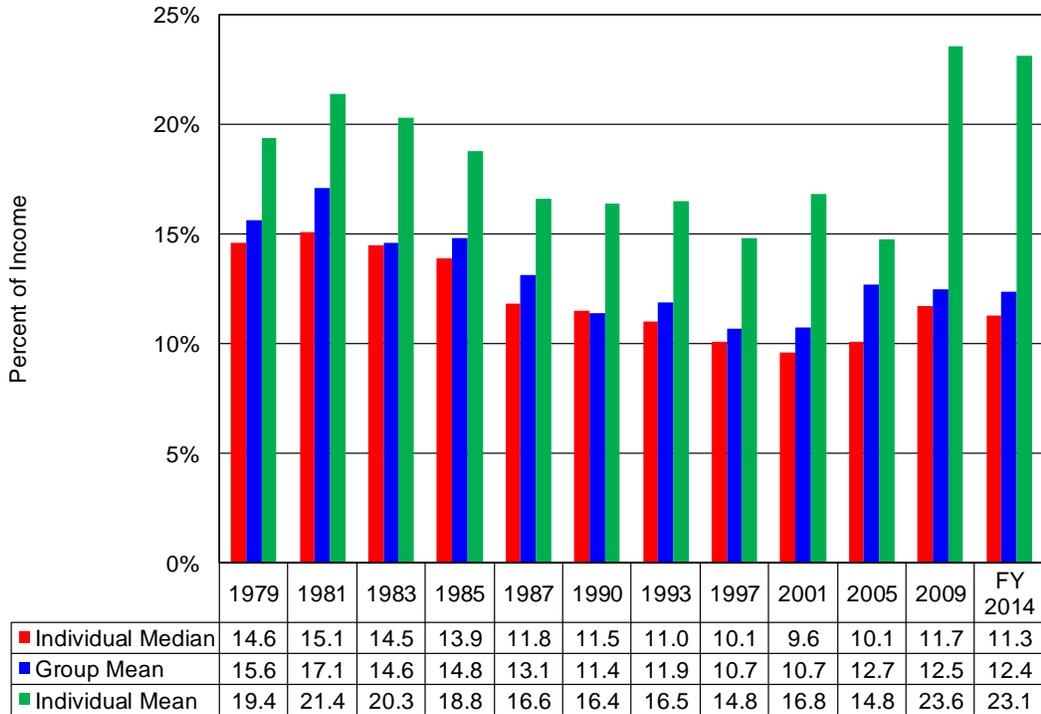
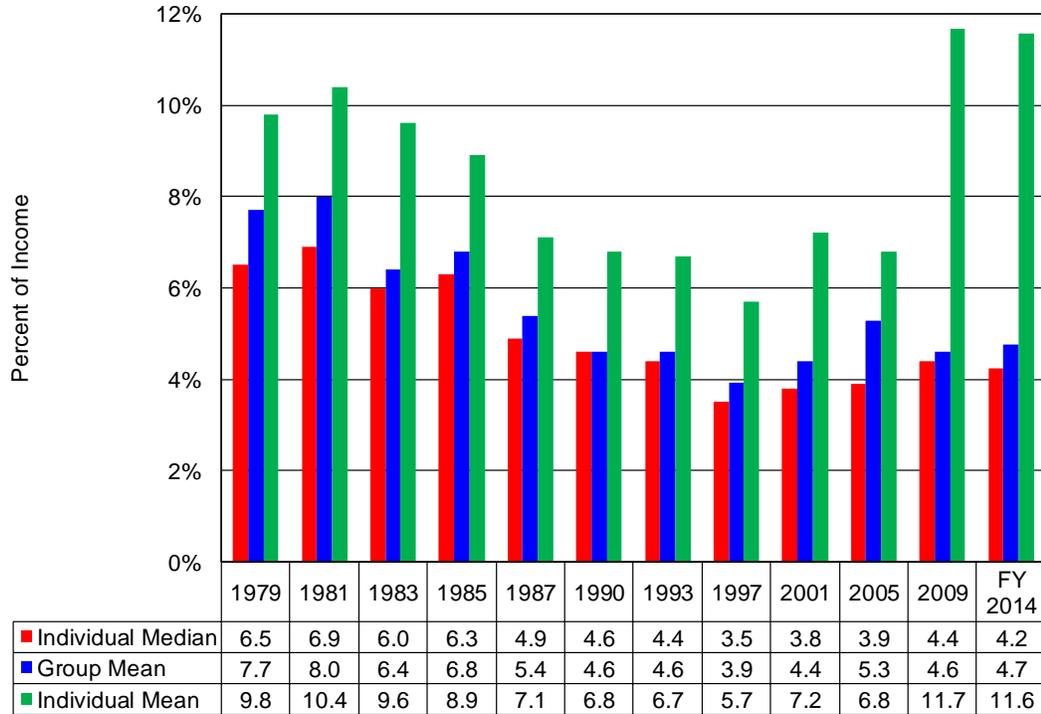


Figure 3-7. Comparison of mean group, mean individual, and median individual home energy burden for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014



Figures 3-8 and 3-9, on the next page, present information on the number and percent of low income households that had home energy burdens that exceeded specified levels. The levels are reference points and do not represent any judgment regarding an “affordable” level of energy burden.

As shown in Figure 3-8, the number of low income households with home energy burdens exceeding 10 percent of income grew from 5.0 million in 1979 to 7.1 million in 1985, an increase of 42 percent. The number of low income households with home energy burdens exceeding 5 percent of income grew by 62 percent from 1979 to 1985. These increases were primarily the result of growth in the total number of low income households. As Figure 3-9 shows, the percentage of low income households with home energy burdens exceeding 5 percent remained quite stable from 1979 through 1985. However, the percentage of low income households with home energy burdens exceeding 10 percent dropped by 17 percent over that same period.

For the period 1985 through 1997, however, both the number and percentage of low income households exceeding specified levels fell significantly from previous levels. For these years, both a reduction in home energy expenditures and increased incomes caused burden to decrease for low income households. In 2001, both the number and percent of households exceeding the specified levels rose. From 2001 to 2009, both the percent of households exceeding the specified levels, and the number of households exceeding the specified levels, increased. In FY 2014, the number of households spending over 10 percent of income on home energy increased slightly from 6.6 million in 2009 to 6.8 million in FY 2014, but the percent of households remained the same. The number of households spending over 5 percent of income on home energy decreased slightly from 12.6 million in 2009 to 12.2 million in FY 2014, and the percent of households decreased slightly from 45 percent in 2009 to 43 percent in FY 2014. The number of low income households with home energy burdens exceeding 10 percent of income in FY 2014 was about 4 percent less than the 1985 level yet about 36 percent more than the 1979 level.

Figure 3-8. Number of low income households (in millions) spending over 5 percent and 10 percent of income on home energy, 1979 to FY 2014

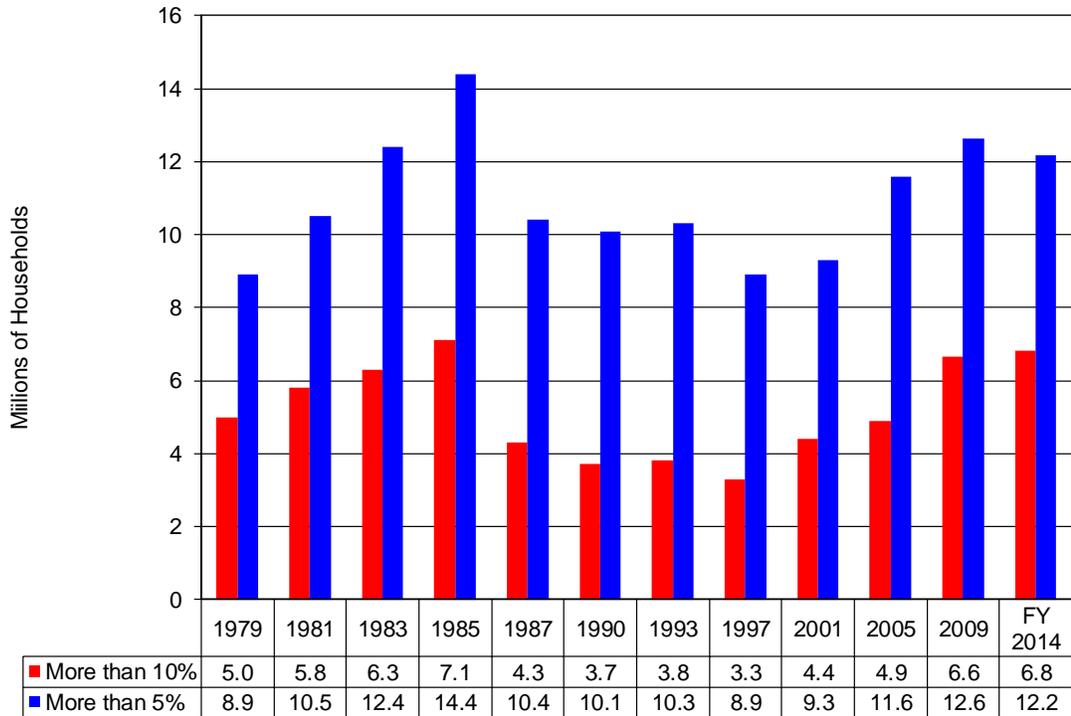


Figure 3-9. Percent of low income households spending over 5 percent and 10 percent of income on home energy, 1979 to FY 2014

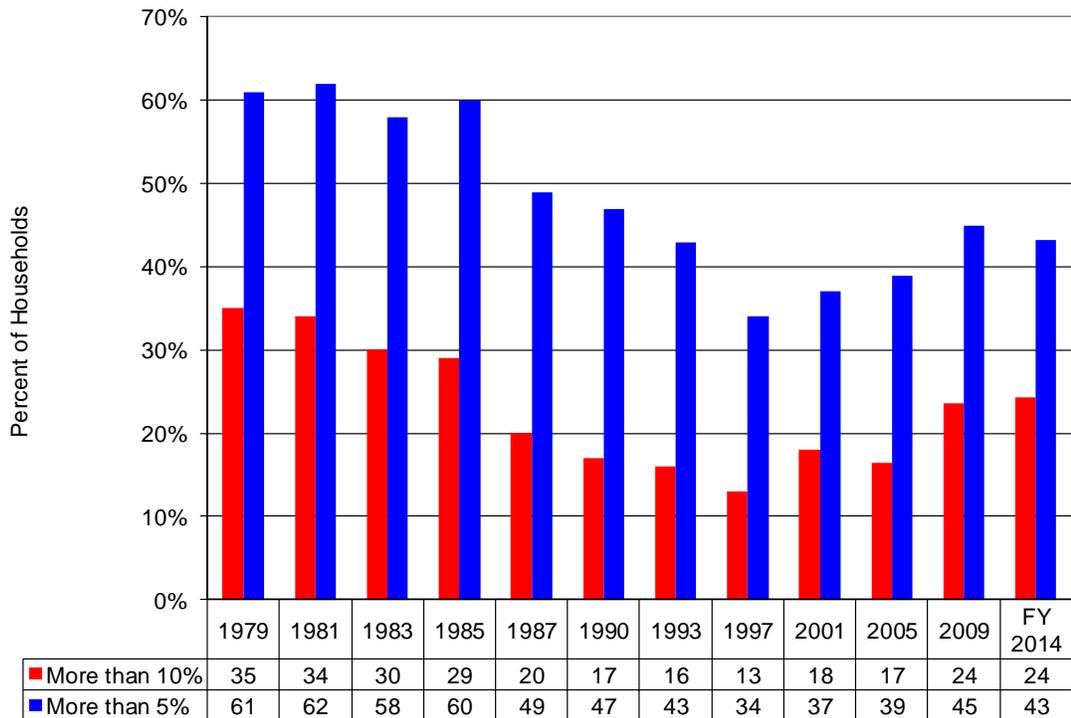


Figure 3-10 shows the total assistance funding that would be required to reduce the home energy burden for all low income households to 10 percent of income and 5 percent of income.²¹ The amount required for a reduction in the home energy burden of low income households to 5 percent of income was \$2.2 billion in 1979, \$4.6 billion by 1985, \$3.3 billion in 2001, \$5.5 billion in 2005, \$5.7 billion in 2009, and \$6.9 billion in FY 2014. The number of households with home energy burdens exceeding 5 percent of income fell between 1985 and 1997. The total dollars of assistance funding required to reduce the home energy burden of low income households to 5 percent also fell through 1997. From 1997 to 2005, increased expenditures caused the number of low income households exceeding the percent of income reference points to rise. Accordingly, the total dollars of assistance funding required to reduce the home energy burden to 5 percent also rose substantially. In FY 2014, the number of low income households exceeding the percent of income reference points was similar to those in 2009, but their average home energy expenditures increased substantially compared to 2009. Therefore, total dollars of assistance funding required to reduce home energy burdens rose as well.

Figure 3-10. Total fuel assistance dollars (in billions) needed to reduce low income household spending on home energy to 5 percent and 10 percent of income, 1979 to FY 2014

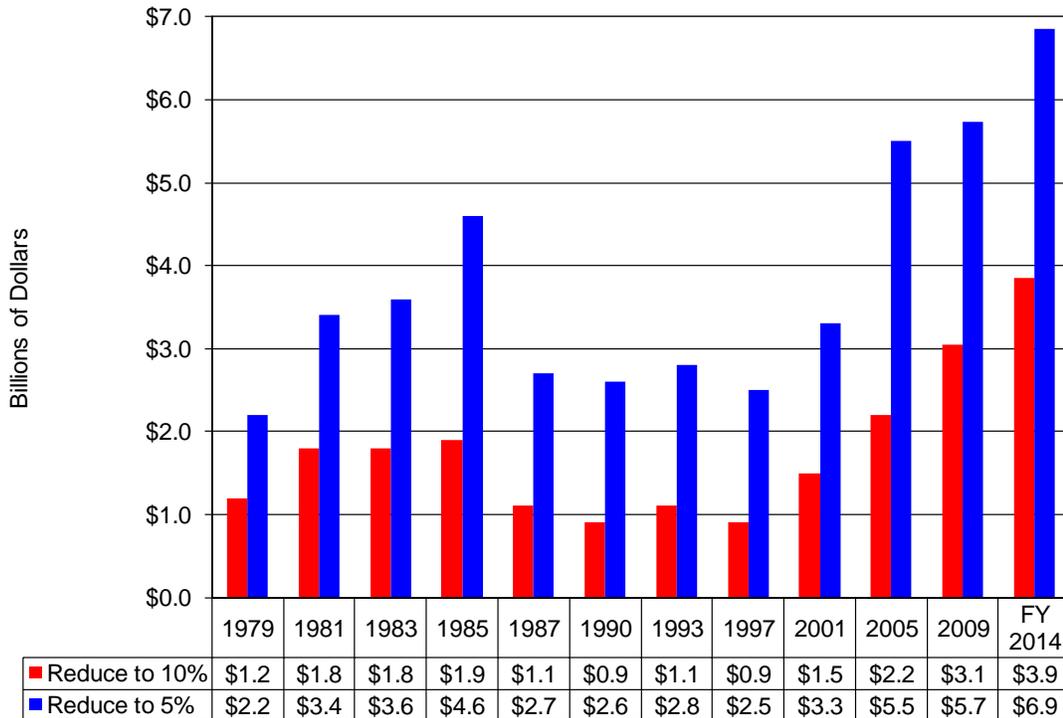


Figure 3-11 on the next page furnishes statistics on the number of low income households that had residential energy expenditures that exceeded specified levels. Figure 3-12 furnishes statistics on total fuel assistance dollars needed to reduce residential energy burden to specified levels. Figure 3-11 shows that the number of households spending over 15 and 25 percent of their income on residential energy followed a pattern similar to that observed in Figure 3-8. The largest number of low income households exceeding 15 percent of income spent on residential energy occurred in 1985, followed by 2009 and FY 2014, respectively. The largest number of low income households

²¹ This is calculated first by finding the amount of funds for each low income household that would be required to reduce its home energy burden to the specified percent of income. This amount is the difference between the household's actual home energy burden and the specified home energy burden (the dollar amount of the specified percent of household income). Then the household amounts are aggregated to produce the total assistance funding that is needed for all low income households.

exceeding 25 percent of income spent on residential energy occurred in FY 2014, followed by 2009. Figure 3-12 demonstrates that the funding assistance required to reduce spending on residential energy by all low income households to the specified percentages reached its highest level in FY 2014, followed by 2009.

Figure 3-11. Number of low income households (in millions) spending over 15 percent and 25 percent of income on residential energy, 1979 to FY 2014

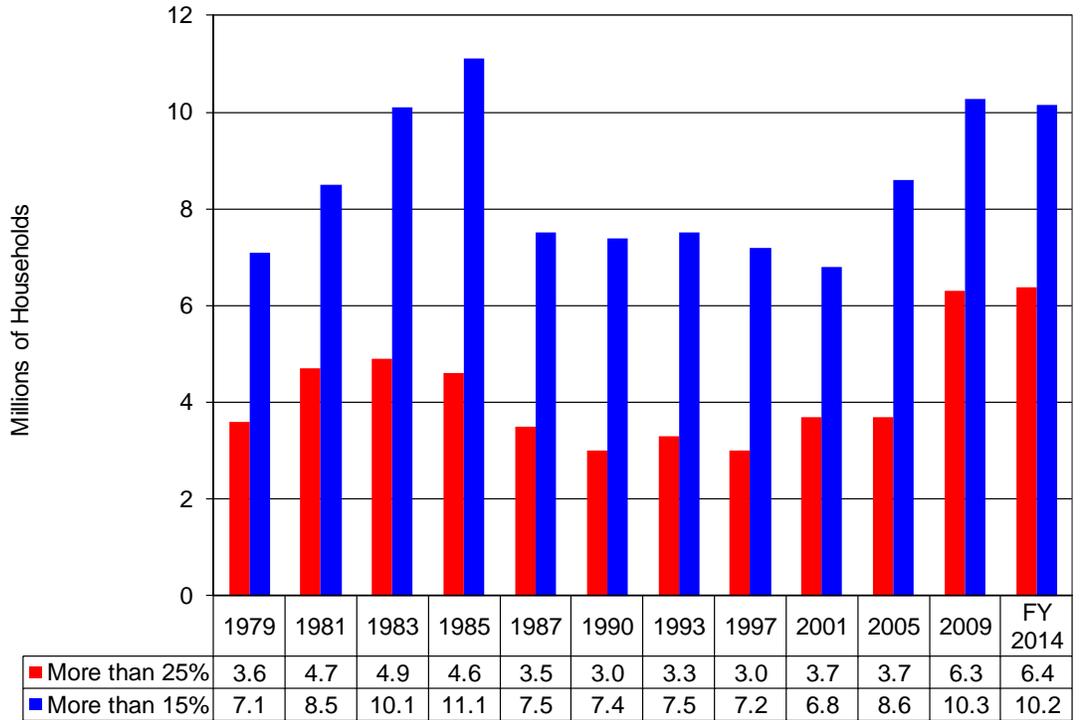


Figure 3-12. Total fuel assistance dollars (in billions) needed to reduce low income household spending on residential energy to 15 percent and 25 percent of income, 1979 to FY 2014

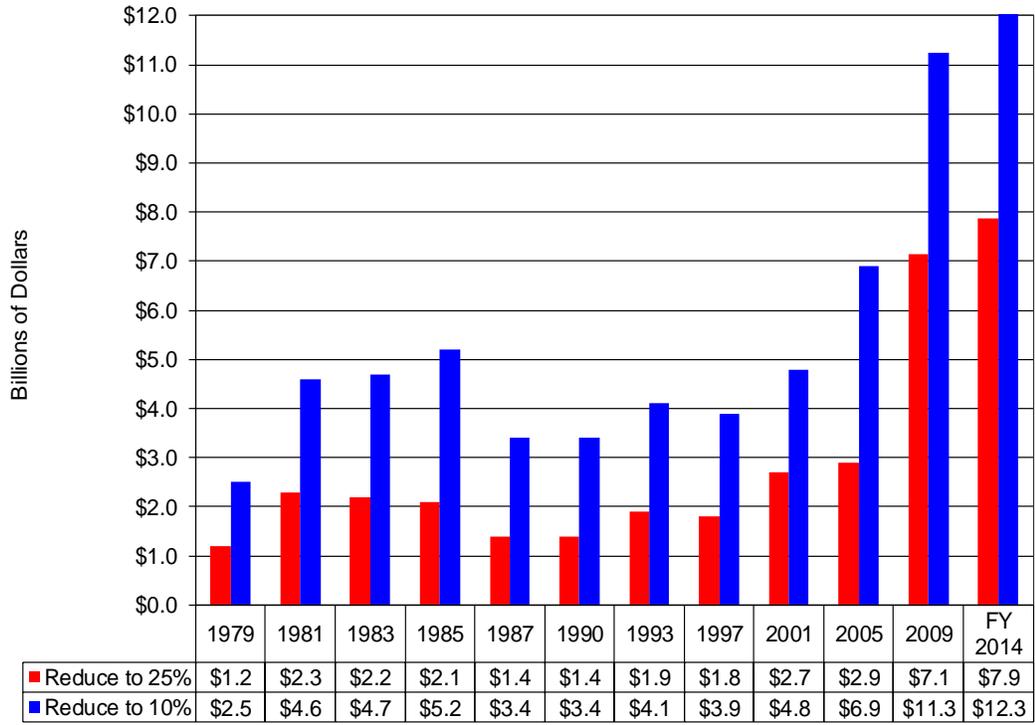


Figure 3-13 shows how the aggregated residential energy bill for all low income households has changed from 1979 to FY 2014. In 1979, the aggregated home energy bill (heating costs plus cooling costs) for low income households was \$4.5 billion. By FY 2014, the aggregated home energy bill had grown to about \$19.8 billion. This growth results from both the increase in average home energy bills and growth in the size of the low income population.

Figure 3-13 also shows that in 1979, home energy costs accounted for about half of the total low income residential energy bill. In FY 2014, home energy costs accounted for about 38.3 percent of the total low income residential energy bill.

Figure 3-13. Aggregated residential energy expenditures (in billions of dollars) by end use for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014

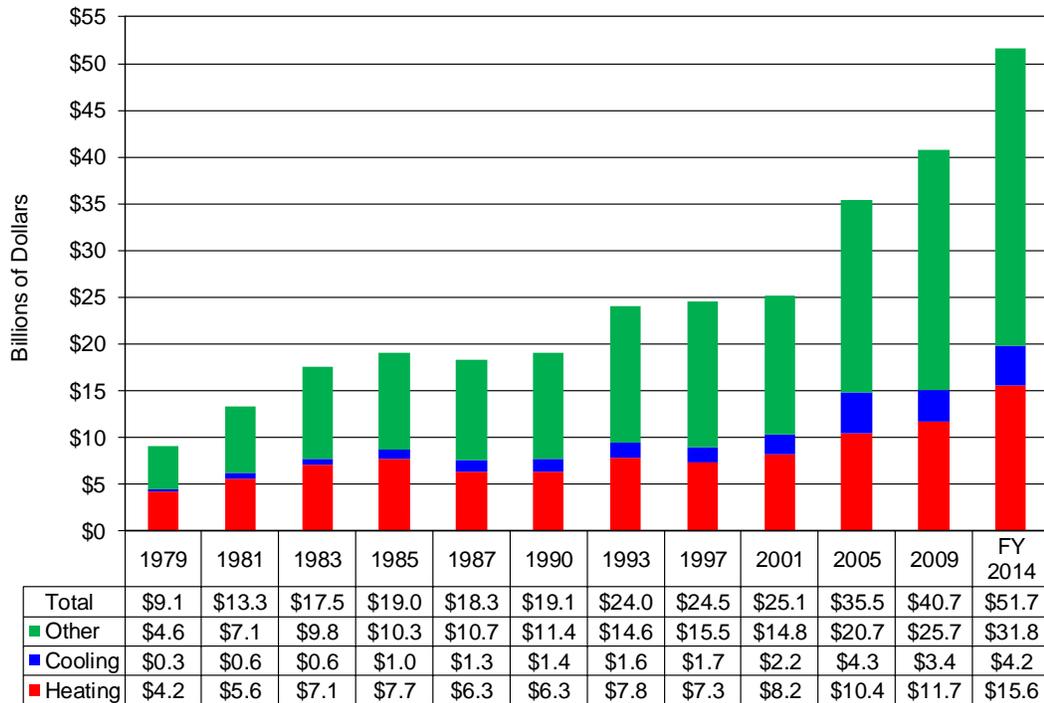
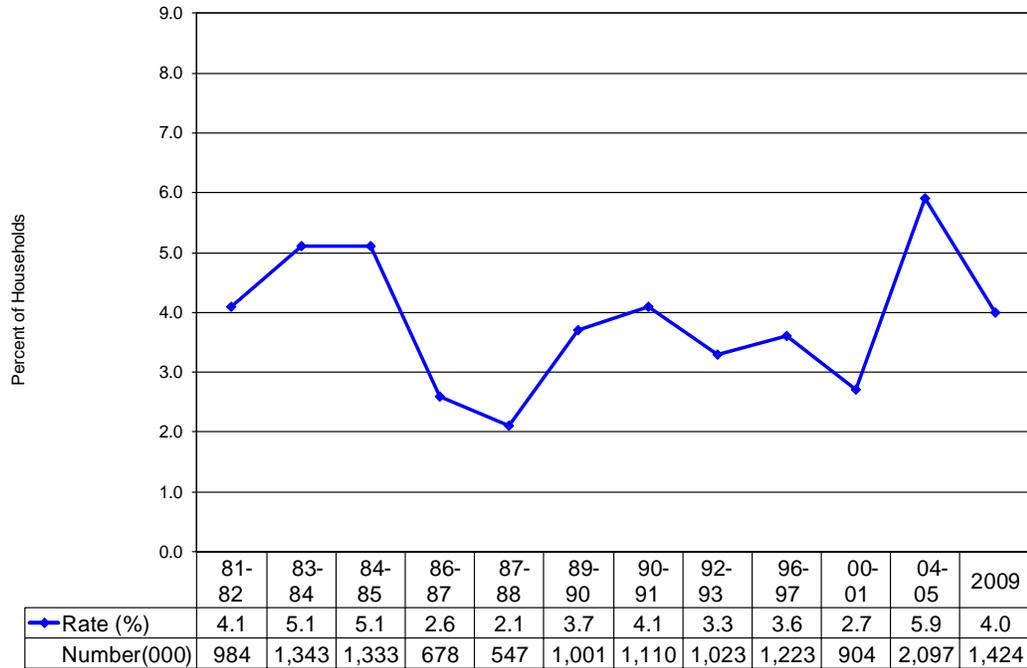


Figure 3-14, on the next page, demonstrates the impact of the inability to afford home energy on LIHEAP income eligible households. It shows the number of LIHEAP income eligible households that reported that they were unable to use their main source of heat for a period of two hours or more during the heating season because they were unable to pay for their main heating fuel. In 1981-82, 984 thousand LIHEAP income eligible households (4.1 percent of LIHEAP income eligible households) had heat interruptions during the heating season. The number and percentage grew to 1.34 million (5.1 percent) in 1983-84 and then fell consistently to 547 thousand (2.1 percent) in 1987-1988. In 1989-90 there was a sharp increase to 1.0 million (3.7 percent). This higher level of heat interruptions was sustained in 1990-91 when 1.1 million (4.1 percent) LIHEAP income eligible households had heat interruptions and in 1992-93 when 1.0 million (3.3 percent) LIHEAP income eligible households had heat interruptions. The number and percentage increased to 1.2 million (3.6 percent) in 1996-97. In 2000-01, the number and percentage of LIHEAP income eligible households with heat interruptions decreased to 904 thousand (2.7 percent). The number and percentage increased substantially to 2.1 million (5.9 percent) in 2004-2005. In 2009, 1.4 million (4.0 percent) LIHEAP income eligible households had heat interruptions due to bill-payment related problems for the household's main heating fuel.²²

²² Data for 2009 exclude those households heating with other fuels that were unable to use their heating equipment because the electric company disconnected service for nonpayment and electricity was needed to run the heating equipment.

Figure 3-14. Percentage of LIHEAP income eligible households with heat interruptions of two hours or more caused by an inability to pay for energy to run the household’s main heating system, 1981-82 heating season to calendar year 2009²³



Analysis of energy price and energy efficiency trends

A number of factors underlie the energy consumption and expenditures trends. Three of the most important factors are fuel prices, weather, and energy efficiency. Figures 3-15, 3-16, and 3-17 furnish information on trends in these factors.

Figure 3-15, on the next page, furnishes an index of average fuel prices compared to an index of inflation that is based upon the Consumer Price Index (CPI). The fuel price index shows the percentage change from 1979 to FY 2014. For example, the CPI-based inflation index grew from 100 in 1979 to 125 in 1981, indicating a 25 percent increase in consumer prices. Figure 3-15 shows that fuel prices outpaced the overall level of inflation from 1979 through 1983. The CPI increased by 37 percent during that period, while the composite average of fuel prices increased by 81 percent. From 1983 through 1997, the increase in the composite average of fuel prices moderated somewhat and generally grew more slowly than the CPI. However, from 1997 to 2005, the pattern was reversed; the composite average fuel price index grew by over 45 percent while the CPI grew by only 22 percent. The rapid growth of prices from 1979 through 1983 explains why residential energy expenditures per low income household rose so rapidly (Figure 3-4) while consumption was declining (Figure 3-3). The moderate growth in fuel prices from 1985 to 1997 (19 percent) explains why residential energy expenditures per low income household rose slightly during that period. In 2009, fuel prices

²³The 2009 RECS collected information on heating interruptions for calendar year 2009, not for the heating season. Data for 2004-2005 heating season and 2009 refer to heat interruptions of any length. Data for the 1981-82 heating season refer to heat interruptions of one day or more. Data for 2009 exclude those households heating with other fuels that were unable to use their heating equipment because the electric company disconnected service for nonpayment and electricity was needed to run the heating equipment. Between 10 and 15 percent of heat interruptions for LIHEAP income eligible households last at least 2 hours but less than 24 hours. The procedures for analyzing heat interruption data have changed since the issuance of the *LIHEAP Report to Congress for FY 1993*. The heat interruption rates for 1983-84 through 1987-88 are slightly higher with this new analysis.

increased by 15 percent over 2005 prices. The increase in fuel prices explains why expenditures also rose. In FY 2014, fuel prices increased by about 5 percent over 2009 prices and once more contributed to an increase in expenditures.

Figure 3-15. Index of dollar prices for fuel oil, natural gas, electricity, and a composite compared to the Consumer Price Index (CPI), 1979 to FY 2014

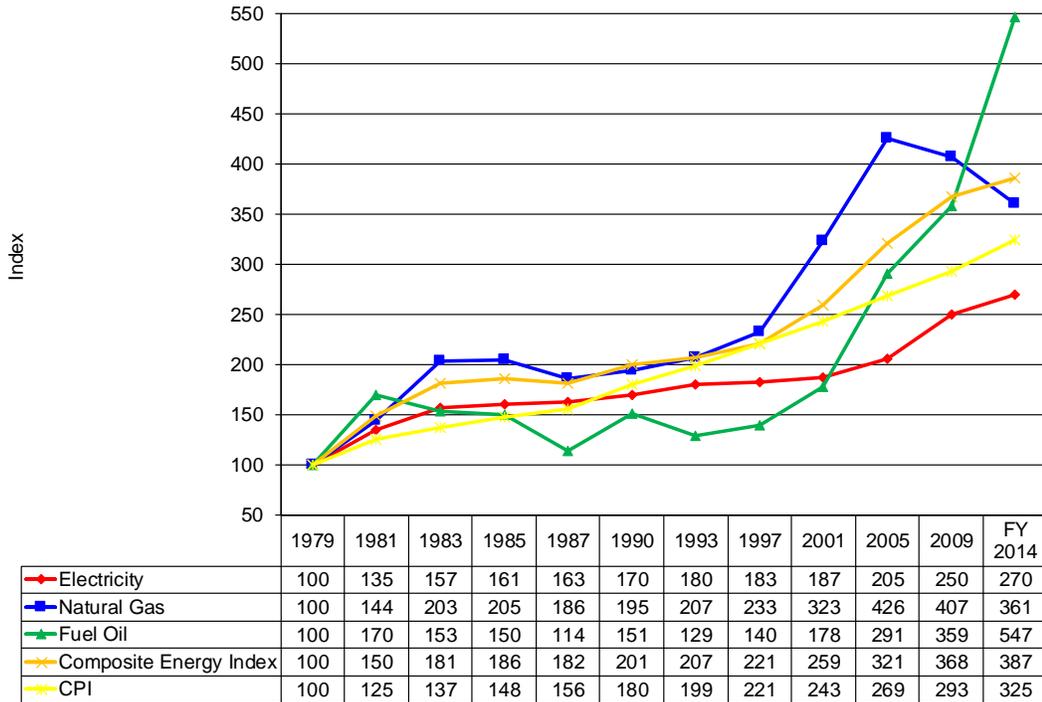


Figure 3-16 demonstrates how changes in heating energy consumption among low income households from 1979 to FY 2014 compared to changes in heating degree days for the same period. From 1979 to 1983, home heating consumption fell more rapidly than did heating degree days, suggesting a significant increase in efficiency as a result of conservation measures or actions. Consumption per heating degree day dropped rapidly for that period. From 1983 to 1997, there was only a moderate reduction in consumption per heating degree day. Thus, heating consumption fluctuations appear to be primarily a result of the changes in the weather for those years. From 1997 to 2005, home heating consumption again fell more rapidly than did heating degree days, suggesting a moderate increase in efficiency as a result of conservation measures or actions. This was perhaps driven by the high fuel prices experienced in 2001 and 2005. From 2005 to 2009, there was a slight reduction in consumption per heating degree day. The consumption per heating degree day was about the same in FY 2014 as in 2009.

Figure 3-16. Index of heating consumption, heating degree days, and heating consumption per heating degree day for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014

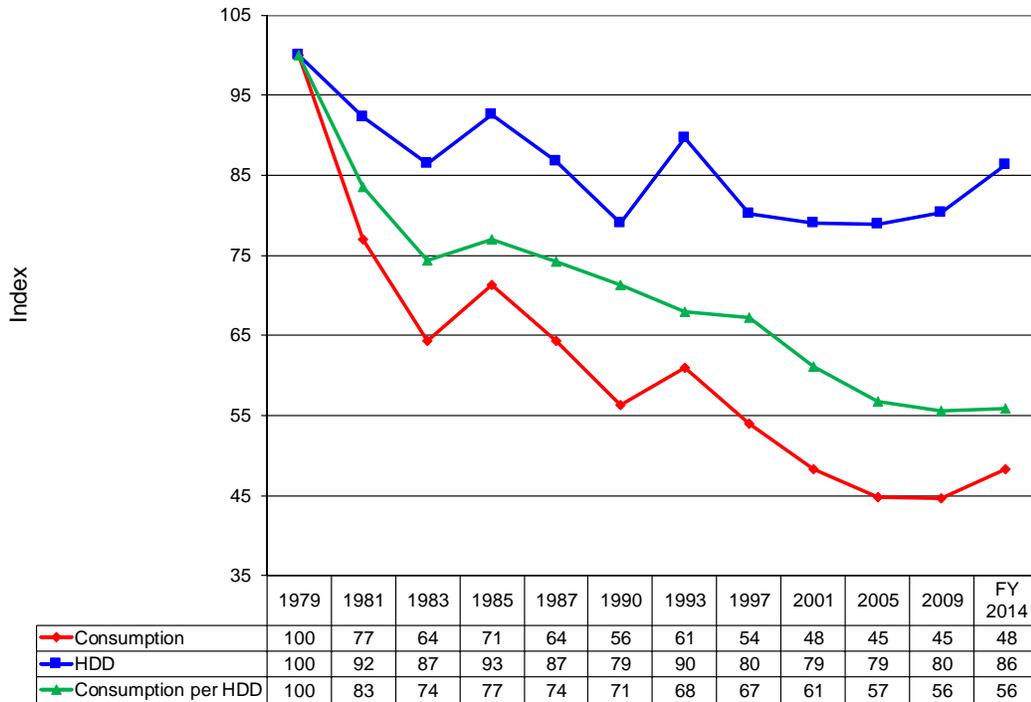
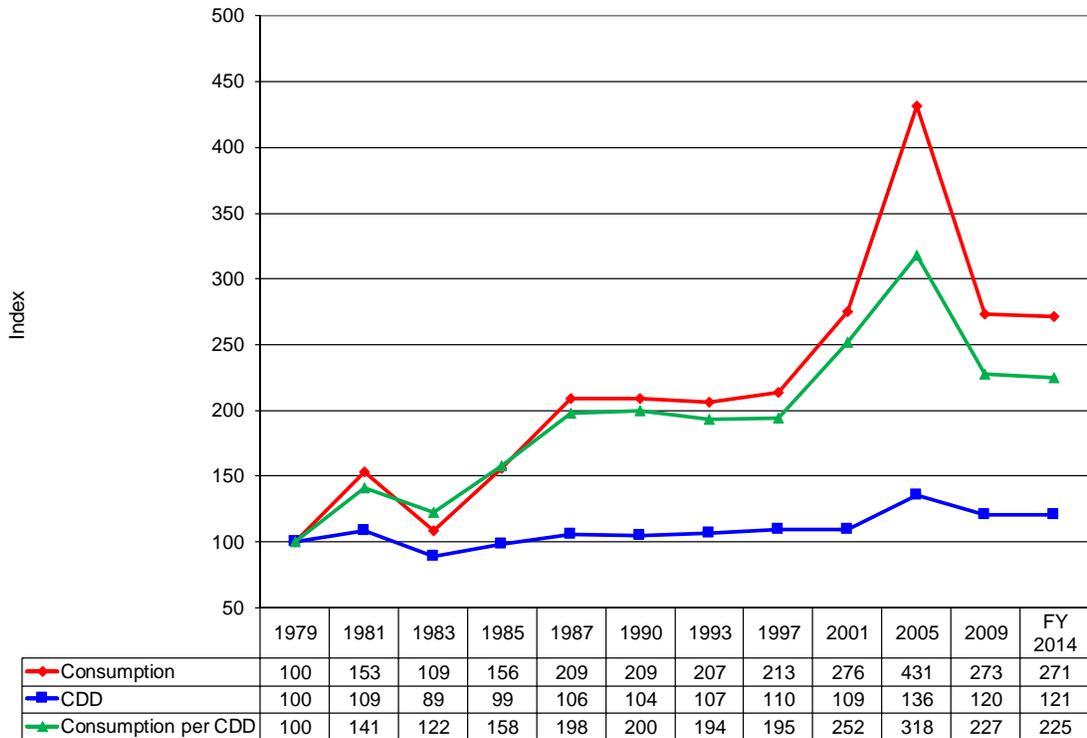


Figure 3-17 shows that home cooling consumption trends among low income households are somewhat more complex than are home heating consumption trends. In FY 2014, mean home cooling consumption was much higher than it was in 1979, even though households experienced relatively smaller increase in cooling degree days. Thus, mean consumption per cooling degree day increased substantially from 1979 to FY 2014, making it appear as though there was a reduction in efficiency. However, the primary cause of the increase in mean home cooling consumption was the large increase in the availability of air-conditioning among low income households.²⁴ As shown in Figure 3-2, only 37 percent of low income households had air-conditioning in 1979, while in 2009, 77 percent of low income households had air-conditioning. Because of this fundamental change in the number of households that use air-conditioning, it is very difficult to assess either changes in efficiency from 1979 to FY 2014 or year-to-year changes in consumption in response to changes in cooling degree days.

²⁴Air-conditioning equipment includes central air conditioners and window or wall units, ceiling fans, and evaporative coolers. The availability of all household appliances increased for low income households over this period due to the overall increase in the wealth of the nation and the decrease in the cost of older technologies.

Figure 3-17. Index of cooling consumption, cooling degree days, and cooling consumption per cooling degree day for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014



Figures 3-18 and 3-19, on the next page, show that the mean group energy burden for low income households is substantially higher than that for all households. In FY 2014, the mean group home energy burden for all households was 1.2 percent, and that for low income households was 4.7 percent. In FY 2014, the mean group residential burden was 3.0 percent for all households and 12.4 percent for low income households. Over time, the gap between the burden for low income and all households has fluctuated somewhat. Figure 3-18 shows that in 1979, the mean group home energy burden for low income households was just over 4 times that of all households, while in 1993, the mean group burden for low income households was close to 3.5 times that of all households. However, in FY 2014, the mean group burden for low income households was again nearly 4 times that of all households.

Figure 3-18. Mean group home energy burden for all households and for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014

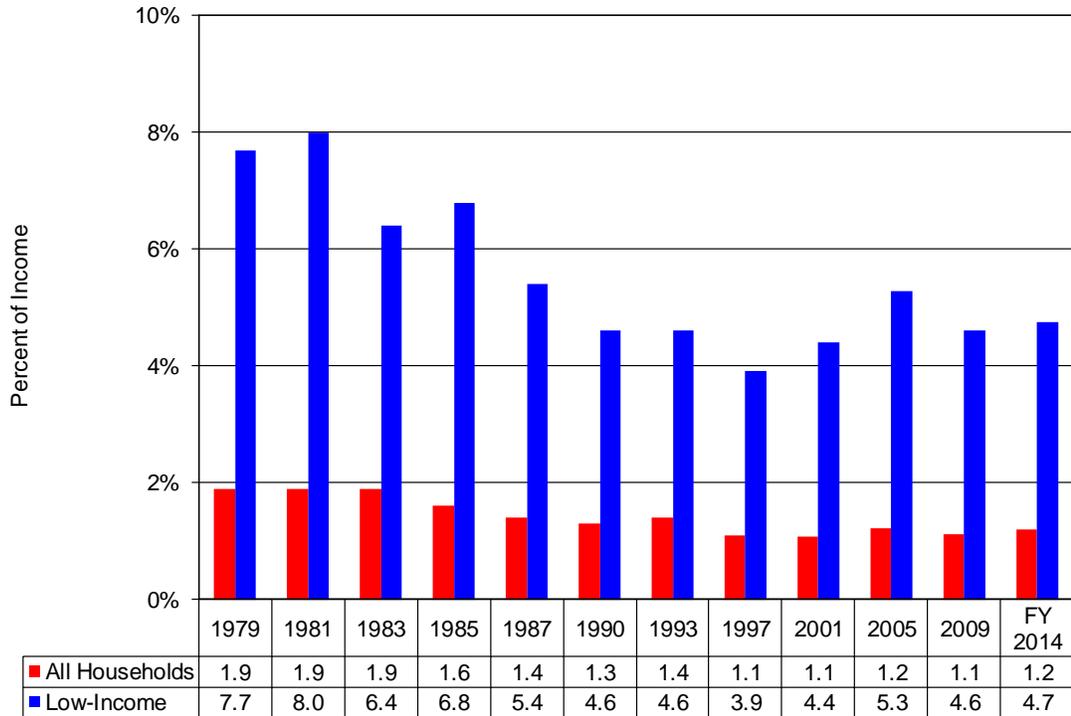
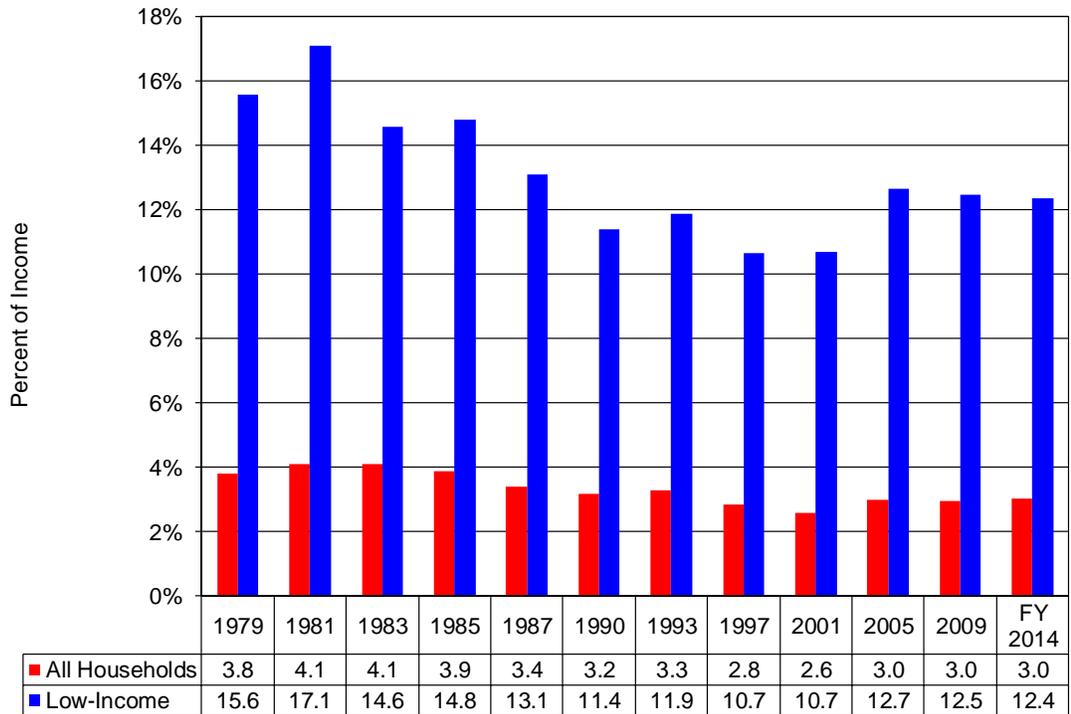


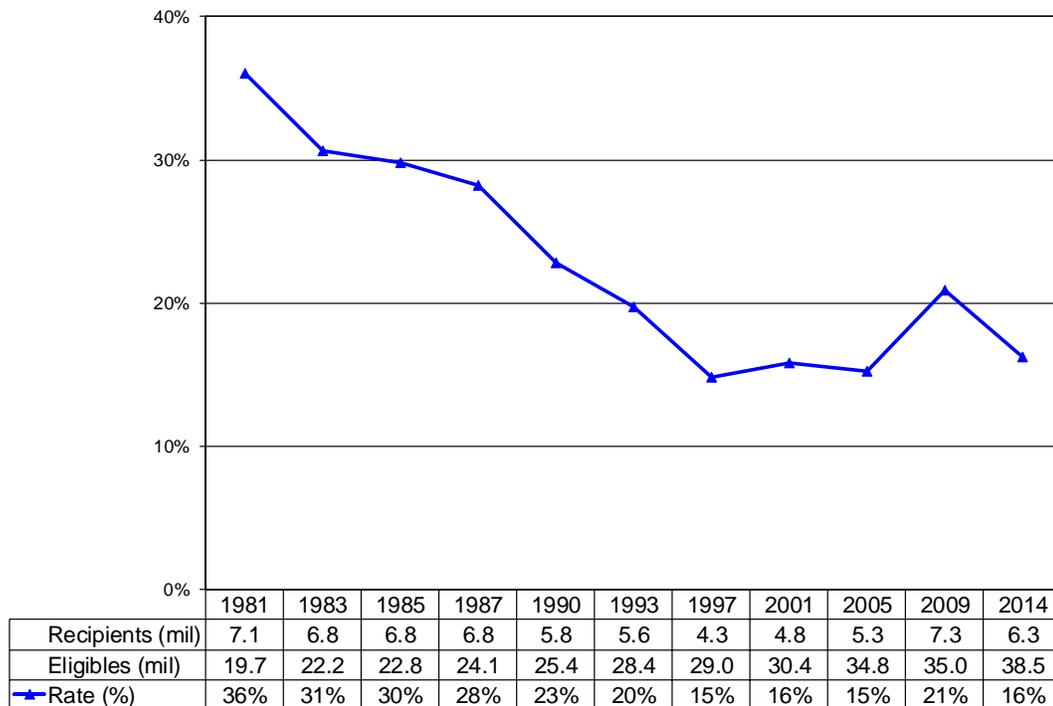
Figure 3-19. Mean group residential energy burden for all households and for households with incomes at or below 150 percent of HHS Poverty Guidelines, 1979 to FY 2014



Trends in LIHEAP

Figures 3-20 through 3-24 furnish information on trends for HHS’s energy assistance programs from FY 1981 through FY 2014.²⁵ Figure 3-20 shows that the percentage of LIHEAP income eligible households that have received heating and/or winter crisis assistance had fallen steadily until 1997 but remained steady at about 16 percent since then, with an exception in FY 2009 when the percentage increased to about 21 percent.²⁶ In FY 1981, 36 percent of eligible households received heating and/or winter crisis assistance benefits; this number fell to 15 percent in 1997. In FY 2014, 16 percent of LIHEAP income eligible households received those benefits. Figure 3-21, on the next page, furnishes statistics on the count of recipients by benefit type.

Figure 3-20. Percentage of LIEAP/LIHEAP federally income eligible households receiving LIEAP/LIHEAP heating and/or winter crisis assistance, FY 1981 to FY 2014

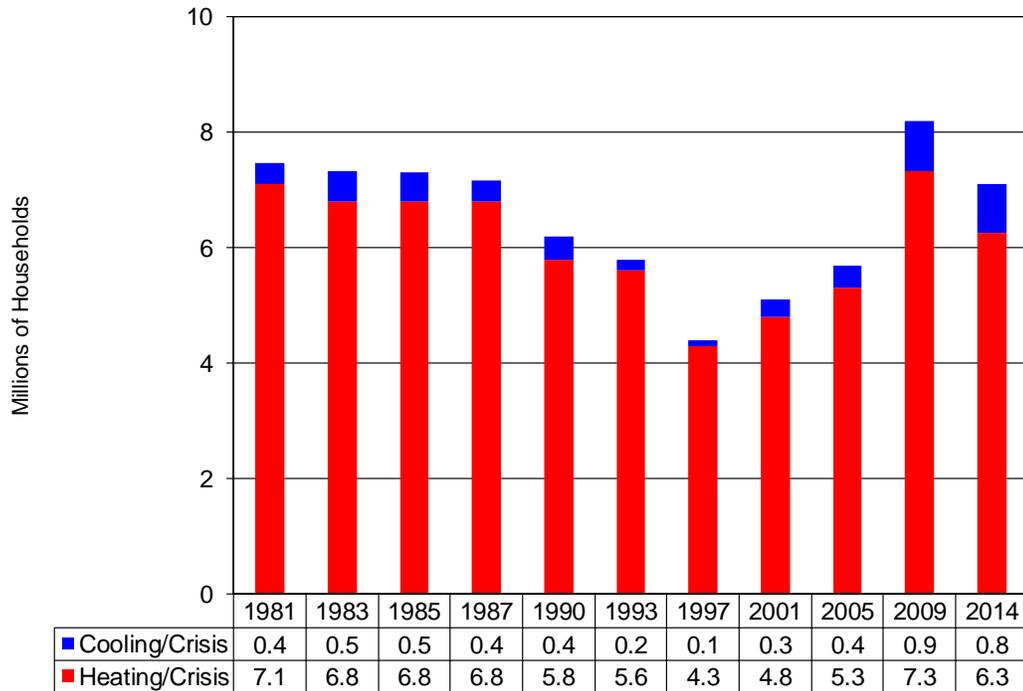


SOURCE: HHS Administrative Data — such data for FY 2014 are preliminary; thus the actual figures may differ.
 NOTE: The FY 1981 estimate of income eligible households is not directly comparable to those of the other years because the income eligibility guidelines for the FY 1981 program differed from those of other years.

²⁵Note that the federal income eligibility guidelines for the FY 1981 Low Income Energy Assistance Program (LIEAP) were different from the LIHEAP programs in other years included in the table. The federal income eligibility guidelines for the FY 1981 LIEAP program were based on the Lower Living Standard of the Bureau of Labor Statistics, whereas the federal income eligibility guidelines for the other years included in the table are based on the HHS Poverty Guidelines and state median income estimates.

²⁶The number of recipient households increased in FY 2009 as a result of greater funding appropriated to LIHEAP. In addition, in FY 2009, the federal income eligibility guidelines were increased to the greater of 150 percent of HHS Poverty Guidelines or 60 percent of the state median income estimates. However, analysis of actual income guidelines implemented by the states in FY 2009 shows that few states increased their eligibility guidelines as a result, and most households served by state LIHEAP programs in FY 2009 had incomes at or below the traditional federal income eligibility guidelines (greater of 150 percent of HHS Poverty Guidelines or 60 percent of the state median income estimates). As a result, the number of federally income eligible households for FY 2009 listed in the table and the “Trends in LIHEAP” section have been updated in the *LIHEAP Home Energy Notebook for FY 2014* to be based on the greater of 150 percent of HHS Poverty Guidelines or 60 percent of the state median income estimates to maintain consistency with prior and future years and provide estimates based on the “effective” guidelines in place during FY 2009.

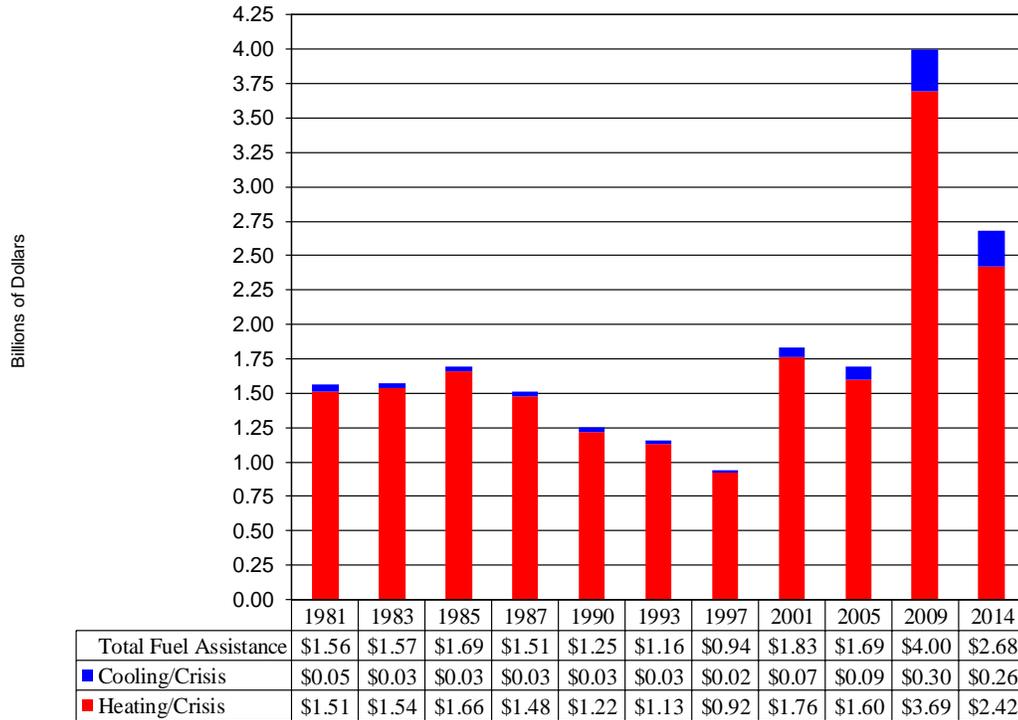
Figure 3-21. Number of households receiving LIHEAP/LIHEAP heating and/or winter crisis assistance or cooling and/or summer crisis assistance, FY 1981 to FY 2014



NOTE: Cooling assistance/summer crisis figures cannot be added to heating assistance/winter crisis figures to generate total assistance + crisis figures for each year because households can receive more than one type of assistance.
 SOURCE: HHS Administrative Data — such data for FY 2014 are preliminary; thus the actual figures may differ.

Figure 3-22, on the following page, shows that the total funds used for fuel assistance benefits have fluctuated over time. For the years shown, funding was highest in FY 2009, when \$4.0 billion dollars were used for heating and cooling assistance benefits, and lowest in FY 1997 when \$0.94 billion dollars were used for assistance benefits.

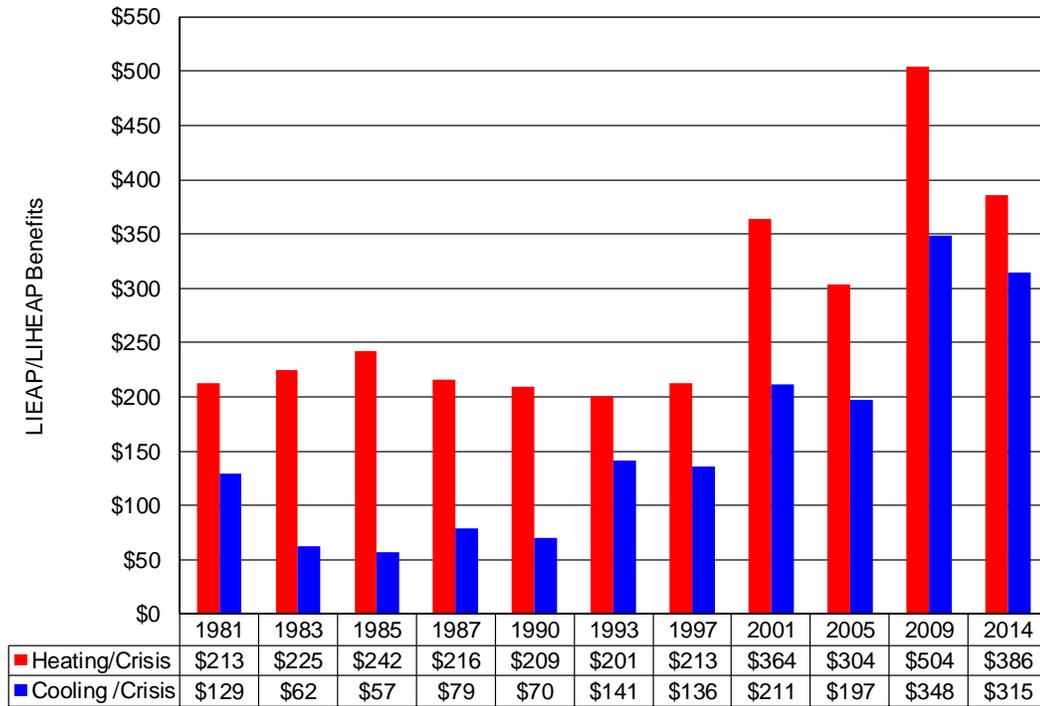
Figure 3-22. Funds used for LIEAP/LIHEAP fuel assistance, FY 1981 to FY 2014



SOURCE: HHS Administrative Data — such data for FY 2014 are preliminary; thus the actual figures may differ.

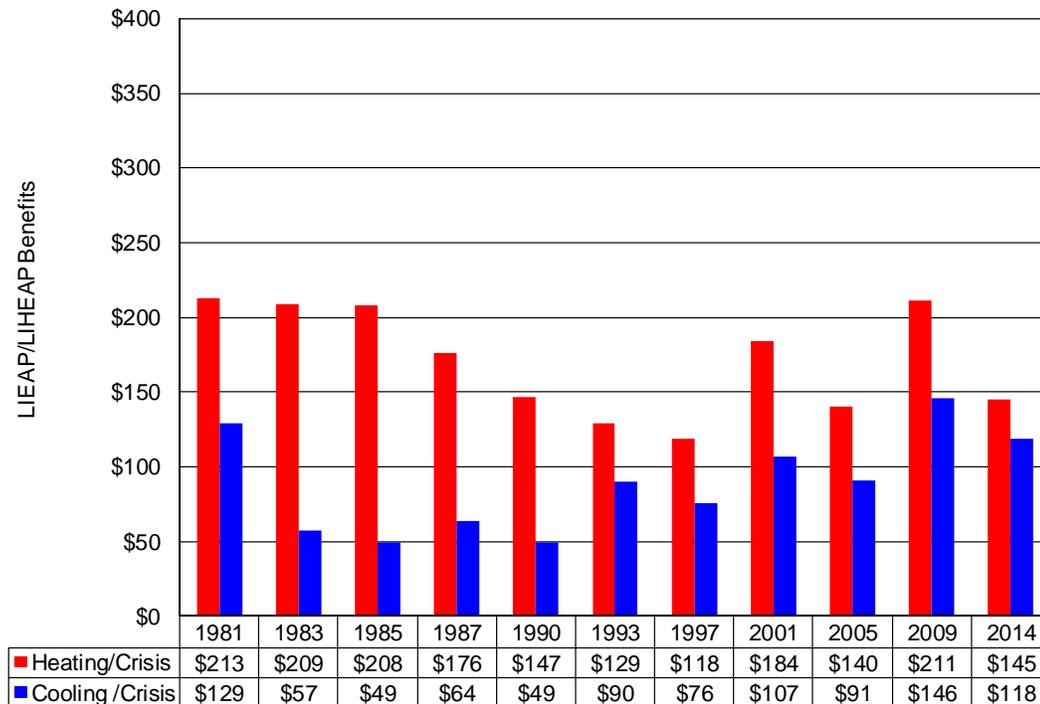
Figure 3-23 on the following page shows that, for the years shown, mean heating/winter crisis benefits were \$213 in FY 1981, grew to \$242 in FY 1985, fell back to \$213 in 1997, rose to \$364 in FY 2001, dropped to \$304 in FY 2005, and then rose substantially to \$504 in FY 2009 until falling to \$386 in FY 2014. Figure 3-24 shows that, after adjusting for inflation, the mean value of benefits has fallen substantially, with a fluctuating resurgence beginning in FY 2001. The mean value of heating and/or winter crisis benefits, in 1981 dollars, fell from \$213 in FY 1981 to \$140 in FY 2005. In FY 2009, mean heating benefits increased considerably to \$211 but decreased to \$145 in FY 2014. With the exception of FY 1981, mean cooling benefits ranged, in 1981 dollars, from \$49 to \$90 through FY 1997, then rose to \$107 in FY 2001, then fell to \$91 in FY 2005. In FY 2009, mean cooling benefits increased substantially to \$146, only to fall again to \$118 in FY 2014. In FY 1993, one state made program changes that significantly increased the mean benefit and decreased the total number of recipients.

Figure 3-23. Mean combined LIEAP/LIHEAP heating and/or winter crisis benefits and mean cooling and/or summer crisis benefits, in nominal dollars, FY 1981 to FY 2014



SOURCE: HHS Administrative Data — such data for FY 2014 are preliminary; thus the actual figures may differ.

Figure 3-24. Mean combined LIEAP/LIHEAP heating and/or winter crisis benefits and mean cooling benefits, in real 1981 dollars, FY 1981 to FY 2014



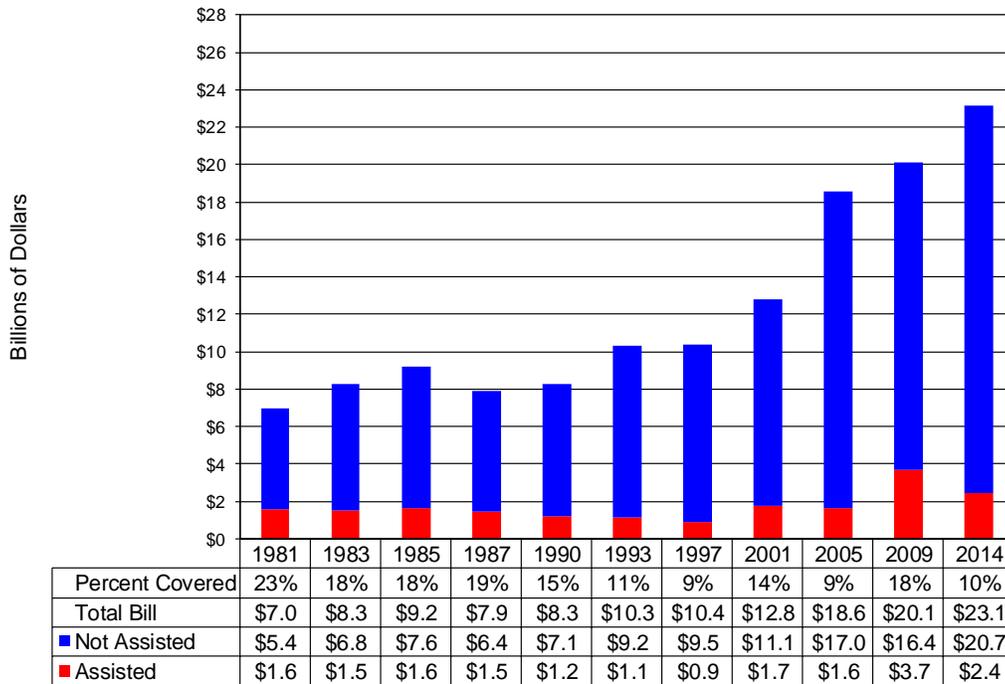
SOURCE: HHS Administrative Data — such data for FY 2014 are preliminary; thus the actual figures may differ.

Analysis of LIHEAP benefits

The impact of LIHEAP heating benefits can be examined in at least two ways. Figure 3-25 shows the share of the aggregated total of low income home heating costs covered by LIHEAP heating and winter crisis benefits (LIHEAP heating coverage). Figure 3-26, on the next page, shows the reduction in mean group home heating burden as a result of LIHEAP benefits (LIHEAP burden offset).

Figure 3-25 shows that the LIHEAP heating coverage rate fell from 23 percent in FY 1981 to 10 percent in FY 2014. An increase in the size of the total bill and an increase in the number of households that are income eligible for assistance benefits in FY 2014 caused this reduction.

Figure 3-25. Amount and percentage of total home heating billed amounts for LIEAP/LIHEAP income eligible households covered by LIEAP/LIHEAP heating and winter crisis benefits, FY 1981 to FY 2014



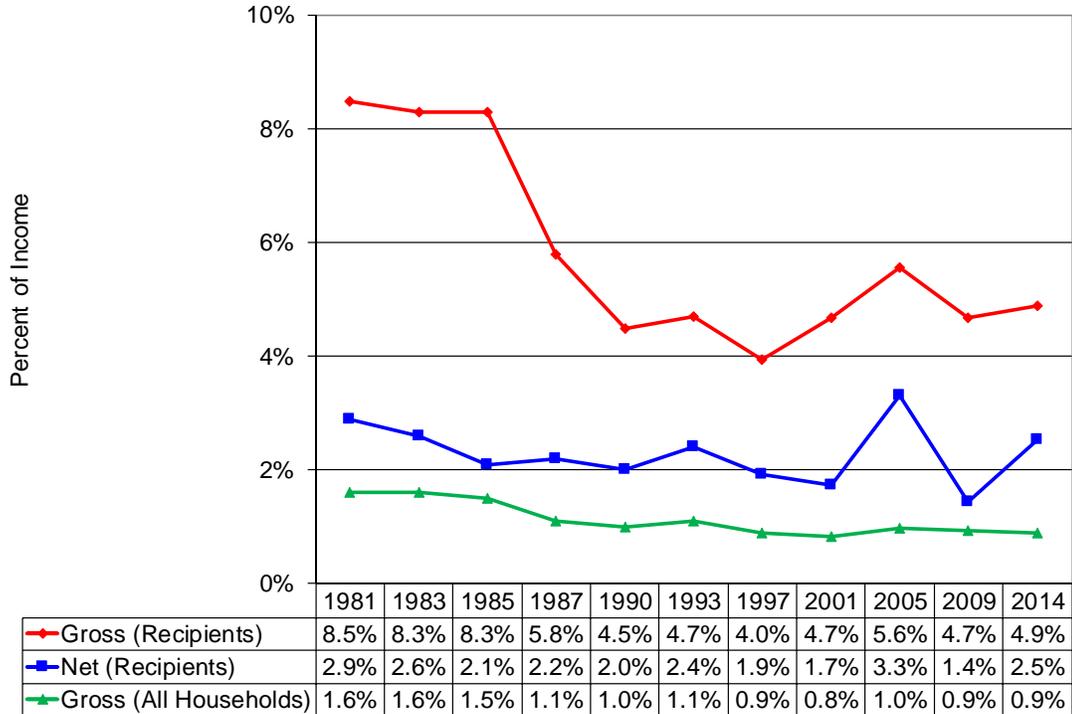
SOURCE: Assistance number from HHS data and heating bill estimates from RECS — HHS data for FY 2014 are preliminary; thus the actual figures may differ.

NOTE: The FY 1981 estimate of income eligible households is not directly comparable to those of the other years because the income eligibility guidelines for the FY 1981 program differed from those of other years.

Figure 3-26 shows that the net effect of LIHEAP has been to lower recipient group home heating burdens to levels that are much closer to the levels of the average household. In FY 1981, the gross mean group home heating burden for LIEAP recipient households was 8.5 percent, while the net mean group home heating burden (with home heating expenditures taken after deducting LIHEAP benefits) was 2.9 percent. In FY 2014, the gross mean group home heating burden for LIHEAP recipients was 4.9 percent, while the net mean group home heating burden was 2.5 percent. It is interesting to note that, while the gross mean group home heating burden for LIHEAP recipients fell from 8.5 percent in FY 1981 to 4.0 percent in FY 1997, decreases in mean LIHEAP benefits in relation to household income caused the net mean group home heating burden to range between 1.3 and 2.2 times as high as the gross mean group home heating burden for all households except for FY 2005 when that ratio was more than 3 to 1. In FY 2001, significant increases in the mean heating benefit caused the net mean group home heating burden for LIHEAP recipients to fall to 1.7 percent,

however it remained twice as high as the mean group burden for all households. In FY 2005, the mean heating benefit decreased by 16 percent, and net mean group home heating burden almost doubled, increasing by 94 percent. The changes in net mean group heating burden resulted from the combination of mean heating benefit decrease and much higher fuel prices in FY 2005. In FY 2009, the net mean group home heating burden for LIHEAP recipients decreased to 1.4 percent, and in FY 2014 it increased to 2.5 percent.

Figure 3-26. Mean group home heating burden for all households and LIHEAP/LIHEAP heating and winter crisis recipient households, FY 1981 to FY 2014



SOURCE: Mean burden uses heating expenditures from RECS and income from CPS ASEC.
 Net Burden = (Mean Expenditures - Mean Benefit) / Mean Income

IV. Federal LIHEAP Targeting Performance

The Government Performance and Results Act of 1993 (GPRA), as amended, focuses on program results to provide Congress with objective information on the achievement of statutory objectives or program goals. The resulting performance data are to be used in making decisions on budget and appropriation levels.

ACF's budget justification for Congress, which contains the LIHEAP performance plan takes into account the fact that the federal government does not provide LIHEAP assistance to the public. Instead, the federal government provides funds to states, certain federal- or state-recognized Indian tribes and tribal organizations, and insular areas to administer LIHEAP at the local level. The LIHEAP performance plan also takes into account the fact that LIHEAP is a block grant whereby LIHEAP grantees have broad flexibility to design their programs, within very broad federal guidelines, to meet the needs of their citizens.

This section of the *Notebook* describes ACF's approach to LIHEAP performance measurement and discusses the findings from ACF-funded research on performance measurement for LIHEAP, including:

- LIHEAP Performance Plan – Review of national LIHEAP program goals, national LIHEAP performance goals, and LIHEAP performance measures.
- Performance Measurement Research – Discussion of the findings from a study to assess the validity of performance measurement estimation procedures and from an evaluation of the performance of LIHEAP with respect to serving the lowest-income households with the highest energy burdens.
- LIHEAP Performance Statistics – Statistics that document the performance of LIHEAP in serving low income vulnerable and high-burden households.

LIHEAP program goals and performance goals

LIHEAP is not an entitlement program. Therefore, the program's grantees are unable to serve all of the households that are income eligible under the federal maximum income eligibility standard. In FY 2014, 16 percent of income eligible households received heating and/or winter crisis assistance. Given that limitation, the LIHEAP statute requires LIHEAP grantees to provide, in a timely manner, that the highest level of assistance will be furnished to those households that have the lowest incomes and the highest energy costs or needs in relation to income, taking into account family size. The LIHEAP statute identifies two groups of low income households as having the highest home energy needs:

- *Vulnerable Households*: Vulnerable households are those with at least one member that is a young child, an individual with disabilities, or a frail older individual. The statute does not define the terms "young children," "individuals with disabilities," and "frail older individuals." The primary concern is that such households face serious health risks if they do not have adequate heating or cooling in their homes. Health risks can include death from hypothermia or hyperthermia, and increased susceptibility to other health conditions such as stroke and heart attacks.
- *High-Burden Households*: High-burden households are those with the lowest incomes and highest home energy costs. The primary concern is that such households will face safety

risks in trying to heat or cool their homes if they cannot pay their heating or cooling bills. Safety risks can include the use of makeshift heating sources or inoperative/faulty heating or cooling equipment that can lead to indoor fires, sickness, or asphyxiation.

The authorizing legislation requires states to design outreach procedures that target LIHEAP reciprocity to income eligible vulnerable and high-burden households, and to design benefit computation procedures that target higher LIHEAP benefits to higher burden households.

Based on the authorizing legislation, LIHEAP's goal is to provide LIHEAP assistance to vulnerable households and high-energy burden households whose health and/or safety are endangered by living in homes without sufficient heating or cooling.

Based on the national LIHEAP program goals, ACF has focused its annual performance goals on targeting the availability of LIHEAP heating assistance to vulnerable low income households. Subject to the availability of data, ACF also is interested in the performance of LIHEAP with respect to targeting benefits to the highest-burden households.

Targeting index performance measures

Performance goals must be measurable in order to determine if the goals are being achieved. ACF has developed a set of developmental performance measures (i.e., targeting indexes) that show the extent to which LIHEAP meets its performance goals. These measures, which are presented below, show LIHEAP's performance in targeting vulnerable and high-burden households:

- The **reciprocity targeting index** quantifies reciprocity targeting performance. The index is computed for a specific group of households by dividing the percent of LIHEAP recipient households that are members of the target group by the percent of all income eligible households that are members of the target group and then multiplying the result by 100. For example, if 25 percent of LIHEAP recipients are high-burden households and 20 percent of all income eligible households are high burden, the reciprocity targeting index for high-burden households is 125 (100 times 25 divided by 20).

An index greater than 100 indicates that the target group's incidence in the LIHEAP recipient population is higher than that group's incidence in the income eligible population. An index less than 100 indicates that the target group's incidence in the LIHEAP-recipient population is lower than that group's incidence in the income eligible population.

- The **benefit targeting index** quantifies benefit targeting performance. The index is computed by dividing the mean LIHEAP benefit for a target group of recipients by the mean LIHEAP benefit for all recipient households and then multiplying the result by 100. For example, if high-burden household recipients have a mean benefit of \$250 and the mean benefit for all households is \$200, the benefit targeting index is 125 (100 times \$250 divided by \$200).

An index greater than 100 indicates that the target group is, on average, receiving more benefits than the overall recipient population. An index less than 100 indicates that the target group is, on average, receiving fewer benefits than the overall recipient population.

- The **burden reduction targeting index** quantifies burden reduction targeting performance. The index is computed by dividing the percent reduction in the median individual energy burden due to LIHEAP for a specified group of recipients by the percent reduction in the median individual energy burden due to LIHEAP for all recipients and then multiplying the

result by 100.²⁷ For example, if high burden recipients have their median individual energy burden reduced by 25 percent (e.g., from 8 percent of income to 6 percent of income) and all recipient households have their median individual energy burden reduced by 20 percent (e.g., from 5 percent of income to 4 percent of income), the burden reduction targeting index is 125 (100 times 25 divided by 20).

An index greater than 100 indicates that the specified group experiences, on average, a greater median individual energy burden reduction than the overall recipient population. An index less than 100 indicates that the specified group experiences, on average, a smaller median individual energy burden reduction than the overall recipient population.

The development of these indexes facilitates tracking of reciprocity, benefit, and burden reduction performance for vulnerable and high-burden households.

- The reciprocity performance data allow for outreach initiatives to improve reciprocity targeting performance.
- The benefit and burden reduction performance data facilitate analysis of how different kinds of benefit determination procedures lead to different levels of benefit and burden reduction targeting performance.

The benefit targeting index and the burden reduction targeting index are both useful measures, but they measure different aspects of benefit targeting.

- The benefit targeting index requires fewer data elements; it is a simple measure of how benefits for a particular group of recipient households compare to benefits for all recipient households.
- The burden reduction index is more comprehensive; it accounts for differences in both energy costs and benefit levels for the group of recipient households compared to energy costs and benefit levels for all recipient households.

The baseline data serve as a starting point against which the degree of change in LIHEAP targeting can be measured, analyzed, and attributed to federal performance enhancement initiatives. The baseline data also provide a roadmap from which ACF can set realistic reciprocity performance targets (a quantitative statement of the degree of desired change) for those parts of the country in which targeting performance can be improved.

ACF's annual LIHEAP performance measures are:

- Increase the reciprocity targeting index score of LIHEAP households having at least one member 60 years or older.
- Maintain the reciprocity targeting index score of LIHEAP households having at least one member five years or younger.

²⁷In general, the mean (or average) is preferred to the median (or midpoint), as it is more informative. The mean, which is commonly called the average, is the sum of all values divided by the number of values. The median is the value at the midpoint in the distribution of values. LIHEAP benefit reciprocity variables are not highly skewed (or distorted); therefore, mean benefits are used to compute the benefit targeting index. Energy burden variables, however, are highly skewed; thus the median energy burden, which is less affected by extreme values, is used to calculate the burden reduction index.

There are no annual measures for the benefit targeting or burden reduction targeting indexes because the data that enter into these indexes are not available annually. The baseline value for the burden reduction targeting index was computed for 2001 using the Residential Energy Consumption Survey (RECS) LIHEAP Supplement. However, this index can be updated only as often as the RECS occurs, which is generally every four years. The last update to this index came from the 2009 RECS data.

Outcome performance measures

ACF seeks to improve the way in which it measures LIHEAP's performance. LIHEAP supports Objective B of HHS's Goal 3: Promote economic and social well-being for individuals, families, and communities. However, the indicators that ACF uses to measure LIHEAP's performance, the young child and elderly reciprocity targeting indexes, serve only as proxies for LIHEAP's outcomes. ACF intended these proxies to be replaced by more outcome-focused measures.

In June 2008, ACF established the LIHEAP Performance Measures Planning Work Group, consisting of State LIHEAP Directors and ACF staff. The Work Group developed a logic model which identifies the long-term goal of LIHEAP as providing LIHEAP recipients with continuous, safe, and affordable home energy service. The Work Group completed its work in January 2010 when it drafted a set of over 36 potential LIHEAP performance measures that could be useful to both the States and ACF. These draft measures are grouped into one of four tiers by type of LIHEAP assistance. Performance measures in tiers 1-3 are to be State-reported based on each State's ability to collect increasingly complex data. Tier 4 data are to be collected at the federal level.

In April 2010, ACF established a follow-up group, the LIHEAP Performance Measures Implementation Work Group (PMIWG), consisting of State LIHEAP Directors and ACF staff. The PMIWG works with stakeholders to evaluate grantees' ability to collect and report on newly established measures and also establishes definitions relating to the new measures. Some of the Work Group activities have included:

- Conducting a LIHEAP Performance Measures Needs Assessment Survey.
- Development of LIHEAP Process Guides on LIHEAP Performance Measurement Best Practices.
- Making presentations about LIHEAP Performance Measures at LIHEAP National Training conferences, National Energy Assistance Directors' Association (NEADA) meetings, and National Energy and Utility Affordability Coalition (NEUAC) conferences.
- Communicating the latest developments of LIHEAP Performance Measures through periodic newsletters.
- Contributing to the development and enhancement of the LIHEAP Performance Measurement Website.
- Working with OCS to develop four new LIHEAP Performance Measures that were approved by OMB in November 2014.
- These four new LIHEAP Performance Measures include: 1) the benefit targeting index for high-burden LIHEAP recipient households; 2) the burden reduction targeting index for high-burden LIHEAP recipient households; 3) the number of LIHEAP recipient households for

which LIHEAP restored home energy service; and 4) the number of LIHEAP recipient households for which LIHEAP prevented loss of home energy service

- Serving as mentors on Performance Measures for other grantees that are working their way through the process.

The PMIWG will be active at least through September 2016. During the period from October 2012 through September 2016, they have been meeting monthly by teleconference (ten times per year) and in-person (twice each year), and have participated in very active sub-committee meetings.

Performance measurement research

ACF has funded several studies to develop a better understanding of LIHEAP targeting performance measurement. Two of these studies recommended that ACF consider making changes in the performance measurement plan for LIHEAP.

- Validation Study – The performance measurement validation study examined the available data sources for estimating the targeting indexes required by the performance measurement plan for LIHEAP and identified the data sources that furnished the most reliable data.²⁸
- Energy Burden Study – The energy burden evaluation study used the 2001 RECS LIHEAP Supplement to measure the baseline performance of LIHEAP in serving high-burden households and to examine the competing demands associated with targeting vulnerable and high-burden households.²⁹

Performance measurement data sources

The ACF performance measurement plan for LIHEAP requires the development of reciprocity targeting indexes for elderly households (i.e., households having at least one member age 60 years or older), young-child households (i.e., households having at least one member age 5 years or younger), and high-burden households (i.e., households having an energy burden that exceeds an energy burden threshold). Data elements needed to compute the reciprocity targeting indexes are:

- The target group's income eligible population – The number of elderly, young child, and high-burden households that are income eligible for LIHEAP.
- Target group recipients – The number of elderly, young child, and high-burden households that are LIHEAP heating recipients.
- The income eligible population – The number of all LIHEAP income eligible households.
- LIHEAP heating recipients – The number of all LIHEAP heating assistance recipients.

The performance measurement validation study and the energy burden study identified the most reliable data sources for the required data elements. The studies found that a number of different data

²⁸ *LIHEAP Targeting Performance Measurement Statistics: GPRA Validation of Estimation Procedures*, September 2004, prepared by APPRISE Incorporated under PSC Order No. 043Y00471301D.

<http://www.acf.hhs.gov/programs/ocs/resource/gpra-validation-of-estimation-procedures-2004>

²⁹ *LIHEAP Energy Burden Evaluation Study*, July 2005, prepared by APPRISE Incorporated under PSC Order No. 043Y00471301D. <http://www.acf.hhs.gov/programs/ocs/resource/liheap-energy-burden-evaluation-study>

sources were needed to furnish the most reliable data for the computation of targeting indexes, including:

- The income eligible population – According to the Census Bureau, the CPS ASEC furnishes the most reliable national estimates of the number of income eligible households.³⁰
- Income eligible vulnerable households – The CPS ASEC furnishes the most reliable estimates of the number of income eligible vulnerable households (i.e., elderly households and young-child households).
- LIHEAP heating recipients – The annual *LIHEAP Household Reports* furnished by state LIHEAP administrators to ACF furnish the most reliable estimates of the number of heating assistance recipient households in each state.
- Vulnerable household heating recipients – The annual *LIHEAP Household Reports* furnished by state LIHEAP administrators to ACF furnish the most reliable estimates of the number of vulnerable heating assistance recipient households in each state.
- Income eligible high-burden households – The RECS furnishes the most reliable estimates of the number of income eligible high-burden households.
- High burden heating recipients – The RECS LIHEAP Supplement furnishes the most reliable estimates of the number of high burden recipient households.

The following data sources are used in reporting on LIHEAP targeting performance for this Notebook:

- CPS ASEC – The CPS ASEC is a national household sample survey that is conducted monthly by the Bureau of the Census. The CPS ASEC includes data that allow one to characterize household demographic characteristics. The CPS ASEC is the best source of annual national data for estimating the number of income eligible households and the number of income eligible vulnerable households. The CPS ASEC data needed to prepare performance statistics for FY 2014 were available in October 2014.
- State annual *LIHEAP Household Report* – The preliminary *LIHEAP Household Report for Federal Fiscal Year (FFY) 2014* were due from the states by September 1, 2014, when the states' LIHEAP block grant applications for FY 2014 were due. ACF set a goal for the states to submit their final *LIHEAP Household Report for Federal Fiscal Year (FFY) 2014* by December 2014. Each *LIHEAP Household Report* needs to be received, reviewed, processed, and compared against data from each state's *LIHEAP Grantee Survey* that was conducted in January 2015 as part of the *LIHEAP Performance Data Form for Federal Fiscal Year (FFY) 2014*. The data on the number of LIHEAP households assisted in FY 2014 will be included in the *LIHEAP Report to Congress* for FY 2014.
- The RECS – The EIA's RECS is a national household sample survey that is conducted once every four years. The most recent survey for which the necessary data is available was conducted in 2009. The RECS data were used in 2001 for baseline measurement of targeting performance for high energy burden households and can track longer-term changes in performance over time (2001 to 2009). However, the RECS currently cannot furnish annual updates on LIHEAP targeting performance for high energy burden households.

³⁰ "Which Data Source to Use." U.S. Census Bureau. Revised March 1, 2016. <http://www.census.gov/topics/income-poverty/income/guidance/data-sources.html>.

Targeting performance for high-burden households

With the available data, the annual reporting of LIHEAP reciprocity targeting index scores includes updates for vulnerable households but not for high energy burden households. To develop a better understanding of the value of targeting performance data for high energy burden households, ACF commissioned the *LIHEAP Energy Burden Evaluation Study* (2005). The purposes of that study included:

- Targeting – Measure the extent to which LIHEAP is serving the lowest income households that have the highest energy burdens.
- Performance goals – Assessment of the importance of the performance goal of increasing the percent of LIHEAP recipient households having the lowest incomes and the highest energy costs.
- Measurement – Identification of procedures that can be used to measure performance of LIHEAP with respect to the goal of increasing the percentage, among LIHEAP recipient households, of those households with the lowest incomes and the highest energy costs (i.e. high energy burden households).

The study furnished the following information to ACF with respect to targeting of high energy burden households.³¹

- Targeting – The study found that, for FY 2001, the reciprocity targeting index for high home energy burden households was 170, indicating that households with a high home energy burden were served at a significantly higher rate than were other income-eligible households. The study furnished a baseline statistic from which changes in targeting to high energy burden households can be compared.
- Performance goals – The study demonstrated that it is important to include a goal of targeting high energy burden households in the performance plan for LIHEAP. The LIHEAP statute gives equal status to the goals of targeting vulnerable households and high energy burden households. Performance goals that are limited to targeting of elderly and young-child households encourage LIHEAP grantees to give preference to low burden vulnerable households over high-burden households that do not have a vulnerable household member.
- Measurement – The study identified options for collecting annual data on high energy burden recipient households.

In addition, the *LIHEAP Energy Burden Evaluation Study* (2005) examined two other performance indicators – the benefit targeting index and the burden reduction targeting index. The study furnished baseline measures for these indicators and discussed the value and challenges of including those

³¹ The study developed an operational definition of “high burden,” though the statute offers no such definition. The study’s definition is used here. This study defined high energy burden as the “energy share” of severe housing (shelter) burden. Severe housing burden is considered by some researchers to be 50% of income. (See Cushing N. Dolbeare. 2001. “Housing Affordability: Challenge and Context.” *Cityscape: A Journal of Policy Development and Research*, (5)2:111-130. A Publication of the U.S. Department of Housing and Urban Development, Office of Policy Development and Research.) The median total residential energy costs for households at or below 150 percent of the HHS’s Poverty Guidelines are 21.8 percent of housing costs. This study defined a residential energy burden of 10.9 percent of income as a high burden, moderate energy burden as costs at or above 6.5 percent of income but less than 10.9 percent of income, and low energy burden as costs less than 6.5 percent of income. Heating and cooling expenditures comprise 39.3 percent of total residential energy expenditures for all households. Therefore, high home energy burden is defined for purposes of this study as heating and cooling costs that exceed 4.3 percent of income. Moderate home energy burden is defined as heating and cooling costs above 2.6 percent of income but less than 4.3 percent of income.

benefit and burden reduction targeting indicators in the performance plan for LIHEAP. These indexes were updated for FY 2005 and FY 2010 using the 2005 and 2009 RECS.

Performance measurement statistics

Tables 4-1a and 4-1b show the LIHEAP reciprocity targeting performance measures from FY 2003 through FY 2014. The first column shows the fiscal year. The second column shows the performance targets (to be reached), and the third column shows the targeting index scores that were achieved. FY 2003 was the baseline year for both measures.

For measure 1A, the baseline targeting index score of 79 indicates that income eligible elderly households were not being effectively targeted within the income eligible population of elderly households in FY 2003. The FY 2004 through FY 2011 targeting index scores fluctuated between 73 and 79. In FY 2012, the targeting index score for households with an elderly member increased to 83, exceeding both the target and the baseline targeting index score. In FY 2013, the targeting index score for households with an elderly member increased to 84, exceeding the baseline targeting index score but falling short of the fiscal year target of 85. In FY 2014, the targeting index score for households with an elderly member decreased to 80, exceeding the baseline targeting index score but falling short of the fiscal year target of 84.

For measure 1B, the baseline targeting index score of 122 for households with a young child indicates that such households were being effectively targeted within the income eligible population of households with young children in FY 2003. The FY 2004 through FY 2011 targeting index scores fluctuated between 110 and 122. However, in FY 2012, the targeting index score for households with a young child decreased to 114, which is lower than the target for FY 2012 and the baseline targeting index score. In FY 2013, the targeting index score for households with a young child increased to 117, exceeding the fiscal year target of 116 but falling short of the baseline targeting index score. In FY 2014, the targeting index score for households with a young child decreased to 112, falling short of both the baseline targeting index score and the fiscal year target of 117.

Table 4-1a. LIHEAP reciprocity targeting performance measure 1A: Increase the reciprocity targeting index score of LIHEAP households having at least one member 60 years or older (reported for FY 2003 – FY 2014)

Fiscal Year	Target	Result
FY 14	84	80
FY 13	85	84
FY 12	80	83
FY 11	75	78
FY 10	78	74
FY 09	96	76
FY 08	96	76
FY 07	94	78
FY 06	92	77
FY 05	84	79
FY 04	82	78
FY 03	Baseline	79

Table 4-1b. LIHEAP reciprocity targeting performance measure 1A: Increase the reciprocity targeting index score of LIHEAP households having at least one member five years or younger (reported for FY 2003 – FY 2014)

Fiscal Year	Target	Result
FY 14	117	112
FY 13	116	117
FY 12	124	114
FY 11	110	122
FY 10	110	118
FY 09	122	117
FY 08	122	110
FY 07	122	110
FY 06	122	112
FY 05	122	113
FY 04	122	115
FY 03	Baseline	122

SOURCE: HHS Administrative Data — such data for FY 2014 are preliminary; thus the actual figures may differ.

As noted above, the *LIHEAP Energy Burden Evaluation Study* developed baseline statistics on high energy burden household targeting. That study recommended that measurement of targeting to high energy burden households is important since LIHEAP’s statutory mandate is to serve the households “with the lowest incomes, that pay a high proportion of household income for home energy, primarily in meeting their immediate home energy needs.”

Table 4-2 shows the national and regional reciprocity targeting indexes for high home energy burden households for FY 2001, FY 2005, and FY 2010. The 2001 RECS, the 2001 RECS LIHEAP Supplement, the 2005 RECS, and the 2009 RECS were used to develop these statistics. These statistics demonstrate that, except for the Northeast region in FY 2005 and FY 2010, LIHEAP was targeting high-burden households.³² However, FY 2010 targeting index scores indicate a significant decrease in targeting high-burden households compared to the FY 2001 baseline scores.

³² The RECS LIHEAP Supplement was first introduced into the RECS in 2001. Because the design was experimental, no variance models were developed for the data file. As a result, it is difficult to develop a precise estimate of variances for statistics developed from the RECS LIHEAP Supplement. Preliminary analysis indicates that the FY 2001 targeting indexes in Table 4-2 are statistically different from 100 while the FY 2001 targeting indexes shown in Tables 4-3 and 4-4 are not statistically different from 100. Therefore, the null hypothesis that high burden households and households that are not high burden are served at the same rate can be rejected, while the null hypothesis that LIHEAP benefits and burden reduction are the same for high burden households and households that are not high burden cannot be rejected. The FY 2005 and FY 2010 targeting indexes in Table 4-2 and 4-4 are statistically different from 100 at the national level but not at the regional level, while the targeting indexes shown in Tables 4-3 are not statistically different from 100 at either regional or national level.

Table 4-2. LIHEAP reciprocity targeting index of high-burden households by region for FY 2001 from the 2001 RECS and the 2001 RECS LIHEAP Supplement, for FY 2005 from the 2005 RECS, and for FY 2010 from the 2009 RECS.

Region	FY 2001	FY 2005	FY 2010
Northeast	163	99	92
Midwest	132	116	112
South	155	119	101
West	293	184	112
United States	170	122	112

The energy burden evaluation study also furnished estimates of the benefit and burden reduction targeting indexes for FY 2001. These indexes were updated for FY 2005 and FY 2010 using the 2005 and 2009 RECS data. Benefit and burden reduction targeting are not part of the performance plan for LIHEAP. However, the study concluded that those indexes were consistent with the statutory mandate to furnish the highest benefits “to those households which have the lowest incomes and the highest energy costs or needs in relation to income.”

Table 4-3 shows national and regional benefit targeting indexes and Table 4-4 shows national and regional burden reduction targeting indexes. In FY 2001, at the national level and in all regions, high-burden households received slightly higher average benefits than did households that did not have high burdens. The benefit targeting index scores for FY 2001 and FY 2010 were similar to one another and they were slightly higher at the national level and in most regions than those in FY 2005. However, Table 4-4 shows that at the national level and in all regions, high-burden households experienced lower burden reductions than did households that did not have a high burden. From FY 2001 to FY 2005, burden reduction index scores decreased for all regions. From FY 2005 to FY 2010, burden reduction index scores increased for all regions but not to the level of FY 2001 baseline scores.

Table 4-3. LIHEAP benefit targeting index of high-burden households by region for FY 2001 from the 2001 RECS and the 2001 RECS LIHEAP Supplement, for FY 2005 from the 2005 RECS, and for FY 2010 from the 2009 RECS

Region	FY 2001	FY 2005	FY 2010
Northeast	103	104	105
Midwest	108	104	107
South	110	81	102
West	124	119	109
United States	109	101	108

Table 4-4. LIHEAP burden reduction targeting of high-burden households by region for FY 2001 from the 2001 RECS and the 2001 RECS LIHEAP Supplement, for FY 2005 from the 2005 RECS, and for FY 2010 from the 2009 RECS

Region	FY 2001	FY 2005	FY 2010
Northeast	96	74	93
Midwest	93	70	90
South	98	84	89
West	86	60	68
United States	94	71	82

Uses of LIHEAP performance data

Performance targeting index data can be useful for both LIHEAP grantees and ACF, as described below.

LIHEAP grantee use of targeting indexes

Individual LIHEAP grantees can use the reciprocity targeting indexes to examine the effectiveness of their outreach to households with vulnerable members.³³

- In absolute terms, if a given group has a reciprocity targeting index over 100, then that group's incidence in the LIHEAP-recipient population is higher than that group's incidence in the income eligible population.
- In relative terms, if a given group has a higher reciprocity targeting index than another group, then the given group has been targeted relative to the other group. For example, if the index for elderly households is 90 and the index for non-vulnerable households is 75, then elderly households are targeted at a higher rate than non-vulnerable households are.

Individual LIHEAP grantees can use the benefit and burden reduction targeting indexes to examine the effectiveness of their benefit determination procedures in serving households with vulnerable members and households with high energy burdens.³⁴

- In absolute terms, if a given group has a benefit or burden reduction targeting index greater than 100, then that group has a higher average benefit (benefit targeting index) or experiences a greater median burden reduction (burden reduction index) than the recipient population has or experiences. If a group has a benefit or burden reduction targeting index less than 100, then that group has a lower average benefit (benefit targeting index) or experiences a smaller median burden reduction (burden reduction index) than the recipient population has or experiences.
- In relative terms, if a given group has a higher benefit or burden reduction targeting index than another group, then the given group has been targeted relative to the other group. For example, if the benefit targeting index for elderly households is 90 and the benefit targeting index for non-vulnerable households is 75, then elderly households have higher average benefits than non-vulnerable households. Likewise, if the burden reduction targeting index for elderly households is 90 and the burden reduction targeting index for non-vulnerable households is 75, then elderly households have greater percentage reduction in median energy burden.

Grantees can use the targeting measures to gauge their current targeting performance and to track changes in targeting performance over time.

ACF's use of targeting indexes

ACF is using national targeting indexes to examine the targeting performance of LIHEAP and to measure changes in performance over time. In so doing, ACF found that the national reciprocity targeting indexes indicate that elderly households face difficulty in enrolling in LIHEAP as compared

³³ LIHEAP grantees have the ability to create these reciprocity targeting indexes using recipient counts from the states' *LIHEAP Household Reports* and the estimated income eligibility counts provided in Appendix B of this report. For FY 2006 and 2007, ACF released information on the rankings of the states in terms of reciprocity targeting indexes. ACF has recently funded a study that classified states' targeting performance in FY 2007 through FY 2010 in five broad categories.

³⁴ LIHEAP grantees have the benefit data needed to create benefit targeting indexes. If they calculate household energy burdens for their recipients, LIHEAP grantees can also create burden reduction indexes.

to young-child households. A review of the literature indicates that other federal social programs also have limited success in serving eligible elderly households, especially in comparison to households with young children. Program participation barriers appear to be most significant when elderly households have not made previous use of public assistance programs. For this reason, ACF is an active federal partner with the National Center for Outreach and Benefit Enrollment that is funded by the Administration on Aging. LIHEAP is one of five federal benefit programs for which the Center is seeking to develop innovative ways to increase enrollment of the elderly.

ACF is continuing to examine the reliability and validity of targeting indexes in making the following comparisons:

- ACF can compare reciprocity targeting measures among groups of households and identify which groups are not effectively targeted by LIHEAP. For example, if the national LIHEAP reciprocity targeting index for elderly households is 85 and the national LIHEAP reciprocity targeting index for households with young children is 110, then households with young children are targeted at a higher level than are elderly households. ACF might conclude from these statistics that a greater share of the technical assistance efforts should be allocated to increasing targeting to elderly households.
- ACF can compare reciprocity targeting measures among areas of the country to assess which areas are in greatest need of technical assistance and to determine the type of technical assistance that is required. For example, if the reciprocity targeting index for elderly households in the New England Census Division is 75, while the reciprocity indexes for elderly households in all other divisions are over 100, then elderly households are targeted at a lower level in New England than in other parts of the country. ACF might conclude from these statistics that a greater share of the technical assistance efforts should be allocated to increasing targeting to elderly households among one or more grantees in New England.
- ACF can compare national targeting measures over time to measure changes in targeting performance. For example, if the targeting indicator for elderly households was 75 in one fiscal year and was 85 in a later fiscal year, then it would demonstrate that LIHEAP targeted elderly households at a higher level over time.

Targeting performance measurement issues

As presented above, targeting indexes are statistical tools that allow ACF to examine targeting across groups of households, across regions of the country, and over time. It is reasonable to expect that the greatest increases in targeting performance can be realized by supporting the targeting efforts for those areas of the country that are currently serving targeted households at the lowest rate.

A major challenge in executing the LIHEAP performance plan is in finding an effective way to gather the data that enter into vulnerable and high burden targeting indexes in a timely way. ACF has found the timeliness of such collection to be challenging, e.g., the *LIHEAP Household Report's* early deadlines. In addition, the RECS' relative infrequency presents an ongoing challenge.

For FY 2011, ACF required states to report for the first time on the *LIHEAP Household Report* an unduplicated count of households receiving all types of LIHEAP benefits. This data is to allow ACF to indicate the targeting of all types of LIHEAP benefits, rather than just the targeting of heating benefits. However, there were a number of states that still were not able to report these unduplicated counts for FY 2014. ACF is working with such states to have a system in place to report these data.

V. Special Study of LIHEAP Assurance 16

LIHEAP Grantees have the option to use Assurance 16 program funds to deliver services that help households to reduce their home energy needs and their reliance on energy assistance. Almost one-half of LIHEAP state and territory grantees reported that they allocated funds to Assurance 16 activities in fiscal year (FY) 2014. A number of reports have furnished information on the types of services delivered with Assurance 16 funding, most recently the [LIHEAP Clearinghouse Issue Brief #2](#) that was published in March 2014. The purpose of this study is to furnish more in-depth information on how LIHEAP funds are invested in Assurance 16 activities, document how the outcomes of Assurance 16 activities are currently being measured, and identify options and alternatives for Assurance 16 performance measurement in the context of the new LIHEAP Performance Management framework.

Background

The LIHEAP Clearinghouse Issue Brief #2 from March 2014 reported that *“Assurance 16 was added to the Low Income Home Energy Assistance Program statute in 1994. Section 2605(b)(16) of the statute allows grantees to spend a limited amount of funds for Assurance 16 activities. Grantees have the option to “use up to 5 percent of such funds, at its option, to provide services that encourage and enable households to reduce their home energy needs and thereby the need for energy assistance, including needs assessments, counseling, and assistance with energy vendors, and report to the Secretary concerning the impact of such activities on the number of households served, the level of direct benefits provided to those households, and the number that remain unserved.”* Issue Brief #2 reviewed FY 2014 LIHEAP State Plans and found that 33 states reported that they planned to allocate funds to Assurance 16 activities.

In the FY 2014 LIHEAP Model Plan, Grantees were asked to report if they planned to use LIHEAP funds to deliver Assurance 16 services, describe what types of services were going to be delivered, and report on how they would be able to ensure that Assurance 16 spending did not exceed the 5 percent spending limit. In the FY 2015 Model Plan, Grantees were asked to furnish additional detail on their Assurance 16 activities, including the number of households that applied for and received program services, the benefits provided to those households, and the impact that the services had on the number of households served by the LIHEAP program.

During FY 2015, the Office of Community Services (OCS) reached out to grantees to encourage them to make effective use of Assurance 16 funds. On May 1, 2015, OCS issued a [“Dear Colleague Notice on Information and Resources Related to Financial Capability,”](#) that reminded grantees that Assurance 16 funds can be used to fund “energy education, energy self-sufficiency, financial counseling, and asset building activities.” The notice also alerted grantees to pilot programs being operated in Missouri by Ameren (a utility company) and the People’s Community Action Corporation (a St. Louis community action program (CAP)), as good examples of the types of activities that could be funded with Assurance 16 funds.

Study Goals

This study is designed to furnish qualitative and quantitative information on the impacts of Assurance 16 program activities, including:

- Programs - What types of programs do grantees choose to operate with Assurance 16 funds and what outcomes (i.e. changes in status of households) are expected from those programs?

- Targeting - What group(s) of households are targeted for program services and why are they targeted?
- Service Provider - Who delivers Assurance 16 services and how are the services delivered?
- Investment - What level of investment (overall and per household served) do grantees make in Assurance 16 programs?
- Qualitative Assessment of Outcomes - What do service providers perceive are the outcomes of the programs that they implement and what are some examples of those outcomes (i.e. how has the program helped achieve the longer-term energy self-sufficiency of households)?
- Quantitative Assessment of Outcomes - What data or information do grantees and/or subgrantees currently have that can effectively document Assurance 16 program outcomes?
- Performance Measurement Context - How can the new LIHEAP performance management data (e.g., heating fuel and electric expenditure data, service restoration events, and service loss prevention events) potentially contribute to measurement of Assurance 16 outcomes?

This study is designed to be both retrospective and prospective. It collects information and reports on what programs were implemented in FY 2014 and FY 2015 and reports on any available outcome data for those years. However, it also looks to the future when new performance management data will be available and considers how those data will enhance the program's ability to measure the performance of Assurance 16 program activities.

Methodology

The study used a number of different qualitative and quantitative resources to develop information on Assurance 16 program activities.

- Review of Model Plans - It used the FY 2014 and FY 2015 LIHEAP Model Plans to develop information on the number of grantees that planned to use LIHEAP funds for Assurance 16 activities, document the type of services they planned to deliver, and quantify the number of households they expected to serve with the allocated funds.
- Analysis of Grantee Surveys - It used the FY 2014 LIHEAP Performance Data Form: Section I. Grantee Survey to document the reported use of FY 2014 LIHEAP funds on Assurance 16 activities.
- Calculation of Assurance 16 Investments – It analyzed data from the LIHEAP Model Plan and the Performance Data Form: Grantee Survey to estimate the total investment in Assurance 16 activities and the average investment per household served by the Assurance 16 program.
- In-Depth Interviews with Grantees - In-depth interviews were conducted with state and territory grantees to gather more detailed information than was available in the LIHEAP Model Plan about the design and implementation of Assurance 16 program activities and the data available to assess the program outcomes for participating households.
- In-Depth Interviews with Service Delivery Agencies - In-depth interviews were conducted with subgrantees that are delivering Assurance 16 services to get more detail on the households targeted for program services, the way that LIHEAP Assurance 16 funds are coordinated with funds from other sources, examples of how the program services deliver

benefits to households, and the data available to assess the program outcomes for participating households.

- Updated Investment per Household Served - For the Assurance 16 programs that were studied in-depth, the investment per household served was reviewed, verified, and discussed with the program manager.

The study was able to identify some data sources that could be used to document program outcomes. However, it was not in the scope of this study to obtain and analyze those data.

Assurance 16 Program Design and Implementation

Types of Services Planned for FY 2015

LIHEAP is a block grant program. Grantees are given wide latitude to deliver LIHEAP program services in the way that they determine best meets the needs of the households that they serve. In their descriptions of Assurance 16 services in their LIHEAP Model Plans, grantees report a diverse set of activities. The following types of client services are offered.

- Outreach - Some grantees include outreach to special populations in their Assurance 16 activities. In most cases, it appears that this outreach is designed to target households that are particularly vulnerable to risks associated with service disruption and/or households that are most at risk for having energy bill payment problems.
- Needs Assessment - Some grantees fund needs assessment services so that households that are most in need of additional Assurance 16 services and other program offerings can be identified and referred to the services that would best address their specific needs.
- Referrals - Some grantees invest their funds in making sure that they have an adequate referral network so that households can be directed to the programs that can serve their needs.
- Programs - Other grantees design and implement programs that directly address the energy needs of households. Programs include:
 - Crisis Intervention - Working with households to identify additional resources that can be combined with LIHEAP to address the immediate crisis(es) that they are facing with respect to payment of their energy bill and other related problems.
 - Vendor Advocacy/Negotiations - Advocacy with vendors on behalf of clients to help restore service and negotiate affordable payment arrangements.
 - Financial Counseling - Furnishing longer-term counseling to households to help them better manage their resources to avoid future energy payment problems.
 - Energy Education and Advocacy for Energy Services - Helping households to better manage their energy usage through changes in energy-using behaviors, delivery of low cost energy efficiency measures (e.g., compact fluorescent light bulbs), and helping households to gain access to weatherization and other energy efficiency services.
- Case Management - Some grantees invest in more comprehensive case management that not only makes services available to households, but works to ensure that households follow-up and take advantage of all of the services available to them.

Each grantee combines the above listed activities in a way that is unique to its individual circumstances. Table 5-1 shows the number and percent of grantees that included each type of activity in their FY 2015 LIHEAP Model Plan. It shows that 35 of 56 state and territory grantees indicated in their FY 2015 LIHEAP Model Plan that they would use block grant funding to provide services through Assurance 16 to households. The most common type of Assurance 16 activity planned for FY 2015 is energy education, which was planned by about 54 percent of grantees.

Table 5-1. Types of Assurance 16 activities planned for FY 2015 by state and territory grantees

Activity	Number of grantees	Percent of total
Outreach	10	18%
Needs assessment	15	27%
Referrals	15	27%
Programs (total)	34	61%
Crisis intervention	4	7%
Vendor advocacy/negotiations	20	36%
Financial counseling ^{1/}	16	29%
Energy education and advocacy	30	54%
Case management	4	7%
Total grantees planning A16 activities ^{2/}	35	63%
Total grantees	56	100%

^{1/} The category “Financial Counseling” includes services described by grantees as financial counseling, budget counseling, or other counseling (unspecified).

^{2/} The total number of grantees planning to deliver Assurance 16 activities in FY 2015 includes 33 state grantees and two territories (American Samoa and Puerto Rico). Included among the state grantees is Maryland, which indicated in its FY 2015 LIHEAP Model Plan that it was not currently using Assurance 16 funds but reserved the option to use these funds at a later time. Accordingly, Maryland’s FY 2015 LIHEAP Model Plan includes an estimate that 5% of available LIHEAP funds would be used for Assurance 16 but does not indicate the types of services that would be provided.

It was outside the scope of this study to document the Assurance 16 practices of all of the Indian tribes and tribal organizations. While the average state grantee can spend over \$3 million per year on Assurance 16 activities, the average tribe can spend only about \$12,000. Designing and implementing an Assurance 16 program for a tribe would be quite different from designing and implementing a state program. However, our research did show that some tribal grantees provide Assurance 16 services to their households. We reviewed the FY 2015 Model Plans for the 23 tribal grantees that received \$500,000 or more in LIHEAP funding for FY 2014. Our review found that only six of the 23 tribes (26%) planned to use LIHEAP funds to deliver Assurance 16 services. Five of the 23 tribes planned to use funds for energy education (22%) and two of the 23 tribes planned to use funds for outreach services (9%). In comparison, over 63 percent of state and territory grantees planned used Assurance 16 funds, with eight different types of services offered.

Types of Assurance 16 Services Planned and Delivered in FY 2014

The FY 2015 Model Plans indicated that 35 grantees planned to allocate funds for Assurance 16 activities. However, sometimes grantees include a plan for Assurance 16 activities in their Model Plan, but later decide that they need to devote the available resources to other types of benefits. Grantees furnished detailed reports on their uses of funds – including spending on Assurance 16 activities – in January 2015 following the end of the program fiscal year for 2014. In order to get a

better understand of which grantees were likely to implement their planned FY 2015 Assurance 16 programs, we reviewed the FY 2014 report on uses of funds and conducted follow-up interviews with grantees to discuss differences between their FY 2014 plans and their reported FY 2014 spending.

The FY 2014 LIHEAP Model Plans showed that 35 state grantees planned to deliver Assurance 16 services. However, only 24 state grantees and two territories reported in the FY 2014 Grantee Survey that they spent funds on Assurance 16 activities.³⁵ The in-depth interviews conducted by APPRISE collected more detailed information on the Assurance 16 services delivered by 15 of the 23 state grantees and two territories that reported using Assurance 16 funding in FY 2014 and planned to do so again in FY 2015.³⁶

Table 5-2 shows the updated distribution of the type of Assurance 16 services that we expect were actually delivered during FY 2015. It counts only those state and territory grantees that reported spending funds on Assurance 16 in the FY 2014 Grantee Survey and that indicated in their FY 2015 Model plan that they intended to spend funds on Assurance 16 program activities in FY 2015. Note that information presented in the table was derived from a combination of data from the FY 2014 Grantee Survey, FY 2015 Model Plans, and in-depth interviews. The table shows that the information furnished in the Model Plan regarding planned Assurance 16 activities is not always consistent with the services delivered with Assurance 16 funds. Most often, the grantee delivers a more comprehensive set of services than is planned. For example, Table 5-2 shows an increase in the number of grantees planning to provide referral, crisis intervention, and general case management services to households relative to the number of grantees listed in Table 5-1.

Overall, the findings from Table 5-2 are similar to those from Table 5-1. A total of 23 state and two territory grantees (45 percent) funded Assurance 16 activities in FY 2014 and planned to do so again in FY 2015. Among all state and territory grantees, the most common activity funded in FY 2014 and planned again in FY 2015 is energy education (41 percent).

³⁵ In some instances, grantees reserved block grant funding for Assurance 16 services when filing their LIHEAP Model Plans, but demand for regular/crisis assistance benefits outpaced available funding. As a result, these grantees reduced funding for non-assistance benefits, including Assurance 16 services, in order to maximize the amount of assistance benefits available to households.

³⁶ One state grantee (Ohio) used funds for Assurance 16 in FY 2014 but did not plan to do so in FY 2015 and was not considered when identifying state grantees for in-depth interviews. In-depth interviews were also conducted with two U.S. territory grantees: American Samoa and Puerto Rico.

Table 5-2. Types of Assurance 16 activities funded in FY 2014 and planned for continuation in FY 2015

Activity	Number of grantees	Percent of grantees
Outreach	10	18%
Needs assessment	15	27%
Referrals	16	29%
Programs (total)	25	45%
Crisis intervention	6	11%
Vendor advocacy/negotiations	15	27%
Financial counseling ^{1/}	15	27%
Energy education and advocacy	23	41%
Case management	9	16%
Total grantees funding A16 activities ^{2/}	25	45%
Total grantees	56	100%

^{1/} The category “Financial counseling” includes services described by grantees as financial counseling, budget counseling, or other counseling (unspecified).

^{2/} Ohio reported funding Assurance 16 activities in its FY 2014 Grantee Survey, but did not plan to deliver Assurance 16 services in FY 2015 according to its FY 2015 LIHEAP State Plan. Accordingly, Assurance 16 services delivered by Ohio in FY 2014 are not counted in Table 5-2 or Table 5-3.

Table 5-3 furnishes a detailed list of the types of Assurance 16 activities that we believe were funded by the grantees in FY 2015. For each grantee, the table shows whether our assessment was based only on the information in the FY 2015 LIHEAP Model Plan (PLAN), was based on information in the Model Plan and was confirmed through in-depth interviews (CONF). It also shows information that was not included in the Model Plan but was reported to us during the in-depth interview (INT).

Table 5-3 shows that grantees take a variety of approaches in terms of the types of services they provide. Some grantees only plan Assurance 16 services in one of the eight identified activities, but other grantees plan services in all or almost all of the different types of Assurance 16 activities. Grantees most often implement three to five different types of activities with Assurance 16 funds. For example, Delaware, Louisiana, and Washington indicated in their FY 2015 LIHEAP Model Plans that only energy education services would be provided. Minnesota and Iowa reported that services would be provided in each of the identified activities, and Arkansas reported that services would be provided in all but one (outreach) of the identified activities. Model Plan descriptions of Assurance 16 activities for many grantees are consistent with their implemented programs; the in-depth interviews with Arkansas, Connecticut, Wyoming, American Samoa, and Puerto Rico confirmed that the listed activities were implemented.

Table 5-3. State-level information on Assurance 16 activities planned for FY 2015^{1/}

Grantee ^{2/}	Outreach	Needs assessment	Referral	Crisis interv.	Vendor advocacy	Financial counseling	Energy ed.	Case mgmt.	Total
Alabama	--	PLAN	--	--	PLAN	PLAN	PLAN	--	4
Arizona*	--	--	INT	--	INT	--	CONF	INT	4
Arkansas*	--	CONF	CONF	CONF	CONF	CONF	CONF	CONF	7
California	--	PLAN	--	--	PLAN	PLAN	PLAN	--	4
Connecticut*	--	CONF	CONF	--	CONF	CONF	CONF	--	5
Delaware	--	--	--	--	--	--	PLAN	--	1
Idaho*	--	PLAN	PLAN	--	--	--	CONF	--	3
Illinois*	INT	INT	INT	--	INT	INT	CONF	INT	7
Indiana	--	--	PLAN	--	--	--	PLAN	PLAN	3
Iowa*	PLAN	CONF	PLAN	CONF	CONF	CONF	CONF	INT	8
Louisiana	--	--	--	--	--	--	PLAN	--	1
Maine	--	PLAN	PLAN	--	PLAN	PLAN	PLAN	--	5
Massachusetts*	CONF	PLAN	CONF	CONF	CONF	CONF	CONF	--	7
Minnesota*	CONF	CONF	CONF	INT	PLAN	CONF	CONF	CONF	8
Mississippi*	INT	--	INT	--	--	INT	CONF	INT	5
Montana*	CONF	INT	CONF	INT	CONF	INT	CONF	--	7
New Hampshire*	PLAN	--	CONF	CONF	CONF	--	--	INT	5
Oregon*	--	PLAN	--	--	PLAN	CONF	CONF	--	4
Rhode Island	--	PLAN	PLAN	--	PLAN	PLAN	--	--	4
South Carolina*	--	PLAN	PLAN	--	PLAN	PLAN	CONF	CONF	6
Tennessee*	--	INT	PLAN	--	--	CONF	CONF	--	4
Washington	--	--	--	--	--	--	PLAN	--	1
Wyoming*	CONF	--	--	--	--	--	CONF	--	2
American Samoa*	CONF	--	--	--	--	--	CONF	--	2
Puerto Rico*	CONF	--	--	--	--	--	CONF	--	2
Total	10	15	16	6	15	15	23	9	N/A

^{1/} The following terminology is used in Table 5-3: (1) "PLAN" indicates that the Model Plan indicates that the grantee plans to provide this Assurance 16 service. (2) "INT" indicates that the grantee provides this Assurance 16 service, as determined during the in-depth interview process conducted with grantees for this special study; (3) "CONF" indicates that the grantee provides this Assurance 16 service, as determined during the review of FY 2015 LIHEAP Model Plans and confirmed during the in-depth interview process conducted with grantees for this special study; and (4) "--" indicates that the grantee does not provide services in this category.

^{2/} In-depth interviews were conducted with grantees marked by an asterisk in Table 5-3: Arizona, Arkansas, Connecticut, Idaho, Illinois, Iowa, Massachusetts, Minnesota, Mississippi, Montana, New Hampshire, Oregon, South Carolina, Tennessee, Wyoming, American Samoa, and Puerto Rico.

Delivery of Assurance 16 Services

Grantees differ in their design and delivery of Assurance 16 program services. Some grantees set the overall framework for the design of Assurance 16 program services, but allow subgrantees discretion regarding which services to offer, how to deliver the services, and which households to target. Other

grantees are more involved in the design, provision, and targeting of these services. Table 5-4 shows whether grantees, subgrantees, or both are involved in the delivery of Assurance 16 program services and which households are targeted, as indicated by interviewed grantees. (Note: Households that are targeted with Assurance 16 program services may differ from households that receive these services. For example, grantees may design their programs to target a specific subgroup of LIHEAP recipient households, but make Assurance 16 program services available to all LIHEAP recipient households.) Among the interviewed grantees, most often Assurance 16 program services are delivered by subgrantee community action agencies. Only three of the 15 interviewed state grantees – Idaho, Minnesota, and Wyoming – reported that the state LIHEAP office is involved in the delivery of Assurance 16 program services. In Minnesota, the state office conducts limited outreach activities to households and provides formal training to subgrantees regarding Assurance 16. In Wyoming, the state office makes outreach materials available to community partners, and Assurance 16 services are also provided by Weatherization Assistance Program (WAP) agencies partnered with LIHEAP during weatherization. The two territories directly implement the LIHEAP program and Assurance 16 services.³⁷

Ten of the 17 interviewed grantees indicated that program services are not targeted to specific subgroups of LIHEAP recipient households, but rather available to all LIHEAP recipient households. Three of the 17 interviewed grantees – Arkansas, Massachusetts, and New Hampshire – indicated that crisis assistance recipient households are targeted with program services. The households targeted in Iowa, Minnesota, and Wyoming vary by type of service, subgrantee, and/or year. In Iowa, all crisis assistance recipient households are targeted with Assurance 16 program services, but non-crisis Assurance 16 program services are made available to all households. However, whether all households are targeted varies by subgrantee and may depend on whether the household is in crisis or applies for assistance in-person at the agency intake office(s). In Minnesota, crisis assistance recipient households are most likely to be targeted, but some subgrantees may make services available to all households or only households that apply for assistance in-person at the agency intake office(s). In Wyoming, program services are targeted to households that have also been assisted by the U.S. Department of Energy’s Weatherization Assistance Program (WAP), as well as “priority” households. American Samoa targets vulnerable households, but appears to serve all households with Assurance 16 services.

³⁷ Puerto Rico also uses contractors to deliver certain services through Assurance 16.

Table 5-4. Delivery of Assurance 16 activities based on grantee interviews

Grantee	Delivery of services	Households targeted
Arizona	Subgrantees	All households
Arkansas	Subgrantees	Crisis households ^{1/}
Connecticut	Subgrantees	All households
Idaho	State office and subgrantees	All households
Illinois	Subgrantees	All households
Iowa	Subgrantees	Varies by type of service and subgrantee
Massachusetts	Subgrantees	Crisis households ^{2/}
Minnesota	State office and subgrantees	Varies by subgrantee
Mississippi	Subgrantees	All households
Montana	Subgrantees	All households
New Hampshire	Subgrantees	Crisis households ^{3/}
Oregon	Subgrantees	All households
South Carolina	Subgrantees	All households
Tennessee	Subgrantees	All households
Wyoming	State office and subgrantees	Varies by type of service and year
American Samoa	Territory office	Vulnerable households ^{4/}
Puerto Rico	Territory office and contractors	All households

^{1/} Households receiving regular assistance benefits in Arkansas are also targeted with Assurance 16 services when it is deemed appropriate and necessary.

^{2/} Households in a financial or energy crisis are targeted in Massachusetts, but all households are eligible to receive Assurance 16 services.

^{3/} Assurance 16 services in New Hampshire are targeted to households who previously had fast-tracked crisis applications to encourage these households to reapply for assistance before experiencing a crisis.

^{4/} Assurance 16 services in American Samoa are targeted to vulnerable households: those with high energy use/burden, elderly members, or bedridden members.

Investments in Assurance 16 Activities

In addition to differences in the types of Assurance 16 programs implemented, there are important differences in the level of investment in these programs. There are two important factors that need to be considered when assessing the level of investment – the amount allocated to the program and the share of the population to which program services are targeted. For example, in FY 2014, Connecticut allocated \$1.2 million to Assurance 16 services, but provided Assurance 16 services to all of their 102,681 households. That is an average investment of about \$11 per household served. In comparison, New Hampshire allocated \$687,500 to Assurance 16 services, but targeted those program services to only 1,842 households. That is an average investment of \$373 per household served.

Table 5-5 shows the amount of funding allocated by each of the 23 state and two territory grantees that reported using funds for Assurance 16 in their FY 2014 Grantee Survey, as well as our best estimate of the available funds per household served.³⁸ The statistics presented include: Total LIHEAP funds used, Assurance 16 funds used, Assurance 16 funds as a percentage of total funds

³⁸ Ohio used funds in for Assurance 16 services in FY 2014, but is excluded from Table 5-5 because it did not plan to use funds for Assurance 16 again in FY 2015.

used, Total LIHEAP households, Assurance 16 spending per LIHEAP household, Assurance 16 households, and Estimated Assurance 16 spending per Assurance 16 household. The statistic on Assurance 16 spending per LIHEAP household was developed by dividing the Assurance 16 funds used by the unduplicated count of households served by the grantee with any type of LIHEAP assistance. The Assurance 16 spending per Assurance 16 household was developed by dividing the Assurance 16 funds used by our best estimate of the number of households targeted or served with Assurance 16 services. The table also furnishes information on the source of information on the number of households served by the Assurance 16 program.

Among all grantees that used funding for Assurance 16 activities in FY 2014 and planned to do so again in FY 2015, about 3 percent of their combined total LIHEAP block grant allocation was directed to Assurance 16 program services. Average spending per Assurance 16 recipient household was estimated to be about \$24. However, the range of these values varied greatly across the grantees. For example, Assurance 16 spending as a percent of total LIHEAP block grant allocation ranged from less than 0.1 percent in Tennessee, where only \$13,907 of the state's total LIHEAP block grant allocation was used for Assurance 16 program services, to 5 percent in California, where about \$7.6 million of the state's total LIHEAP block grant allocation was used for Assurance 16 program services. Two grantees – Louisiana and Tennessee – used less than one percent of their total LIHEAP block grant allocation to provide Assurance 16 program services; eight grantees – Arizona, California, Idaho, Illinois, South Carolina, Wyoming, American Samoa, and Puerto Rico – used at least 4 percent of their total LIHEAP block grant allocation to provide Assurance 16 program services. Almost all (19) state and territory grantees that used funding for Assurance 16 activities in FY 2014 are estimated to have spent \$50 or less per Assurance 16 recipient household, while five state and territory grantees – Arkansas, Delaware, New Hampshire, Wyoming, and Puerto Rico – are estimated to have spent greater than \$50 on Assurance 16 program services per Assurance 16 recipient household.

Table 5-5. State-Level information on investments in Assurance 16 (A16) activities per household (HH) for FY 2014

Grantee ^{1/}	Total LIHEAP funds used	A16 funds used ^{2/}	A16 funds as % of total funds used	Total LIHEAP HHs ^{3/}	A16 spending per LIHEAP HH	A16 HHs ^{4/}	Estimated A16 spending per A16 HH ^{5/}	Source for A16 HHs ^{6/}
Alabama	\$51,551,796	\$506,509	1.0%	89,251	\$6	34,355	\$15	PLAN
Arizona* ^{7/}	\$22,116,134	\$933,980	4.2%	28,781	\$32	28,781	\$32	HHR
Arkansas*	\$27,575,756	\$1,052,055	3.8%	87,496	\$12	728	\$1,445	PLAN
California	\$152,764,309	\$7,613,453	5.0%	219,178	\$35	219,178	\$35	HHR
Connecticut*	\$85,003,850	\$1,179,059	1.4%	102,681	\$11	102,681	\$11	HHR
Delaware	\$14,296,795	\$170,619	1.2%	16,445	\$10	1,800	\$95	PLAN
Idaho*	\$20,282,227	\$959,395	4.7%	50,263	\$19	50,263	\$19	HHR
Illinois*	\$181,972,136	\$7,553,390	4.2%	335,843	\$22	335,843	\$22	HHR
Indiana	\$79,053,343	\$2,275,725	2.9%	133,625	\$17	N/A	N/A	N/A
Iowa* ^{8/}	\$56,430,461	\$546,830	1.0%	93,994	\$6	53,652	\$10	INT
Louisiana	\$42,157,313	\$337,259	0.8%	68,979	\$5	68,979	\$5	HHR
Maine	\$39,886,748	\$485,289	1.2%	39,571	\$12	39,571	\$12	HHR
Massachusetts*	\$140,959,905	\$3,597,400	2.6%	183,009	\$20	183,009	\$20	HHR
Minnesota*	\$124,715,820	\$4,433,607	3.6%	135,647	\$33	135,647	\$33	HHR
Mississippi*	\$30,810,431	\$1,149,914	3.7%	44,451	\$26	44,451	\$26	HHR

^{1/} In-depth interviews were conducted with grantees marked by an asterisk in Table 5-5: Arizona, Arkansas, Connecticut, Idaho, Illinois, Iowa, Massachusetts, Minnesota, Mississippi, Montana, New Hampshire, Oregon, South Carolina, Tennessee, Wyoming, American Samoa, and Puerto Rico.

^{2/} Table 5-5 excludes Ohio, which spent \$204,040 of its total block grant of \$165,821,219 in FY 2014 on Assurance 16 services, but did not set aside funding for Assurance 16 activities in FY 2015.

^{3/} "Total LIHEAP households" is the unduplicated count of households assisted with any type of LIHEAP assistance in FY 2014, as reported by grantees in the FY 2014 Household Report.

^{4/} "A16 households" is the number of households served with Assurance 16 services in FY 2014, as reported by grantees in the FY 2015 LIHEAP State Plan and updated based on information from interviews with certain grantees.

^{5/} Estimated Assurance 16 spending per Assurance 16 household has not been verified in detail by the grantee. It is a best estimate based on the grantee's total use of Assurance 16 funding and the total number of households served by Assurance 16 activities (as indicated by the grantee) in FY 2014. This estimate is intended to illustrate the order of magnitude of household-level investments.

^{6/} The following terminology is used in Table 5-5 to indicate the source of information used to estimate the number of Assurance 16 recipient households: 1) "PLAN" indicates that the reported number in the FY 2015 LIHEAP Model Plan was used; 2) "HHR" indicates that the unduplicated count of households served by the grantee with any type of assistance, as indicated in the grantee's FY 2014 Household Report, was used in place of the number reported in the FY 2015 LIHEAP Model Plan; and 3) "INT" indicates that the grantee provided an updated count of households during the interview process. Grantees for which a number was unavailable was coded "N/A".

^{7/} Arizona was unable to provide an unduplicated count of households assisted with any type of LIHEAP assistance in FY 2014, but was able to provide an unduplicated count for FY 2013, so the funding amounts and number of households served listed in Table 5-5 for Arizona are from FY 2013.

^{8/} An unduplicated count of Assurance 16 recipient households is unavailable in Iowa. The number of Assurance 16 recipient households listed in Table 5-5 for Iowa corresponds to the number of households receiving energy education services in the state.

LIHEAP Home Energy Notebook for FY 2014: V. Special Study of LIHEAP Assurance 16

Grantee ^{1/}	Total LIHEAP funds used	A16 funds used ^{2/}	A16 funds as % of total funds used	Total LIHEAP HHs ^{3/}	A16 spending per LIHEAP HH	A16 HHs ^{4/}	Estimated A16 spending per A16 HH ^{5/}	Source for A16 HHs ^{6/}
Montana*	\$21,266,194	\$450,001	2.1%	20,088	\$22	20,088	\$22	HHR
New Hampshire* ^{9/}	\$26,252,860	\$687,500	2.6%	36,011	\$19	1,842	\$373	INT
Oregon*	\$38,796,743	\$1,500,116	3.9%	65,402	\$23	65,402	\$23	HHR
Rhode Island	\$26,017,823	\$650,000	2.5%	31,120	\$21	31,120	\$21	HHR
South Carolina*	\$42,732,312	\$1,941,240	4.5%	53,664	\$36	53,664	\$36	HHR
Tennessee*	\$58,189,689	\$13,907	<0.1%	106,387	<\$1	106,387	<\$1	HHR
Washington	\$57,206,105	\$2,145,227	3.7%	73,967	\$29	61,811	\$35	PLAN
Wyoming*	\$10,220,613	\$466,700	4.6%	9,897	\$47	3,000	\$156	PLAN
American Samoa* ^{10/}	\$280,177	\$14,009	5.0%	500	\$28	493	\$28	PLAN
Puerto Rico*	\$15,248,049	\$762,402	5.0%	96,812	\$8	15,000	\$51	PLAN
Total	\$1,365,787,589	\$41,425,586	3.0%	2,123,062	\$20	1,657,745	\$24 ^{11/}	N/A

^{9/} New Hampshire provided an updated count of households receiving Assurance 16 services for program year 2015.

^{10/} American Samoa and Puerto Rico are not required to submit Grantee Surveys. As a result, total LIHEAP funds used, Assurance 16 funds used, and Assurance 16 funds as a percent of total LIHEAP funds used are derived from their FY 2015 Model Plans.

^{11/} The total estimated Assurance 16 spending per Assurance 16 household, representing the average of all grantees included in Table 5-5, excludes funding used by Indiana on Assurance 16 services because a reliable source for the number of households receiving Assurance 16 services was unavailable for this grantee.

Grantee Perceptions of Assurance 16 Program Outcomes

Several grantees – including Connecticut, Iowa, and Minnesota – reported that they perceive that the best use of the Assurance 16 program is to provide case management services, thereby allowing resources to be combined in an effective manner to meet all of a household’s needs. Those grantees asserted that, since crises faced by households are often complex and multifaceted, referrals to other programs and services can be life-saving for some households in the short-term, while also producing positive impacts on finances in the long-term.

Grantees that emphasize energy education services – such as Oregon and South Carolina – reported that they perceive that Assurance 16 services reduce energy burden by increasing energy-related knowledge of recipients and encouraging energy saving behaviors among households. Wyoming believes that using Assurance 16 funds to combine energy education with home weatherization services can have a substantial impact on changing energy consumption behaviors of households because of the hands-on learning approach and ability to identify specific opportunities directly in the home.

Some grantees report that the Assurance 16 program allows them to be more efficient in their energy service provision. For example, Assurance 16 funds allow subgrantees in Mississippi to auto-refer LIHEAP recipient households with high energy bills to weatherization services. Similarly, Massachusetts cited the use of Assurance 16 funds in building partnerships with energy vendors making its entire LIHEAP program operations more efficient.

Table 5-6 shows the availability of state-level data for reporting Assurance 16 activities. The availability of input, output, and outcome data varies across grantees, with many grantees possessing only the most basic information for Assurance 16 program services provided in their states or territories. Most grantees only have aggregate data on the number of households served and funding used. Only three of the 15 interviewed state grantees – Minnesota, Montana, and Wyoming – receive information from subgrantees on both the funding spent and number of households receiving specific services. Iowa receives information from its subgrantees on the number of households receiving each type of service, but not funding spent on each type of service. Conversely, Mississippi receives information from its subgrantees on the amount of funding spent on each type of service, but not the number of households receiving each type of service. Two of the four grantees with activity-level output data available (Iowa and Minnesota) indicated that they are unable to produce an unduplicated count of total households receiving Assurance 16 program services from the available data. Only New Hampshire indicated that household-level output data on Assurance 16 program services is collected in the statewide reporting system.³⁹

In general, the availability of outcome data is limited at the grantee level. The available outcome data reported by grantees includes: analysis of the rate at which households drop out of Assurance 16 program classes and assessment of the number of households in need of home appliance replacements by Arkansas; anecdotal information documenting household outcomes from exit interviews and narrative reports conducted in Arkansas, Connecticut, and South Carolina; information on the number of households no longer in need of LIHEAP assistance and energy saved by American Samoa; and measurement indicators that will be developed and reported by subgrantees to the state beginning on October 2015 in Minnesota.

³⁹ Minnesota used to collect household-level data reported by subgrantees through an activity log in its eHeat database. However, due to inconsistent and unreliable data, the state LIHEAP office has streamlined its eHeat reporting system to enable subgrantees to enter data in aggregate and submit aggregate reports.

Table 5-6. State-Level availability of data for reporting Assurance 16 activities based on grantee interviews

Grantee	Input data	Output data	Outcome data
Arizona	Total funding spent	All households - assumed ^{1/}	Unavailable
Arkansas	<ul style="list-style-type: none"> Total funding spent Funding spent by week 	<ul style="list-style-type: none"> Total number of households served Number of households served by week 	<ul style="list-style-type: none"> Drop ratio of households from classes Number of households in need of home appliance replacement Anecdotal information from exit interviews documenting household outcomes^{2/}
Connecticut	Total funding spent	Total number of households served	Anecdotal information from narrative reports including about how A16 services impacted households' lives, helped during crisis situations, and helped households move from short-term to long-term stability
Idaho	Total funding spent	Total number of households served	Unavailable
Illinois	Total funding spent	Total number of households served	Unavailable
Iowa	<ul style="list-style-type: none"> Total funding spent Funding spent by fiscal quarter 	Number of households served by type of activity by fiscal quarter	Unavailable
Massachusetts	Total funding spent	All households - assumed	Unavailable
Minnesota ^{3/}	<ul style="list-style-type: none"> Total funding spent Funding spent by "proactive" activity 	Number of households served by type of activity	Measurement indicators in aggregate specific to each subgrantee and other anecdotal information ^{4/}
Mississippi	<ul style="list-style-type: none"> Total funding spent Funding spent by type of activity 	All households - assumed	Unavailable
Montana	<ul style="list-style-type: none"> Total funding spent Funding spent by type of activity 	Number of households served for select types of activities ^{5/}	Unavailable
New Hampshire	Total funding spent	<ul style="list-style-type: none"> Total number of households served Household-level tracking data 	Unavailable ^{6/}
Oregon	Total funding spent	Unavailable	Unavailable
South Carolina	Total funding spent	Total number of households served	Anecdotal information from follow-up questionnaires and success stories submitted for the CSBG Information System Survey
Tennessee	Total funding spent	All households - assumed	Unavailable
Wyoming	<ul style="list-style-type: none"> Total funding spent Funding spent by type of activity 	Number of households served for select types of activities ^{7/}	Unavailable

Grantee	Input data	Output data	Outcome data
American Samoa	Total funding spent	Total households served	Information on the number of households no longer in need of assistance and amount of energy saved ^{6/}
Puerto Rico	Total funding spent	Number of households served for select types of activities ^{7/}	Unavailable

^{1/} Grantees for which the availability of output data is indicated as “All households - assumed” did not indicate during the in-depth interview that they actually collect data on households receiving Assurance 16 services from their service delivery agencies, but reported a number in their FY 2015 Model Plans comparable to their total number of households served with any type of LIHEAP assistance. In addition, these grantees indicated during the in-depth interviews that all LIHEAP recipient households are targeted or eligible to receive Assurance 16 services.

^{2/} The state grantee indicated that one outcome that is documented during the exit interview is whether a household has experienced a reduction in energy use or burden. However, this information is self-reported and documented in a qualitative sense and does not indicate the amount of reduction.

^{3/} Minnesota has implemented a new reporting system that will require subgrantees to propose and report on program activities and measurement indicators for Assurance 16. Input, output, and impact data will be available in October 2015. The prior reporting system allowed, but did not require, subgrantees to log each individual action with a household. However, because the reporting was not required, the data were inconsistent and unreliable. While the new reporting system will streamline data entry, Minnesota does not have capacity at present to measure unduplicated counts of recipients by type of Assurance 16 service, and the new reporting data for Assurance 16 will not be linked with the new LIHEAP Performance Measurement data.

^{4/} Beginning in October 2015, impact data will be available in Minnesota with the filing of proactive Assurance 16 activities reports by subgrantees. The proactive Assurance 16 activities report requires subgrantees to propose indicators of success/impact to measure, describe how the indicators were actually measured, and the outcomes associated with the activity or program.

^{5/} Montana collects data at the state-level on the number of households receiving referral services through Assurance 16. The number of households receiving energy education materials through Assurance 16 might be available at the state-level.

^{6/} While outcome data are not readily available in New Hampshire, the state LIHEAP office collects and tracks household-level output data over successive years for crisis assistance recipients, giving it capacity to examine outcomes related to the effectiveness of outreach through Assurance 16 to households previously in crisis by determining whether they applied for early assistance in the subsequent year or presented a repeat crisis situation.

^{7/} Wyoming collects data at the state-level on the number of households receiving energy education services at the time of the weatherization audit through the WAP program and the number of households who were specifically targeted by the state with Assurance 16 services. It does not include households receiving Assurance 16 services via outreach events.

^{8/} These outcome data were indicated by American Samoa during the in-depth interview as being available but have not been formally analyzed.

^{9/} Puerto Rico provided an estimate of the number of households receiving energy education information in its FY 2015 Model Plan.

Follow-up interviews were then conducted with subgrantees from six of the 15 state grantees identified to have the most innovative and replicable program models based on the initial in-depth interviews with the state LIHEAP offices. The goal of the subgrantee interviews was to receive additional detail about program service delivery and targeted recipients, the use of reporting systems, and collaboration with other funding sources.

Results of the subgrantee interviews are summarized in Table 5-7 and reveal that the majority of subgrantees take a holistic case management approach, providing households with referrals to other social services and access to utility payment programs, while also offering financial literacy and energy conservation education through one-on-one sessions or group classes. At the Community Renewal Team (CRT) in Connecticut and the Minnesota Valley Action Council (MVAC), Assurance 16 households may be eligible to receive additional financial services such as enrollment in matching savings programs.⁴⁰

Two subgrantees focus their Assurance 16 activities on outreach. One of the main goals at the Community Action Partnership (CAP) of Northwest Montana is to reach out to households that are unaware of the LIHEAP program, while New Hampshire's Southwestern Community Services (SCS) focuses on contacting and encouraging households that previously experienced an emergency fuel crisis to apply early for LIHEAP assistance in order to maximize their benefits.

Subgrantees differ widely in their delivery approach of Assurance 16 activities, even among those in the same state. For example, the Community Action Agency (CAA) of Coconino County and Mesa Community Action Network (MesaCAN) of Arizona both provide services in the same five categories of activities, but MesaCAN offers more services and more intensive services to returning households – those who have received LIHEAP assistance in the past. These households attend an orientation which includes a financial assessment, an energy workshop provided by a utility vendor, and a meeting with their path-specific coach.⁴¹ Meanwhile, households new to LIHEAP at MesaCAN have a one-on-one meeting with a case manager in which they receive educational pamphlets and referrals, and learn about utility payment plans.

Other subgrantees restrict Assurance 16 services to specific segments of LIHEAP households. Ozark Opportunities Inc. (OOI) in Arkansas and SCS in New Hampshire, for example, strictly target crisis assistance applicants. MVAC in Minnesota sends out general referral resource guides to all of its LIHEAP households, but only targets its short-term or “responsive” referrals and payment negotiations services to households in crisis, and its long-term or “proactive” case management services to households with \$500 or more in utility arrearages or with a history of disconnections or disconnect notices.

⁴⁰ CRT in Connecticut offers an “Individual Development Account (IDA) Matched Savings” program while MVAC operates a matching savings project through its “Family Assets for Independence in Minnesota (FAIM)” program. FAIM is funded by the federal Assets for Independence (AFI) program.

⁴¹ At the beginning of the orientation, households choose one or more paths toward self-sufficiency. The three paths that households may choose from are employment, education, and financial management.

Table 5-7. Subgrantee-Level Assurance 16 activities, leveraged funding sources and availability of data based on grantee interviews

Subgrantee	A16 activities	Leveraging of funding sources	Output data	Outcome data
Arizona: CAA of Coconino County	<ul style="list-style-type: none"> • Referrals • Vendor Advocacy • Financial Counseling • Energy Education • Case Management 	May use CSBG and/or other available funds depending on the specific supporting services received by households	All LIHEAP households	The CAP 60 system tracks household reported self-sufficiency scores from the initial walk-in, and then after 30, 60, and 90 day follow-ups
Arizona: Mesa Community Action Network (MesaCAN)	<ul style="list-style-type: none"> • Referrals • Vendor Advocacy • Financial Counseling • Energy Education • Case Management 	CSBG funds A16 staff salaries	All LIHEAP households, but activities differ between first time LIHEAP households and repeat LIHEAP households with the latter receiving more in-depth services	A database tracks the individual progress of returner households based on the chosen self-sufficiency path (employment, education and/or financial)
Arkansas: Central Arkansas Development Council (CADC)	<ul style="list-style-type: none"> • Referrals • Financial Counseling • Energy Education • Case Management 	May use CSBG funds depending on the specific supporting services received by households	Any LIHEAP household who expresses interest - estimated at about 225 per year ^{1/}	A database records each household's goals and outcomes. Case workers also complete a scale matrix with households during the first, midpoint and exit interviews to assess impacts on household budget, energy consumption, and energy conservation. ^{2/}
Arkansas: Ozark Opportunities Inc. (OOI)	<ul style="list-style-type: none"> • Needs Assessment • Referrals • Crisis Intervention • Vendor Advocacy^{3/} • Financial Counseling • Energy Education • Case Management 	CSBG funds A16 staff salaries; partnerships with faith-based and non-profit organizations	Crisis applicants only - estimated at about 700 for PY 2015 ^{4/}	Case notes and household outcomes based on mid-year and end-of-year follow-up surveys are tracked in a database and may be isolated by individual, household, program and/or community
Connecticut: Community Renewal Team (CRT)	<ul style="list-style-type: none"> • Needs Assessment • Referrals • Vendor Advocacy • Financial Counseling • Energy Education • Case Management 	May use CSBG funds depending on the specific supporting services received by households; leveraged funds from a non-profit fuel fund	All LIHEAP applicants (11,428 as of the 3 rd quarter of 2015)	Follow-up surveys and data tracked in two databases are used to produce the fiscal and narrative reports mentioned earlier

^{1/} While CADC (Arkansas) does not directly target crisis households or a specific set of households, the intent of CADC's Assurance 16 program is to reduce the incidence of utility crises. Households specify in the LIHEAP application whether they want to receive the case management services offered through Assurance 16. In addition, households can only participate in the Assurance 16 program once every five years, but upon completion of the program, they can elect to transition into additional services offered by the agency.

^{2/} CADC's (Arkansas) database hasn't been optimized to track Assurance 16 matrix information yet.

^{3/} OOI (Arkansas) provides vendor advocacy services in the form of a utility bill cash incentive given after completion of a basic life skills training session.

^{4/} OOI's (Arkansas) 2015 program year was shortened to six months due to an employment vacancy.

LIHEAP Home Energy Notebook for FY 2014: V. Special Study of LIHEAP Assurance 16

Subgrantee	A16 activities	Leveraging of funding sources	Output data	Outcome data
Minnesota: Minnesota Valley Action Council (MVAC)	<ul style="list-style-type: none"> • Outreach • Needs Assessment • Referrals • Crisis Intervention • Vendor Advocacy/Negotiation • Financial Counseling • Energy Education • Case Management 	None	<p>All LIHEAP households receive a mailed referral guide</p> <p>About one-third (~2,230 LIHEAP households) receive the “responsive” services^{5/}</p> <p>About 75 LIHEAP households receive “proactive” services^{6/}</p>	Households receiving proactive services complete a survey and MVAC reports outcomes and impacts for each of the “proactive” services
Montana: CAP Northwest Montana	<ul style="list-style-type: none"> • Outreach • Energy Education • Financial Counseling 	A16 services may be combined with other funding sources. For example, CSBG co-funds the “1 st Time Home Buyer Class” and a local credit union provides a grant for the “Free to Choo\$e” financial education program	All LIHEAP households	<p>The financial benefit of the “Free to Choo\$e” program can be tracked by comparing the household’s pre and post class credit report</p> <p>The agency also tracks households that follow-up for more information after receiving educational brochures, and notes each household’s area of interest so it can target future activities</p>
New Hampshire: Southwestern Community Services (SCS)	<ul style="list-style-type: none"> • Outreach^{7/} • Referrals • Crisis Intervention • Vendor Advocacy/Negotiation 	Housing stabilization funding; private funding and funding through the basic donation program (“WARM fund) to help prevent fuel disconnections and repair faulty equipment	Crisis applicants ^{8/}	The agency tracks crisis households in its software to monitor their emergency situations and provide follow-up services from year to year

^{5/} “Responsive” services include short-term referrals or payment negotiations for households in crisis.

^{6/} “Proactive” services include more intensive and longer-term case management activities. They are targeted toward households with \$500 or more in utility arrearages or those that have been disconnected or received disconnect notices over the last two program years.

^{7/} SCS’s (New Hampshire) outreach is targeted toward households with elderly members, young children, and disabled members in addition to the crisis households.

^{8/} SCS’s (New Hampshire) output data for Assurance 16 is documented for households who have previously experienced an emergency fuel crisis (i.e. households that were low or out of fuel).

The subgrantees interviewed confirmed that the average spending amounts per Assurance 16 household that were estimated from the initial round of interviews were accurate assessments of their household investments. All but one of the interviewed subgrantees combine funding from other sources to run their Assurance 16 programs. Funding from the Community Service Block Grant (CSBG) has helped pay staff salaries and supports referral services received by Assurance 16 households. It is the most common additional input source, but subgrantees have also formed unique partnerships with other agencies in their communities. CAP Northwest Montana, for example, receives funding from a local credit union to offer a program called “Free to Choo\$e” which educates Assurance 16 households and others about credit management and opens up a \$300 line of credit for participants upon completion, regardless of their prior credit history.

Most of the interviewed subgrantees (6 out of 8) track household-level progress or reported outcomes over time, usually through follow-up surveys or interviews. Two agencies, for example, utilize scoring matrices. During the first, midpoint and exit interviews, case workers at the Central Arkansas Development Council (CADC) help households complete a scale matrix ranging from “thriving” to “at risk” to measure changes in household budget, energy consumption, and energy conservation. Meanwhile, the CAA of Coconino County in Arizona has households fill out a self-sufficiency scoring matrix in areas such as employment, education, and health during the initial walk-in session, and then again during 30-, 60-, and 90-day follow ups.

Despite the availability of household-level data at the subgrantee level, reporting up to the grantee-level has its challenges, given the differences in community needs and in turn the activities that subgrantees conduct. In the past, Minnesota allowed subgrantees at their discretion to log Assurance 16 activities on a household level in the state’s eHeat database, but due to inconsistent and unreliable data, the state has streamlined eHeat to allow subgrantees to enter information in aggregate and submit aggregate reports.

Two of the interviewed subgrantees have received positive feedback from Assurance 16 households on the financial counseling activities the subgrantees provide. The spending diary and needs/wants list in CADC’s (Arkansas) program have helped households better understand where their money is going, while fostering a trusting relationship between households and case workers. MesaCAN in Arizona started to offer its financial assessment to all of its returning LIHEAP households at orientation after hearing its benefits from households.

CADC and OOI in Arkansas offer monetary benefits to households to complete their Assurance 16 programs. At CADC, all but eight households completed the program in 2014, and at OOI, 95 percent of those enrolled in the program are on track toward fulfilling their self-reliance goals.⁴² MVAC in Minnesota has also experienced a completion rate over 90 percent in its proactive services program.

Reporting on Assurance 16 Program Outcomes

LIHEAP grantees that use funds for Assurance 16 are expected to “*report to the Secretary concerning the impact of such activities on the number of households served, the level of direct benefits provided to those households, and the number that remain unserved.*” In the discussions with LIHEAP grantees, it appears that most state and territory grantees collect and report data on the Assurance 16 program inputs (i.e., funds used and programs offered) and that many state and territory grantees collect and report data on Assurance 16 program outputs (i.e., number of households served and the types of services delivered). However, very few state and territory grantees have developed the capacity to collect or report information on the outcomes of Assurance 16 program activities,

⁴² CADC indicated that the households who drop out of the Assurance 16 program typically do so before the exit interview despite the final and largest incentive being available upon completion. OOI reported data over a shortened, six-month program year in 2015.

including the “*impact of such activities on the number of households served*” or on the “*number that remain unserved.*”

Most LIHEAP grantees delegate the responsibility for collecting and reporting information on Assurance 16 program inputs, outputs, and outcomes to service delivery agencies. And, while most of these subgrantees are able to report inputs and outputs to grantees, very few are collecting outcome data, and even fewer are reporting such outcome data to grantees. The challenges associated with collecting and reporting data include:

- Some programs serve all households. For those programs, grantees would need to specify procedures for sampling households and conducting follow-up research to enable subgrantees to collect and report outcome data, since it would be too expensive to collect outcome data for all households served by the program.
- Some programs allow each subgrantee to design and implement its own Assurance 16 services. For those programs, it would be difficult to get consistent data on program outcomes.
- Many programs are co-funded by LIHEAP and other funding sources. For those programs, it would be difficult to attribute outcomes to the LIHEAP contribution to program services.
- Grantees generally do not have information on the number of "program eligible households" (i.e., households that have income at or below the state's income standard and that meet all other program requirements) making it difficult to ascertain the number of households that "remain unserved" by program services.

Despite those difficulties, our research found that some grantees and subgrantees collect and report on the outcomes of Assurance 16 program activities. New Hampshire asks subgrantees to target outreach services to households that received LIHEAP crisis grants in the prior program year and then track whether those grantees are able to avoid crises in the current program year. Service delivery agencies in Arizona track the outcomes through direct follow-up with the households. Arkansas service delivery agencies are able to report on the share of households that successfully complete their programs and are able to document some of the benefits of the program. Those data collection and reporting activities could be replicated by other grantees and subgrantees.

Of those grantees and subgrantees that track program outcomes, New Hampshire best demonstrates the type of data collection and reporting model that would need to be implemented if grantees are to report Assurance 16 program outcomes. New Hampshire directs subgrantees to conduct outreach and deliver counseling services to LIHEAP recipients that received crisis benefits in the prior program year. The subgrantee is asked to record the information on service delivery in the state's database. New Hampshire is then able to make use of the household-level information on the Assurance 16 services delivered and the household's status in the current program year to track program outcomes.

Measuring outcomes is more challenging for grantees that encourage subgrantees to deliver a broader range of services. For example, Minnesota allows each subgrantee to deliver the services that it perceives best meet the needs of its households. Previously, they asked all subgrantees to report the same information on program outcomes. However, they found that, for many subgrantees, the specified outcomes were not consistent with the Assurance 16 program they implemented. They are transitioning to a system where each subgrantee is responsible for developing the program outcome data that best describes its program outcomes. The challenge is that the state office then needs to determine how to compare and contrast the outcomes from different subgrantees and then how to consolidate the information in such a way that they can effectively report outcomes to OCS. In addition, it seems that it would be useful to record household-level Assurance 16 participation in the

statewide eHeat database so that the state office can conduct additional research on the longer-term outcomes associated with Assurance 16 program participation.

For both grantees and subgrantees, recording household-level information on Assurance 16 program participation, as well as any direct outcomes associated with program participation, is an important first step in the development of more robust outcomes measurement. Grantee-level systems are needed to track and report Assurance 16 activities and outcomes. And, such systems are needed to enable grantees to examine the relationship between Assurance 16 program participation and other types of longer-term program participation and benefits.

Interface of Performance Management Framework with Measurement of Assurance 16 Outcomes

The systems that will need to be developed to collect and report data for the new LIHEAP Mandatory Performance Measures for FY 2016 are complementary with the types of systems that would be needed to measure Assurance 16 program outcomes and impacts. In both cases, grantees need to collect participation and outcome data for individual households, record those data in a statewide database, and use that database to develop the required information. In addition, the types of data that are specified as LIHEAP Performance Measures (i.e., Service Restoration, Service Loss Prevention, Benefit Targeting, and Burden Reduction Targeting) would furnish outcome data that is relevant to measuring outcomes of the most common Assurance 16 program activities.

Most grantees invest Assurance 16 program funds in activities that are designed to help households reduce their energy bills. The new Mandatory Performance Measures will require grantees to collect energy expenditure data for households. If a household participates in LIHEAP in FY 2016 and in FY 2017, and receives Assurance 16 energy education in FY 2016, a grantee could examine the change in expenditure data from FY 2016 to FY 2017 to help measure program outcomes for an Assurance 16 energy education program. A direct measure of the change in expenditures would not be adequate to document program outcomes, since other factors such as weather and energy prices are likely to have a greater impact on energy expenditures than the energy education program. However, if the grantee compared changes in energy expenditures for households that received energy education to changes in energy expenditures for a similar group of households that did not receive energy education, it could furnish more robust information on potential program outcomes and impacts.

Many grantees invest Assurance 16 program funds in activities that are designed to help households improve their ability to pay their energy bills and avoid service terminations. The new Mandatory Performance Measures will require grantees to collect information on Service Restoration and Service Loss Prevention for households. If a household participates in LIHEAP in FY 2016 and in FY 2017, and receives Assurance 16 crisis intervention, budget counseling, and/or case management services in FY 2016, a grantee could examine the change in household payment status from FY 2016 to FY 2017 to help measure program outcomes for the Assurance 16 program. Direct measurement of the change in the rate at which households experience service loss would not be adequate to document program outcomes, since other factors such as weather, energy prices, utility shutoff practices, and the size of LIHEAP benefits are likely to also have an impact on service loss. However, if the grantee compared changes in shutoffs for households that received services to changes in shutoffs for a similar group of households that did not receive program services, it could furnish more robust information on potential program outcomes and impacts.

The new Mandatory Performance Measures are designed to enhance the ability of grantees to manage the performance of their LIHEAP programs. Using those data to increase the amount of information available to measure Assurance 16 program outcomes is likely to give grantees and OCS a better

understanding of how Assurance 16 program services can be used to increase the effectiveness of the LIHEAP program.

Recommendations for Additional Research

The purpose of this study was to furnish more in-depth information on how LIHEAP funds are invested in Assurance 16 activities, document how the outcomes of Assurance 16 activities are currently being measured, and identify options and alternatives for performance measurement in the context of the new LIHEAP Performance Management framework. The study was successful in meeting those objectives.

The study found that many grantees make substantial investments in Assurance 16 activities. In FY 2014, 25 grantees spent more than \$40 million to deliver services to more than 1.6 million households for eight different kinds of services. Some grantees spend as little as \$5 per client on services, but three grantees spend over \$100 per client.

Grantees and subgrantees have developed a diverse array of services for their households that are designed to reduce their longer-term need for energy assistance. Most grantees are able to report to OCS on the inputs to Assurance 16 (funding and program designs) and the outputs from Assurance 16 (services delivered). However, very few grantees are asking their subgrantees to collect Assurance 16 program outcome data and only one grantee is able to report those data to OCS in a consistent way. Moreover, no grantees or subgrantees have developed procedures for measuring the net impacts of their Assurance 16 activities. Grantees appear to have a good understanding of the expected outcomes and impacts of their Assurance 16 programs and they have plenty of anecdotal information about how their Assurance 16 programs have affected individual households. However, there is no consistent evidence on Assurance 16 best practices.

The following additional research is recommended to enhance OCS' ability to report on the outcomes and impacts of Assurance 16 activities, and to identify best practices that grantees can implement to meet the needs of their households.

- **Analysis of Existing Data** - This study found that some subgrantees collect detailed information on the households that they serve through their Assurance 16 programs. In some cases, subgrantees have longitudinal data on households and conduct follow-up interviews with households. However, those data have not been analyzed. Analysis of those existing datasets would furnish some information on the types and magnitudes of changes for individual Assurance 16 households.
- **Collection and Analysis of Supplemental Data** - The study found that some subgrantees have made significant investments for individual households and have collected a significant amount of information about the experiences of those households. However, the data that they have collected falls short of being able to furnish information on program outcomes. Collection and analysis of additional data would improve the measurement of program outcomes.
- **Process Evaluations of Program Models** - Grantees and subgrantees have designed and implemented thoughtful and innovative program models. However, there is no systematic evidence that the programs are implemented in the way that they were designed or that households perceive that the program services are useful. Process evaluations of some promising program models would furnish information to OCS and grantees on which program models can be implemented effectively and are perceived by households to have value.

- **Impact Evaluation of Program Models** - No grantees have implemented their Assurance 16 programs in such a way that they can measure the program impacts. Impact evaluations of some promising program models would furnish information to OCS and grantees on the benefits that households receive from participation in Assurance 16. To conduct reliable impact evaluations, grantees would need to set up procedures for randomizing assignment of eligible households to treatment and control groups, and would have to collect information that reliably measures how the program impacts the client.
- **Special Study of Small Programs** - Most territories and tribal grantees serve a relatively small population, have relatively small LIHEAP allocations (i.e., less than \$1,000,000), and can only spend a small amount on Assurance 16 program (i.e., less than \$50,000). It would be useful for OCS to identify standard program models that such grantees could adopt with low overhead costs so that households in these jurisdictions can receive Assurance 16 program services in a cost effective way.

Each of these recommended research activities require investment of LIHEAP resources in research rather than client services. And, when viewed at the individual program level, it may appear the investment in research would be expensive compared to the amount spent on an individual program. However, since many grantees implement similar programs, the investment in research should be considered in the context of the total amount spent on Assurance 16 program services (over \$40 million) and the relative lack of information on program best practice and impacts.

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 2013. 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. Currently, this survey is conducted every four years.

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.⁴³

The 2009 RECS is the thirteenth survey in the series of surveys.⁴⁴ For the 2009 RECS, 12,083 households were interviewed, including 724 verified LIHEAP recipient households. For the tabulations in this *Notebook*, 2009 RECS consumption and expenditure data were updated using price and weather data to represent consumption and expenditures for FY 2014.

⁴³ 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).

⁴⁴ 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/>

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:⁴⁵

- The 2009 RECS data for calendar year 2009 were updated to FY 2014 (October 1, 2013 to September 30, 2014), using procedures that adjust the 2009 data to reflect the weather and fuel prices for FY 2014. These procedures are comparable to those used for the FY 1986 - FY 2013 annual LIHEAP Reports to Congress. However, the reader should exercise caution in comparing the data in this *Notebook* 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.

⁴⁵ 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>.

Therefore, the 2014 CPS ASEC 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 *Notebook*.⁴⁶

- 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 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 2014 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 2014 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 of this *Notebook*.

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.⁴⁷

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

⁴⁶ Note that household-level energy and income data from RECS are used to calculate mean and median individual energy burden.

⁴⁷ 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).

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).

Computational procedures

There are two ways to compute mean energy burden for households.⁴⁸ 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.⁴⁹ 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.⁵⁰ 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

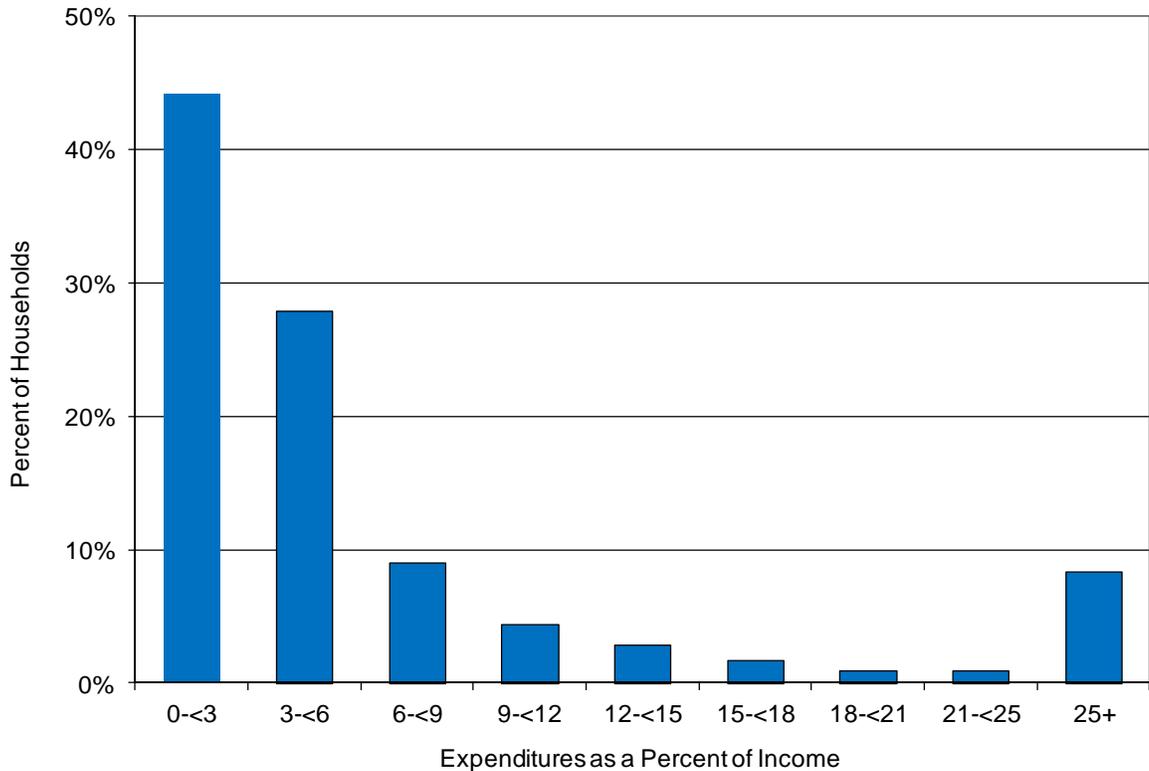
⁴⁸ The mean is the sum of all values divided by the number of values. The mean is also referred to as the average.

⁴⁹ 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.

⁵⁰ 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.

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 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.⁵¹

⁵¹ 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 *Notebook’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 *Notebook* 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 Fiscal Year 2014. The following equation was applied to each household in the microsimulation data file.

$$\text{FY 2014 Projected Btus} = (2009 \text{ estimated heat use} * \text{HDD change}) + (2009 \text{ estimated cooling use} * \text{CDD change}) + (2009 \text{ estimated water heat use} + 2009 \text{ estimated appliance use})$$

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

$$\text{Preliminary Expenditures} = 2009 \text{ Expenditures} * (\text{FY 2014 Projected Usage} / 2009 \text{ Actual Usage})$$

$$\text{Final Expenditures} = \text{Preliminary Expenditures} * \text{Price Change}^{52}$$

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 2014. For example, electricity prices increased by about 7.9 percent from 2009 to FY 2014.

Table A-1. National price factors for FY 2014

Fuel	Price Factors for FY 2014 Projections
Electricity	1.0786
Natural gas	0.8850
Fuel oil / kerosene	1.5253
Liquefied petroleum gas (LPG)	1.3447

⁵² 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 2014, and electricity consumption data is from the *Electric Power Monthly*, November 2014. Natural gas price and consumption data used for calculating price factors are from the *Monthly Energy Review*, December 2014. Fuel oil/kerosene price data for calculating price factors are from the U.S. City Average, Fuel Oil #2, Consumer Price Index of the Bureau of Labor Statistics, Series ID APU000072511. LPG price data were obtained from the Energy Information Administration website (<http://www.eia.doe.gov>). Fuel oil/kerosene and LPG consumption data are from the *Monthly Energy Review*, December 2014.

Expenditure data were adjusted using national price factors for FY 2014. Earlier *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.

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 2014^{1/}

Census Region	All Fuels ^{2/} (MMBtus) ^{3/}	Natural Gas (MMBtus)	Electricity (MMBtus)	Fuel Oil (MMBtus)	Kerosene (MMBtus)	LPG (MMBtus)
US - All households	92.4	113.2	60.8	123.3	67.8	114.7
US - Non-low income households	98.7	117.4	66.2	131.4	73.7	121.9
US - Low income households ^{4/}	80.7	104.2	52.2	108.5	65.4	99.8
US - LIHEAP recipient households ^{5/}	94.8	115.3	56.3	116.8	85.7*	102.4
Northeast - All households	111.9	121.8	52.0	125.1	73.1	118.5
Northeast - Non-low income households	119.2	128.2	57.2	134.2	79.3	127.3
Northeast - Low income households	99.0	110.9	43.4	107.5	70.4	94.6
Northeast - LIHEAP recipient households	103.3	109.3	46.1	118.0	89.2*	97.9*
Midwest - All households	119.4	133.5	68.3	116.3	NC	133.6
Midwest - Non-low income households	125.8	138.2	78.0	118.1	NC	137.1
Midwest - Low income households	107.7	124.4	54.2	114.9	NC	125.7
Midwest - LIHEAP recipient households	113.0	128.5	60.5	101.9*	NC	109.1
South - All households	78.1	107.7	61.9	114.6	60.8	98.1
South - Non-low income households	84.7	114.8	66.2	117.6	69.0*	108.3
South - Low income households	66.0	91.6	54.3	108.2	58.7*	80.6
South - LIHEAP recipient households	77.2	114.8	60.1	118.9*	64.2*	105.8*
West - All households	72.2	85.3	55.5	111.5	48.6*	100.9
West - Non-low income households	78.1	88.6	61.4	111.0	49.4*	105.4
West - Low income households	60.3	75.4	47.5	113.0*	47.8*	92.2
West - LIHEAP recipient households	66.2	89.9	44.9	114.9*	NC	58.4*

^{1/} Developed from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy, and adjusted for FY 2014 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.

* = 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-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 2014

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	\$2,199	3.0%	\$2,095	2.9%	\$1,917	2.6%	\$3,968	5.5%	\$2,342	3.2%	\$3,623	5.0%
US - Non-low income households	\$2,363	2.4%	\$2,210	2.3%	\$2,099	2.2%	\$4,282	4.4%	\$2,649	2.7%	\$3,838	3.9%
US - Low income households ^{3/}	\$1,894	10.0%	\$1,847	9.8%	\$1,623	8.6%	\$3,390	18.0%	\$2,219	11.8%	\$3,178	16.9%
US - LIHEAP recipient households ^{4/}	\$2,137	13.1%	\$1,974	12.1%	\$1,660	10.2%	\$3,647	22.4%	\$3,016*	18.5%	\$3,312	20.3%
Northeast - All households	\$2,964	3.7%	\$2,530	3.2%	\$1,951	2.4%	\$4,077	5.1%	\$2,570	3.2%	\$4,493	5.6%
Northeast - Non-low income households	\$3,213	2.9%	\$2,710	2.4%	\$2,132	1.9%	\$4,413	4.0%	\$2,951	2.7%	\$4,780	4.3%
Northeast - Low income households	\$2,520	12.0%	\$2,225	10.6%	\$1,656	7.9%	\$3,426	16.3%	\$2,404	11.5%	\$3,726	17.8%
Northeast - LIHEAP recipient households	\$2,620	14.5%	\$2,161	11.9%	\$1,618	8.9%	\$3,684	20.3%	\$3,156*	17.4%	\$3,613*	19.9%
Midwest - All households	\$2,142	3.1%	\$2,032	2.9%	\$1,704	2.4%	\$3,248	4.7%	NC	NC	\$3,864	5.5%
Midwest - Non-low income households	\$2,256	2.5%	\$2,122	2.3%	\$1,874	2.1%	\$3,340	3.7%	NC	NC	\$3,971	4.3%
Midwest - Low income households	\$1,935	10.4%	\$1,859	10.0%	\$1,459	7.8%	\$3,173	17.0%	NC	NC	\$3,621	19.4%
Midwest - LIHEAP recipient households	\$2,025	12.6%	\$1,874	11.7%	\$1,576	9.8%	\$2,971*	18.5%	NC	NC	\$3,242	20.2%
South - All households	\$2,196	3.3%	\$2,289	3.4%	\$2,073	3.1%	\$3,649	5.4%	\$1,997	3.0%	\$3,217	4.8%
South - Non-low income households	\$2,380	2.7%	\$2,471	2.8%	\$2,241	2.5%	\$3,801	4.3%	\$2,060*	2.3%	\$3,480	3.9%
South - Low income households	\$1,859	10.8%	\$1,882	10.9%	\$1,780	10.3%	\$3,329	19.3%	\$1,981*	11.5%	\$2,766	16.0%
South - LIHEAP recipient households	\$2,018	15.2%	\$2,201	16.6%	\$1,826	13.8%	\$4,081*	30.8%	\$2,168*	16.4%	\$3,781*	28.5%
West - All households	\$1,623	2.0%	\$1,641	2.1%	\$1,505	1.9%	\$3,288	4.1%	\$1,731*	2.2%	\$3,154	4.0%
West - Non-low income households	\$1,762	1.7%	\$1,741	1.6%	\$1,690	1.6%	\$3,262	3.1%	\$1,983*	1.9%	\$3,339	3.1%
West - Low income households	\$1,342	6.8%	\$1,341	6.8%	\$1,257	6.3%	\$3,361*	17.0%	\$1,461*	7.4%	\$2,791	14.1%
West - LIHEAP recipient households	\$1,263	7.0%	\$1,364	7.6%	\$1,139	6.4%	\$2,760*	15.4%	NC	NC	\$1,730*	9.7%

^{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 2014. 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 2014 CPS ASEC, which reports income for calendar year 2013. Mean group residential burden is computed as mean group residential 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 2014

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	\$2,199	8.6%	\$2,095	7.5%	\$1,917	9.0%	\$3,968	12.4%	\$2,342	15.8%	\$3,623	11.9%
US - Non-low income households	\$2,363	3.3%	\$2,210	2.9%	\$2,099	3.2%	\$4,282	5.1%	\$2,649	5.1%	\$3,838	5.8%
US - Low income households ^{3/}	\$1,894	18.4%	\$1,847	17.3%	\$1,623	18.4%	\$3,390	25.8%	\$2,219	20.2%	\$3,178	24.4%
US - LIHEAP recipient households ^{4/}	\$2,137	18.8%	\$1,974	17.7%	\$1,660	17.5%	\$3,647	23.4%	\$3,016*	19.0%	\$3,312	28.9%
Northeast - All households	\$2,964	9.9%	\$2,530	8.3%	\$1,951	9.9%	\$4,077	12.5%	\$2,570	18.9%	\$4,493	10.8%
Northeast - Non-low income households	\$3,213	3.8%	\$2,710	3.2%	\$2,132	2.8%	\$4,413	5.2%	\$2,951	5.4%	\$4,780	5.7%
Northeast - Low income households	\$2,520	20.8%	\$2,225	17.0%	\$1,656	21.6%	\$3,426	26.7%	\$2,404	24.8%	\$3,726	24.4%
Northeast - LIHEAP recipient households	\$2,620	18.7%	\$2,161	15.5%	\$1,618	17.7%	\$3,684	24.4%	\$3,156*	20.7%	\$3,613*	23.4%
Midwest - All households	\$2,142	8.8%	\$2,032	8.3%	\$1,704	9.2%	\$3,248	15.7%	NC	NC	\$3,864	11.4%
Midwest - Non-low income households	\$2,256	3.3%	\$2,122	3.1%	\$1,874	2.8%	\$3,340	5.6%	NC	NC	\$3,971	5.5%
Midwest - Low income households	\$1,935	18.9%	\$1,859	18.2%	\$1,459	18.5%	\$3,173	23.9%	NC	NC	\$3,621	24.8%
Midwest - LIHEAP recipient households	\$2,025	21.5%	\$1,874	20.7%	\$1,576	20.0%	\$2,971*	19.9%	NC	NC	\$3,242	26.5%
South - All households	\$2,196	9.5%	\$2,289	8.8%	\$2,073	9.8%	\$3,649	8.0%	\$1,997	11.6%	\$3,217	12.9%
South - Non-low income households	\$2,380	3.6%	\$2,471	3.4%	\$2,241	3.6%	\$3,801	4.3%	\$2,060*	5.6%	\$3,480	6.6%
South - Low income households	\$1,859	20.5%	\$1,882	21.1%	\$1,780	20.6%	\$3,329	15.7%	\$1,981*	13.1%	\$2,766	23.7%
South - LIHEAP recipient households	\$2,018	20.0%	\$2,201	20.2%	\$1,826	19.0%	\$4,081*	16.3%	\$2,168*	8.7%	\$3,781*	57.4%
West - All households	\$1,623	5.5%	\$1,641	4.5%	\$1,505	6.0%	\$3,288	15.5%	\$1,731*	5.2%	\$3,154	11.8%
West - Non-low income households	\$1,762	2.3%	\$1,741	2.2%	\$1,690	2.3%	\$3,262	4.9%	\$1,983*	2.0%	\$3,339	5.0%
West - Low income households	\$1,342	11.8%	\$1,341	11.5%	\$1,257	11.0%	\$3,361*	45.4%	\$1,461*	8.7%	\$2,791	25.0%
West - LIHEAP recipient households	\$1,263	9.8%	\$1,364	10.9%	\$1,139	8.7%	\$2,760*	11.0%	NC	NC	\$1,730*	20.9%

^{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 2014. 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 2014 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2014 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2014 residential energy burden for each household is computed as estimated FY 2014 residential energy expenditures divided by estimated FY 2014 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 2014

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	\$2,199	3.9%	\$2,095	3.4%	\$1,917	3.9%	\$3,968	6.3%	\$2,342	10.1%	\$3,623	7.0%
US - Non-low income households	\$2,363	2.8%	\$2,210	2.6%	\$2,099	2.8%	\$4,282	4.5%	\$2,649	4.4%	\$3,838	5.4%
US - Low income households ^{3/}	\$1,894	8.9%	\$1,847	8.5%	\$1,623	8.3%	\$3,390	15.4%	\$2,219	12.9%	\$3,178	15.1%
US - LIHEAP recipient households ^{4/}	\$2,137	9.5%	\$1,974	8.4%	\$1,660	8.7%	\$3,647	15.0%	\$3,016*	14.5%	\$3,312	19.7%
Northeast - All households	\$2,964	4.7%	\$2,530	4.0%	\$1,951	3.6%	\$4,077	6.2%	\$2,570	11.2%	\$4,493	5.9%
Northeast - Non-low income households	\$3,213	3.3%	\$2,710	2.7%	\$2,132	2.3%	\$4,413	4.6%	\$2,951	4.3%	\$4,780	4.6%
Northeast - Low income households	\$2,520	11.1%	\$2,225	9.5%	\$1,656	7.9%	\$3,426	16.3%	\$2,404	14.3%	\$3,726	13.0%
Northeast - LIHEAP recipient households	\$2,620	10.9%	\$2,161	8.1%	\$1,618	6.0%	\$3,684	16.2%	\$3,156*	14.5%	\$3,613*	14.3%
Midwest - All households	\$2,142	3.9%	\$2,032	3.7%	\$1,704	3.6%	\$3,248	9.1%	NC	NC	\$3,864	6.4%
Midwest - Non-low income households	\$2,256	2.8%	\$2,122	2.7%	\$1,874	2.5%	\$3,340	5.3%	NC	NC	\$3,971	5.0%
Midwest - Low income households	\$1,935	9.2%	\$1,859	8.8%	\$1,459	7.2%	\$3,173	13.4%	NC	NC	\$3,621	18.7%
Midwest - LIHEAP recipient households	\$2,025	9.6%	\$1,874	9.0%	\$1,576	9.0%	\$2,971*	9.1%	NC	NC	\$3,242	19.7%
South - All households	\$2,196	4.4%	\$2,289	3.9%	\$2,073	4.4%	\$3,649	5.7%	\$1,997	9.7%	\$3,217	7.9%
South - Non-low income households	\$2,380	3.1%	\$2,471	3.0%	\$2,241	3.1%	\$3,801	4.3%	\$2,060*	4.6%	\$3,480	6.3%
South - Low income households	\$1,859	9.9%	\$1,882	10.6%	\$1,780	9.3%	\$3,329	10.2%	\$1,981*	10.5%	\$2,766	15.2%
South - LIHEAP recipient households	\$2,018	9.9%	\$2,201	12.2%	\$1,826	9.3%	\$4,081*	7.6%	\$2,168*	8.7%	\$3,781*	17.8%
West - All households	\$1,623	2.5%	\$1,641	2.3%	\$1,505	2.8%	\$3,288	5.6%	\$1,731*	2.2%	\$3,154	7.2%
West - Non-low income households	\$1,762	2.0%	\$1,741	1.9%	\$1,690	1.9%	\$3,262	4.2%	\$1,983*	2.2%	\$3,339	4.7%
West - Low income households	\$1,342	5.5%	\$1,341	5.4%	\$1,257	5.6%	\$3,361*	61.2%	\$1,461*	8.8%	\$2,791	12.2%
West - LIHEAP recipient households	\$1,263	6.3%	\$1,364	5.9%	\$1,139	5.6%	\$2,760*	11.0%	NC	NC	\$1,730*	10.6%

^{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 2014. 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 2014 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2014 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2014 residential energy burden for each household is computed as estimated FY 2014 residential energy expenditures divided by estimated FY 2014 annual income. Median individual residential burden is computed by computing the median of the individual values.

^{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	33.8%	56.4%	1.5%	0.1%	4.4%	1.8%
South - Low income households	27.9%	59.3%	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	61.5%	24.2%	0.6%	0.1%	3.3%	3.0%
West - Low income households	41.2%	36.4%	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.

NC = No cases in the 2009 RECS household sample.

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 2014^{1/}

Census Region	All Fuels ^{2/} (MMBtus) ^{3/}	Natural Gas (MMBtus)	Electricity (MMBtus)	Fuel Oil (MMBtus)	Kerosene (MMBtus)	LPG (MMBtus)
US - All households	40.0	57.0	11.8	78.0	36.9	58.0
US - Non-low income households	42.2	57.6	12.4	82.6	37.2	60.9
US - Low income households ^{4/}	35.9	55.7	10.9	69.5	36.7	52.1
US - LIHEAP recipient households ^{5/}	47.3	64.5	12.4	74.0	46.4*	54.7
Northeast - All households	63.0	68.5	15.4	80.1	43.9	61.8
Northeast - Non-low income households	65.6	69.9	16.7	85.0	45.6	63.9
Northeast - Low income households	58.3	66.0	13.3	70.5	43.2	56.1
Northeast - LIHEAP recipient households	60.9	64.3	12.0	76.3	52.1*	56.9*
Midwest - All households	64.0	76.5	18.5	72.3	NC	75.5
Midwest - Non-low income households	66.6	78.2	20.6	72.0	NC	76.5
Midwest - Low income households	59.3	73.2	15.6	72.6	NC	73.3
Midwest - LIHEAP recipient households	62.6	77.6	16.7	58.8*	NC	58.8
South - All households	23.2	43.8	10.9	67.2	25.6	41.0
South - Non-low income households	25.1	45.9	11.3	71.2	23.6*	45.8
South - Low income households	19.7	39.2	10.2	58.8	26.0*	32.8
South - LIHEAP recipient households	24.1	48.3	12.3	63.4*	12.0*	45.2*
West - All households	24.3	35.3	9.6	55.1	20.7*	49.1
West - Non-low income households	27.0	36.4	9.8	56.7	13.2*	49.5
West - Low income households	18.7	32.0	9.3	50.5*	28.7*	48.4
West - LIHEAP recipient households	23.8	41.6	8.6	65.4*	NC	27.6*

^{1/} Developed from the 2009 Residential Energy Consumption Survey (RECS), Energy Information Administration, U.S. Department of Energy, and adjusted for FY 2014 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 2014

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	\$652	0.9%	\$612	0.8%	\$378	0.5%	\$2,105	2.9%	\$1,101	1.5%	\$1,709	2.4%
US - Non-low income households	\$680	0.7%	\$614	0.6%	\$393	0.4%	\$2,231	2.3%	\$1,086	1.1%	\$1,794	1.8%
US - Low income households ^{3/}	\$601	3.2%	\$608	3.2%	\$353	1.9%	\$1,874	9.9%	\$1,108	5.9%	\$1,535	8.1%
US - LIHEAP recipient households ^{4/}	\$797	4.9%	\$709	4.4%	\$398	2.4%	\$2,015	12.4%	\$1,387*	8.5%	\$1,641	10.1%
Northeast - All households	\$1,251	1.6%	\$896	1.1%	\$633	0.8%	\$2,168	2.7%	\$1,294	1.6%	\$2,200	2.8%
Northeast - Non-low income households	\$1,319	1.2%	\$919	0.8%	\$665	0.6%	\$2,298	2.1%	\$1,368	1.2%	\$2,239	2.0%
Northeast - Low income households	\$1,130	5.4%	\$858	4.1%	\$581	2.8%	\$1,916	9.1%	\$1,261	6.0%	\$2,095	10.0%
Northeast - LIHEAP recipient households	\$1,208	6.7%	\$821	4.5%	\$485	2.7%	\$2,076	11.4%	\$1,553*	8.6%	\$2,047*	11.3%
Midwest - All households	\$797	1.1%	\$722	1.0%	\$512	0.7%	\$1,810	2.6%	NC	NC	\$2,017	2.9%
Midwest - Non-low income households	\$818	0.9%	\$730	0.8%	\$543	0.6%	\$1,840	2.0%	NC	NC	\$2,052	2.2%
Midwest - Low income households	\$759	4.1%	\$707	3.8%	\$466	2.5%	\$1,785	9.6%	NC	NC	\$1,936	10.4%
Midwest - LIHEAP recipient households	\$799	5.0%	\$757	4.7%	\$498	3.1%	\$1,433*	8.9%	NC	NC	\$1,584	9.9%
South - All households	\$462	0.7%	\$518	0.8%	\$356	0.5%	\$1,881	2.8%	\$804	1.2%	\$1,322	2.0%
South - Non-low income households	\$487	0.5%	\$538	0.6%	\$369	0.4%	\$1,984	2.2%	\$576*	0.6%	\$1,453	1.6%
South - Low income households	\$415	2.4%	\$473	2.7%	\$334	1.9%	\$1,662	9.6%	\$862*	5.0%	\$1,096	6.3%
South - LIHEAP recipient households	\$490	3.7%	\$561	4.2%	\$387	2.9%	\$1,989*	15.0%	\$390*	2.9%	\$1,438*	10.8%
West - All households	\$323	0.4%	\$334	0.4%	\$278	0.3%	\$1,477	1.9%	\$612*	0.8%	\$1,374	1.7%
West - Non-low income households	\$345	0.3%	\$345	0.3%	\$286	0.3%	\$1,511	1.4%	\$381*	0.4%	\$1,410	1.3%
West - Low income households	\$279	1.4%	\$301	1.5%	\$266	1.3%	\$1,383*	7.0%	\$859*	4.3%	\$1,302	6.6%
West - LIHEAP recipient households	\$305	1.7%	\$367	2.0%	\$256	1.4%	\$1,629*	9.1%	NC	NC	\$752*	4.2%

^{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 2014. 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 2014 CPS ASEC, which reports income for calendar year 2013. Mean group home heating burden is computed as mean group energy expenditures (from RECS) divided by mean group income (from CPS ASEC). See 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 2014

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	\$652	3.2%	\$612	2.9%	\$378	2.5%	\$2,105	8.0%	\$1,101	9.1%	\$1,709	6.7%
US - Non-low income households	\$680	1.0%	\$614	0.9%	\$393	0.6%	\$2,231	2.8%	\$1,086	2.0%	\$1,794	2.8%
US - Low income households ^{3/}	\$601	7.3%	\$608	7.4%	\$353	5.6%	\$1,874	17.5%	\$1,108	11.9%	\$1,535	14.6%
US - LIHEAP recipient households ^{4/}	\$797	8.5%	\$709	8.7%	\$398	5.8%	\$2,015	14.6%	\$1,387*	9.2%	\$1,641	14.8%
Northeast - All households	\$1,251	5.2%	\$896	3.9%	\$633	4.4%	\$2,168	8.1%	\$1,294	11.6%	\$2,200	6.4%
Northeast - Non-low income households	\$1,319	1.6%	\$919	1.2%	\$665	0.9%	\$2,298	2.8%	\$1,368	2.3%	\$2,239	2.8%
Northeast - Low income households	\$1,130	11.6%	\$858	8.6%	\$581	10.1%	\$1,916	18.3%	\$1,261	15.7%	\$2,095	15.9%
Northeast - LIHEAP recipient households	\$1,208	10.3%	\$821	8.4%	\$485	5.6%	\$2,076	15.6%	\$1,553*	10.5%	\$2,047*	12.8%
Midwest - All households	\$797	4.2%	\$722	3.9%	\$512	4.4%	\$1,810	10.2%	NC	NC	\$2,017	6.9%
Midwest - Non-low income households	\$818	1.3%	\$730	1.1%	\$543	0.9%	\$1,840	3.2%	NC	NC	\$2,052	3.1%
Midwest - Low income households	\$759	9.6%	\$707	9.2%	\$466	9.4%	\$1,785	15.9%	NC	NC	\$1,936	15.5%
Midwest - LIHEAP recipient households	\$799	10.8%	\$757	10.9%	\$498	10.1%	\$1,433*	10.5%	NC	NC	\$1,584	14.9%
South - All households	\$462	2.6%	\$518	2.7%	\$356	2.3%	\$1,881	4.3%	\$804	5.0%	\$1,322	6.3%
South - Non-low income households	\$487	0.8%	\$538	0.8%	\$369	0.6%	\$1,984	2.3%	\$576*	1.6%	\$1,453	2.8%
South - Low income households	\$415	5.9%	\$473	7.1%	\$334	5.3%	\$1,662	8.6%	\$862*	5.9%	\$1,096	12.2%
South - LIHEAP recipient households	\$490	6.5%	\$561	7.9%	\$387	5.6%	\$1,989*	8.7%	\$390*	1.6%	\$1,438*	21.8%
West - All households	\$323	1.4%	\$334	1.2%	\$278	1.4%	\$1,477	10.9%	\$612*	2.6%	\$1,374	7.5%
West - Non-low income households	\$345	0.5%	\$345	0.5%	\$286	0.4%	\$1,511	2.3%	\$381*	0.5%	\$1,410	2.2%
West - Low income households	\$279	3.3%	\$301	3.2%	\$266	2.8%	\$1,383*	35.4%	\$859*	4.8%	\$1,302	17.7%
West - LIHEAP recipient households	\$305	2.4%	\$367	2.8%	\$256	2.1%	\$1,629*	6.5%	NC	NC	\$752*	9.4%

^{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 2014. 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 2014 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2014 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2014 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 2014

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	\$652	1.0%	\$612	1.0%	\$378	0.8%	\$2,105	3.3%	\$1,101	4.1%	\$1,709	3.2%
US - Non-low income households	\$680	0.7%	\$614	0.7%	\$393	0.5%	\$2,231	2.2%	\$1,086	1.6%	\$1,794	2.3%
US - Low income households ^{3/}	\$601	2.4%	\$608	2.7%	\$353	1.8%	\$1,874	9.1%	\$1,108	7.0%	\$1,535	7.1%
US - LIHEAP recipient households ^{4/}	\$797	3.3%	\$709	2.9%	\$398	2.5%	\$2,015	8.7%	\$1,387*	6.1%	\$1,641	10.5%
Northeast - All households	\$1,251	1.8%	\$896	1.4%	\$633	1.3%	\$2,168	3.3%	\$1,294	5.4%	\$2,200	2.8%
Northeast - Non-low income households	\$1,319	1.2%	\$919	1.0%	\$665	0.7%	\$2,298	2.2%	\$1,368	2.2%	\$2,239	2.1%
Northeast - Low income households	\$1,130	4.6%	\$858	3.6%	\$581	3.0%	\$1,916	9.8%	\$1,261	7.6%	\$2,095	7.1%
Northeast - LIHEAP recipient households	\$1,208	4.8%	\$821	2.8%	\$485	2.3%	\$2,076	10.5%	\$1,553*	6.1%	\$2,047*	9.6%
Midwest - All households	\$797	1.3%	\$722	1.3%	\$512	1.1%	\$1,810	5.7%	NC	NC	\$2,017	3.8%
Midwest - Non-low income households	\$818	0.9%	\$730	0.9%	\$543	0.7%	\$1,840	3.4%	NC	NC	\$2,052	2.7%
Midwest - Low income households	\$759	3.4%	\$707	3.3%	\$466	2.4%	\$1,785	8.8%	NC	NC	\$1,936	10.5%
Midwest - LIHEAP recipient households	\$799	3.9%	\$757	3.9%	\$498	2.9%	\$1,433*	5.0%	NC	NC	\$1,584	10.5%
South - All households	\$462	0.8%	\$518	0.9%	\$356	0.7%	\$1,881	2.7%	\$804	2.2%	\$1,322	3.0%
South - Non-low income households	\$487	0.5%	\$538	0.6%	\$369	0.5%	\$1,984	2.1%	\$576*	1.6%	\$1,453	2.2%
South - Low income households	\$415	2.1%	\$473	2.5%	\$334	1.9%	\$1,662	5.3%	\$862*	4.1%	\$1,096	6.0%
South - LIHEAP recipient households	\$490	2.7%	\$561	3.3%	\$387	2.5%	\$1,989*	3.8%	\$390*	1.6%	\$1,438*	13.8%
West - All households	\$323	0.4%	\$334	0.4%	\$278	0.5%	\$1,477	2.4%	\$612*	0.6%	\$1,374	2.4%
West - Non-low income households	\$345	0.3%	\$345	0.3%	\$286	0.3%	\$1,511	2.2%	\$381*	0.6%	\$1,410	1.6%
West - Low income households	\$279	0.9%	\$301	1.2%	\$266	1.1%	\$1,383*	28.0%	\$859*	6.9%	\$1,302	5.7%
West - LIHEAP recipient households	\$305	1.5%	\$367	1.9%	\$256	1.4%	\$1,629*	6.5%	NC	NC	\$752*	4.2%

^{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 2014. 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 2014 income is estimated by inflating income reported in the 2009 RECS by the consumer price index (CPI) and FY 2014 energy expenditures are estimated by adjusting energy expenditures reported in the 2009 RECS for changes in weather and energy prices. FY 2014 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 2014

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%	6.1	\$231	0.3%	1.0%	0.3%
US - Non-low income households	94.3%	7.0	\$264	0.3%	0.4%	0.2%
US - Low income households ^{4/}	89.1%	4.4	\$164	0.9%	2.1%	0.5%
US - LIHEAP recipient households ^{5/}	88.6%	3.3	\$123	0.8%	1.3%	0.3%
Northeast - All households	89.0%	2.2	\$114	0.1%	0.4%	0.1%
Northeast - Non-low income households	93.4%	2.5	\$128	0.1%	0.1%	0.1%
Northeast - Low income households	81.1%	1.7	\$85	0.4%	0.9%	0.3%
Northeast - LIHEAP recipient households	79.9%	1.9	\$95	0.5%	0.8%	0.3%
Midwest - All households	95.0%	3.1	\$101	0.1%	0.4%	0.1%
Midwest - Non-low income households	97.1%	3.5	\$115	0.1%	0.2%	0.1%
Midwest - Low income households	91.3%	2.3	\$75	0.4%	0.9%	0.3%
Midwest - LIHEAP recipient households	91.2%	2.0	\$65	0.4%	0.8%	0.2%
South - All households	98.7%	10.4	\$383	0.6%	1.7%	0.6%
South - Non-low income households	99.4%	12.0	\$446	0.5%	0.6%	0.5%
South - Low income households	97.3%	7.3	\$266	1.5%	3.7%	1.2%
South - LIHEAP recipient households	99.5%	6.2	\$214	1.6%	2.5%	0.8%
West - All households	82.2%	4.5	\$182	0.2%	0.6%	0.1%
West - Non-low income households	83.7%	5.1	\$206	0.2%	0.3%	0.1%
West - Low income households	79.3%	3.3	\$128	0.6%	1.2%	0.3%
West - LIHEAP recipient households	81.8%	2.9	\$102	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 2014. Expenditures represent billed costs for electricity used.

^{3/} Represents the percent of household income used for home cooling energy expenditures. See text in Appendix A for definitions of different energy burden statistics.

^{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 reciprocity targeting performance statistics.

State-level estimates of the number of income eligible households for FY 2014 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.⁵⁸ 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 2011-2013 ACS three-year 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 2013 single-year ACS PUMS data.⁵⁹

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,⁶⁰ derived from the 2011-2013 ACS, using the using the federal maximum income standard and the 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 2011-2013 ACS, using the using the federal maximum income standard and the FY 2014 state income standards, respectively.

⁵⁸ For an explanation, and to better understand the differences between the ACS and CPS ASEC, please visit "Which Data Sources to Use" at <https://www.census.gov/topics/income-poverty/income/guidance/data-sources.html>.

⁵⁹ The Census Bureau recommends data estimates from the three-year ACS instead of the one-year ACS when precision of the estimates are of primary importance. See <https://www.census.gov/programs-surveys/acs/guidance/estimates.html>.

⁶⁰ The Census Bureau changed the questions on disability in ACS in 2008. Since the new questions were not comparable to those in previous years, the reader should exercise caution in comparing the estimates of households with disabled individuals with those in previous *Notebooks*.

LIHEAP Home Energy Notebook for FY 2014: Appendix B: Income Eligible Household Estimates

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

(Three-Year ACS 2011-2013)

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	600,043	220,772	112,157	276,455	158,353
Alaska	61,548	18,878	14,682	23,286	19,438
Arizona	696,714	243,347	148,449	228,550	229,962
Arkansas	343,475	122,996	67,384	158,275	89,663
California	3,964,208	1,390,343	876,123	1,313,914	1,316,111
Colorado	581,340	189,679	113,749	184,021	209,140
Connecticut	439,760	183,790	71,421	155,800	132,090
Delaware	101,929	42,230	17,384	37,579	29,548
District of Columbia	71,007	24,831	11,023	28,274	22,784
Florida	2,140,515	905,465	342,641	754,930	656,811
Georgia	1,113,914	362,927	235,643	410,301	362,545
Hawaii	126,864	53,912	25,261	41,574	37,953
Idaho	158,438	52,604	35,177	59,395	46,274
Illinois	1,510,993	562,637	278,408	517,047	497,017
Indiana	749,412	260,248	146,552	291,052	229,043
Iowa	347,131	136,444	59,819	129,566	103,419
Kansas	314,904	109,819	64,963	117,349	96,815
Kentucky	550,567	205,416	97,861	276,070	128,597
Louisiana	591,845	212,939	107,277	251,350	175,606
Maine	171,101	72,277	22,261	79,363	42,987
Maryland	652,002	255,648	118,976	221,169	207,102
Massachusetts	859,275	374,633	120,205	353,368	239,032
Michigan	1,221,328	438,760	212,512	500,649	360,803
Minnesota	617,387	236,228	109,587	217,951	192,465
Mississippi	373,710	136,345	75,026	173,693	99,316
Missouri	726,878	266,115	128,411	302,267	209,314
Montana	120,368	45,079	19,852	45,120	37,646
Nebraska	199,800	71,410	39,506	67,460	65,472
Nevada	283,704	94,446	61,509	93,364	94,508
New Hampshire	150,953	64,347	20,532	63,076	41,306
New Jersey	1,059,271	445,277	183,094	359,697	325,496
New Mexico	222,816	77,745	47,222	85,018	67,631
New York	2,360,959	953,618	402,824	859,998	713,748
North Carolina	1,166,069	416,823	223,629	461,173	354,439
North Dakota	82,467	31,314	11,950	26,274	30,611
Ohio	1,442,767	537,128	253,243	591,304	410,893
Oklahoma	416,978	146,135	87,178	179,855	113,500
Oregon	458,035	165,764	82,428	178,705	139,627
Pennsylvania	1,556,952	673,670	233,828	653,519	413,771
Rhode Island	141,674	57,815	21,574	58,297	40,662
South Carolina	559,079	206,704	108,885	228,668	160,816
South Dakota	88,818	34,875	15,772	33,191	25,498
Tennessee	756,938	277,749	140,859	334,073	203,688
Texas	2,625,100	826,175	653,064	926,451	839,300
Utah	220,033	60,654	62,761	66,114	71,460
Vermont	71,289	30,923	10,175	30,503	18,275
Virginia	894,226	342,812	159,886	327,979	280,181
Washington	768,883	272,446	150,148	286,308	236,513
West Virginia	232,779	94,252	33,585	122,665	53,119
Wisconsin	693,500	271,734	114,354	256,759	210,125
Wyoming	56,641	21,778	10,513	19,039	17,783
All States	35,716,387	13,299,956	6,761,323	13,457,858	10,858,256

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

^{2/} 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 ACS estimate of the total number of all U.S. households is 115,731,199.

^{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*.

LIHEAP Home Energy Notebook for FY 2014: Appendix B: Income Eligible Household Estimates

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 ACS 2011-2013)

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%	533,182	189,359	104,328	248,623	139,236
Alaska	150%	48,452	14,584	11,937	19,542	14,141
Arizona	169% ^{6/7/}	696,576	243,318	148,366	228,495	229,962
Arkansas	145% ^{7/8/}	337,808	121,908	64,587	156,041	88,025
California	198% ^{7/8/}	3,961,140	1,389,415	873,560	1,312,719	1,315,937
Colorado	150%	377,050	114,189	82,058	125,523	130,324
Connecticut	260% ^{7/8/}	439,760	183,790	71,421	155,800	132,090
Delaware	200%	89,404	35,694	16,554	33,169	25,583
District of Columbia	195% ^{7/8/}	71,007	24,831	11,023	28,274	22,784
Florida	150%	1,789,950	730,546	307,215	640,032	543,933
Georgia	171% ^{7/8/}	1,112,832	362,764	234,790	409,825	362,447
Hawaii	150%	90,389	37,538	19,379	31,834	25,037
Idaho	150%	144,733	46,480	32,802	54,642	42,313
Illinois	150%	1,015,201	339,310	207,925	360,006	330,906
Indiana	150%	576,992	182,457	123,690	228,917	174,168
Iowa	150%	244,808	89,735	45,574	95,838	71,808
Kansas	130%	189,382	56,369	44,132	73,025	57,911
Kentucky	130%	415,201	140,525	80,126	214,403	96,016
Louisiana	170% ^{7/8/}	591,310	212,876	106,750	251,073	175,598
Maine	150% ^{9/}	139,770	62,221	18,430	68,350	30,763
Maryland	175%	383,351	147,940	74,540	147,399	108,756
Massachusetts	255% ^{7/8/}	859,275	374,633	120,205	353,368	239,032
Michigan	110%	622,384	169,752	131,969	268,688	185,657
Minnesota	182% ^{7/10/}	489,119	184,660	87,352	180,998	147,098
Mississippi	146% ^{7/8/}	368,514	135,477	72,469	171,881	98,222
Missouri	135%	503,506	165,502	97,741	216,389	142,696
Montana	171% ^{7/11/}	120,368	45,079	19,852	45,120	37,646
Nebraska	116%	103,292	32,689	22,834	37,654	33,035
Nevada	150%	221,377	69,596	51,896	75,746	71,445
New Hampshire	200%	118,129	48,951	16,187	51,333	32,088
New Jersey	200%	761,203	311,573	143,758	274,673	218,757
New Mexico	150%	222,705	77,690	47,222	84,931	67,631
New York	209% ^{7/12/}	2,360,959	953,618	402,824	859,998	713,748
North Carolina	130%	807,723	263,111	171,775	328,770	239,611
North Dakota	199% ^{7/8/}	82,467	31,314	11,950	26,274	30,611
Ohio	175%	1,294,686	461,320	241,471	540,859	362,139
Oklahoma	110%	248,062	73,824	56,982	109,109	67,866
Oregon	181% ^{7/8/}	457,543	165,684	82,070	178,487	139,548
Pennsylvania	150%	1,050,059	413,797	176,443	467,030	270,601
Rhode Island	224% ^{7/8/}	141,674	57,815	21,574	58,297	40,662
South Carolina	150%	489,131	175,106	100,023	202,943	138,321
South Dakota	175%	83,649	32,231	15,652	31,577	23,595
Tennessee	150%	674,263	236,998	131,493	301,128	180,703
Texas	125%	1,783,245	521,055	481,133	641,607	552,643
Utah	150%	176,471	44,939	52,449	54,163	57,051
Vermont	195% ^{7/8/}	71,289	30,923	10,175	30,503	18,275
Virginia	130%	447,469	155,613	87,938	178,502	132,747
Washington	125%	393,593	119,361	81,575	156,971	120,638
West Virginia	130%	180,145	65,865	28,638	96,683	41,495
Wisconsin	198% ^{7/8/}	693,227	271,684	114,120	256,619	210,125
Wyoming	189% ^{7/8/}	56,631	21,778	10,513	19,039	17,773
All States	Not applicable	29,130,456	10,437,487	5,769,470	11,182,870	8,749,197

^{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 ACS average estimate of the total number of all U.S. households is 115,731,199.

^{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.

LIHEAP Home Energy Notebook for FY 2014: Appendix B: Income Eligible Household Estimates

^{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 150 percent of HHS Poverty Guidelines or 60 percent of the state median income, whichever is less. Eligibility for households with incomes between 150 percent and 170 percent of HHS Poverty Guidelines is limited to those households with a vulnerable member who is susceptible to hypothermia, such as elderly persons or persons under two years of age.

^{10/} 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.

^{11/} 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.

^{12/} The state can use a state income guideline of 150 percent of HHS Poverty Guidelines if it is greater than 60 percent of the state median income.

LIHEAP Home Energy Notebook for FY 2014: Appendix B: Income Eligible Household Estimates

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 ACS 2011-2013)

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	600,043	319,496	108,025	105,661	66,861
Alaska	61,548	27,653	10,639	10,160	13,096
Arizona	696,714	343,673	120,566	126,706	105,769
Arkansas	343,475	190,885	75,607	74,154	2,829
California	3,964,208	1,664,244	595,912	585,259	1,118,793
Colorado	581,340	212,165	80,596	84,289	204,290
Connecticut	439,760	131,340	44,438	46,662	217,320
Delaware	101,929	33,848	12,982	14,283	40,816
District of Columbia	71,007	39,115	9,260	7,837	14,795
Florida	2,140,515	1,014,994	380,071	394,885	350,565
Georgia	1,113,914	572,260	185,461	182,279	173,914
Hawaii	126,864	54,470	19,003	16,916	36,475
Idaho	158,438	74,970	33,392	36,371	13,705
Illinois	1,510,993	599,977	200,886	214,338	495,792
Indiana	749,412	330,246	120,802	125,944	172,420
Iowa	347,131	133,769	51,129	59,910	102,323
Kansas	314,904	128,746	49,879	53,789	82,490
Kentucky	550,567	295,092	101,234	94,882	59,359
Louisiana	591,845	307,690	97,790	97,253	89,112
Maine	171,101	70,159	29,605	28,718	42,619
Maryland	652,002	187,477	64,016	66,731	333,778
Massachusetts	859,275	278,912	96,322	94,902	389,139
Michigan	1,221,328	550,907	178,381	187,562	304,478
Minnesota	617,387	208,903	74,751	82,004	251,729
Mississippi	373,710	228,335	73,842	68,379	3,154
Missouri	726,878	329,114	121,939	121,303	154,522
Montana	120,368	52,293	20,561	24,371	23,143
Nebraska	199,800	77,725	38,268	33,840	49,967
Nevada	283,704	124,139	48,322	48,916	62,327
New Hampshire	150,953	41,522	17,480	18,638	73,313
New Jersey	1,059,271	306,188	110,088	115,870	527,125
New Mexico	222,816	136,491	44,424	41,790	111
New York	2,360,959	995,111	310,046	314,975	740,827
North Carolina	1,166,069	558,416	206,894	205,368	195,391
North Dakota	82,467	30,764	10,910	13,164	27,629
Ohio	1,442,767	637,587	219,990	224,593	360,597
Oklahoma	416,978	213,604	83,068	82,588	37,718
Oregon	458,035	202,170	73,511	74,683	107,671
Pennsylvania	1,556,952	592,922	223,876	233,261	506,893
Rhode Island	141,674	51,134	19,646	18,965	51,929
South Carolina	559,079	285,024	102,137	101,970	69,948
South Dakota	88,818	35,914	17,374	17,579	17,951
Tennessee	756,938	393,235	139,247	141,781	82,675
Texas	2,625,100	1,323,026	460,219	458,044	383,811
Utah	220,033	96,554	38,930	40,987	43,562
Vermont	71,289	24,308	12,045	12,227	22,709
Virginia	894,226	308,795	113,300	116,131	356,000
Washington	768,883	290,583	103,010	106,288	269,002
West Virginia	232,779	125,645	45,516	45,143	16,475
Wisconsin	693,500	256,551	101,506	110,195	225,248
Wyoming	56,641	19,892	8,347	10,481	17,921
All States	35,716,387	15,508,033	5,505,243	5,593,025	9,110,086

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

^{2/} The greater of 60 percent of state median income estimates or 150 percent of the HHS Poverty Guidelines.

^{3/} The three-year ACS estimate of the total number of all U.S. households is 115,731,199.

LIHEAP Home Energy Notebook for FY 2014: Appendix B: Income Eligible Household Estimates

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 ACS 2011-2013)

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%	533,182	319,496	108,025	105,661	0
Alaska	150%	48,452	27,653	10,639	10,160	0
Arizona	169% ^{4/5/}	696,576	343,673	120,566	126,706	105,631
Arkansas	145% ^{5/6/}	337,808	190,885	75,421	68,673	2,829
California	198% ^{5/6/}	3,961,140	1,664,230	595,599	582,518	1,118,793
Colorado	150%	377,050	212,165	80,596	84,289	0
Connecticut	260% ^{5/6/}	439,760	131,340	44,438	46,662	217,320
Delaware	200%	89,404	33,848	12,982	14,283	28,291
District of Columbia	195% ^{5/6/}	71,007	39,115	9,260	7,837	14,795
Florida	150%	1,789,950	1,014,994	380,071	394,885	0
Georgia	171% ^{5/6/}	1,112,832	572,260	185,366	181,292	173,914
Hawaii	150%	90,389	54,470	19,003	16,916	0
Idaho	150%	144,733	74,970	33,392	36,371	0
Illinois	150%	1,015,201	599,977	200,886	214,338	0
Indiana	150%	576,992	330,246	120,802	125,944	0
Iowa	150%	244,808	133,769	51,129	59,910	0
Kansas	130%	189,382	128,746	49,879	10,757	0
Kentucky	130%	415,201	295,092	101,234	18,875	0
Louisiana	170% ^{5/6/}	591,310	307,690	97,765	96,743	89,112
Maine	150% ^{7/}	139,770	70,159	29,605	28,718	11,288
Maryland	175%	383,351	187,477	64,016	66,731	65,127
Massachusetts	255% ^{5/6/}	859,275	278,912	96,322	94,902	389,139
Michigan	110%	622,384	550,907	71,477	0	0
Minnesota	182% ^{5/8/}	489,119	208,903	74,731	81,535	123,950
Mississippi	146% ^{5/6/}	368,514	228,335	73,623	63,402	3,154
Missouri	135%	503,506	329,114	121,939	52,453	0
Montana	171% ^{9/}	120,368	52,293	20,561	24,371	23,143
Nebraska	116%	103,292	77,725	25,567	0	0
Nevada	150%	221,377	124,139	48,322	48,916	0
New Hampshire	200%	118,129	41,522	17,480	18,638	40,489
New Jersey	200%	761,203	306,188	110,088	115,870	229,057
New Mexico	150%	222,705	136,491	44,424	41,790	0
New York	209% ^{5/10/}	2,360,959	995,111	310,046	314,975	740,827
North Carolina	130%	807,723	558,416	206,894	42,413	0
North Dakota	199% ^{5/6/}	82,467	30,764	10,910	13,164	27,629
Ohio	175%	1,294,686	637,587	219,990	224,593	212,516
Oklahoma	110%	248,062	213,604	34,458	0	0
Oregon	181% ^{5/6/}	457,543	202,170	73,511	74,191	107,671
Pennsylvania	150%	1,050,059	592,922	223,876	233,261	0
Rhode Island	224% ^{5/6/}	141,674	51,134	19,646	19,665	51,929
South Carolina	150%	489,131	285,024	102,137	101,970	0
South Dakota	175%	83,649	35,914	17,374	17,579	12,782
Tennessee	150%	674,263	393,235	139,247	141,781	0
Texas	125%	1,783,245	1,323,026	460,219	0	0
Utah	150%	176,471	96,554	38,930	40,987	0
Vermont	195% ^{5/6/}	71,289	24,308	12,045	12,227	22,709
Virginia	130%	447,469	308,795	113,300	25,374	0
Washington	125%	393,593	290,583	103,010	0	0
West Virginia	130%	180,145	125,645	45,516	8,984	0
Wisconsin	198% ^{5/6/}	693,227	256,551	101,506	109,922	225,248
Wyoming	189% ^{5/6/}	56,631	19,892	8,347	10,471	17,921
All States	Not applicable	29,130,456	15,508,019	5,336,170	4,231,003	4,055,264

^{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 ACS estimate of the total number of all U.S. households is 115,731,199.

^{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.

LIHEAP Home Energy Notebook for FY 2014: Appendix B: Income Eligible Household Estimates

^{7/} The state income guideline is 150 percent of HHS Poverty Guidelines or 60 percent of the state median income, whichever is less. Eligibility for households with incomes between 150 percent and 170 percent of HHS Poverty Guidelines is limited to those households with a vulnerable member who is susceptible to hypothermia, such as elderly persons or persons under two years of age.

^{8/} 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.

^{9/} 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.

^{10/} The state can use a state income guideline of 150 percent of HHS Poverty Guidelines if it is greater than 60 percent of the state median income.