Data Collection Activities

This appendix describes the data collection activities that were conducted for the *LIHEAP Report to Congress for Fiscal Year 2015*. Data collection activities include state LIHEAP grantee reporting and national household surveys.

Under the block grants created by the Omnibus Budget Reconciliation Act of 1981 (OBRA), federal information collection and reporting requirements for grantees have been limited mostly to only that information which is mentioned specifically in statute.

LIHEAP Household Report

Section 2605(c)(1)(G) of the LIHEAP Act, 42 U.S.C. § 8624(c)(1)(G), requires grantees, as part of their annual LIHEAP grant application, to report the following LIHEAP household data:

- The number and income levels of assisted households.

- The number of assisted households with one or more individuals who are elderly, disabled, or a young child.

- The number and income levels of households applying for LIHEAP assistance, not just those households that receive LIHEAP assistance.

The *LIHEAP Household Report* (OMB Clearance No 0970-0060) gathers state-level data on LIHEAP assisted and applicant households. The submission of the *LIHEAP Household Report* is required as part of each grantee's LIHEAP grant application for funding in the subsequent fiscal year. Reporting instructions provided to grantees for FY 2015 are available in [LIHEAP Action Transmittal 2016-05](#). A copy of the *LIHEAP Household Report for Federal Fiscal Year 2015* is available at:
https://liheappm.acf.hhs.gov/sites/default/files/private/training/pm_webinar/FY2015_Household_Report_Long_Form_Template.pdf

State-reported data on LIHEAP applicant households are not always comparable across states because states can define applicant households differently. Consequently, such data are excluded from the *LIHEAP Report to Congress for Fiscal Year 2015*. However, the reporting of such data is required as part of each grantee's LIHEAP grant application.

Starting in FY 2011, states were required to provide an unduplicated count of households that received any type of LIHEAP assistance, regardless of the type of LIHEAP assistance provided to households (including LIHEAP weatherization assistance). However, states are not requested to break down the unduplicated count of households that received any type of LIHEAP assistance by poverty level (HHSPG).

Starting in FY 2015, states were asked to report separately on the number of households assisted with SNAP nominal benefits; these households are excluded from the unduplicated count of households that received any type of LIHEAP assistance. States were also requested to report separately on households receiving winter crisis assistance versus households receiving year-round crisis assistance. (Prior to FY 2015, states reported on the combined count of the number of households receiving winter/year-round crisis assistance during the federal fiscal year.)

Separate unduplicated counts of the number of assisted households with any vulnerable members, i.e., either elderly, disabled, or young child, regardless of the type of LIHEAP assistance provided to households, as well as an unduplicated count of the number of assisted households having at least one vulnerable member, regardless of the type of LIHEAP assistance provided to households, were also requested.

Instructions to the *FY 2015 LIHEAP Household Report* included information on how to count such households. However, as discussed throughout this appendix, a few states had difficulty in computing unduplicated counts of households for FY 2015, and these data have been suppressed from the *LIHEAP Report to Congress for Fiscal Year 2015.*

Table A-1 provides information for FY 2015 on the percentage of assisted households for which complete data exists for poverty levels, elderly, disabled, young children, and unduplicated vulnerable households, as reported by the states. If a state reported missing or unreliable data, their data were suppressed.

Table A-1.   Percent of assisted households by poverty level, elderly, disabled, young children, and any vulnerable member, as reported uniformly by states, by type of LIHEAP assistance, FY 2015[1]

Household characteristic	Heating assistance	Cooling assistance	Winter crisis assistance	Year-round crisis assistance	Summer crisis assistance	Weatherization assistance	Any type of assistance
Poverty level	100.0%	100.0%	100.0%	100.0%	100.0%	99.7%	NA[2]
Elderly[3]	100.0	100.0	100.0	100.0	100.0	99.2	80.6
Disabled[4]	100.0	100.0	100.0	100.0	100.0	99.2	80.6
Young child[5]	100.0	100.0	100.0	100.0	100.0	99.2	80.6
Elderly, disabled or young child	100.0	100.0	100.0	100.0	100.0	99.2	80.6

[1] These data are derived from the *LIHEAP Household Report for FY 2015.* They're current as of August 23, 2016. Percentages of 100% indicate that states were able to provide complete information for the reported household characteristic. Percentages under 100% indicate that some states were unable to provide complete information for the reported household characteristic.

[2] This information was not collected from states.

[3] "Elderly" refers to a household with at least one member who is 60 years old or older.

[4] "Disability" refers to a household with at least one member who is disabled (the definition of "disability" is determined by each state).

[5] "Young child" refers to a household with at least one member who is five years old or younger.

LIHEAP Performance Data Form - Grantee Survey Section

All states are required annually to complete the *LIHEAP Performance Data Form - Grantee Survey Section* (*Grantee Survey*) (OMB Clearance No. 0970-0449). The data from this survey provides state-level estimates on the sources and uses of states' LIHEAP funds, average household benefits, and the maximum income cutoffs for a four-member household.

HHS conducted this survey for FY 2015 in January 2016, with revised instructions provided to grantees in April 2016. Reporting instructions provided to grantees for FY 2015 are available in LIHEAP Action Transmittal 2016-04. A copy of the *LIHEAP Performance Data Form for Federal Fiscal Year 2015 - Grantee Survey Section* is available at: https://liheappm.acf.hhs.gov/sites/default/files/private/grantee_tools/requirements/FY2015_LIHEAP_Performance_Data_Form_Template.pdf

A key feature of this survey is the collection of estimates of sources and uses of LIHEAP obligated funds. The estimates of obligated funds do not provide data on LIHEAP expenditures in FY 2015, as LIHEAP obligations in FY 2015 could be spent in FY 2016 or later, depending on state law.   The estimates provide a snapshot of how states obligated their FY 2015 funds.

National Household Surveys

Since FY 1982, HHS has relied upon the two national household surveys described below. The results of these surveys provide a variety of national and regional demographic and energy-related data on characteristics of households eligible for LIHEAP and households receiving LIHEAP fuel assistance.

Data from national household surveys are subject to the following errors (for further information, see https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar15.pdf):

- **Sampling error.** The data in the national household surveys are estimates of the actual figures that would have been obtained by interviewing the entire population using the same methodology. The estimates from the chosen sample also differ from other samples of housing units and persons within those housing units. Sampling error in data arises due to the use of probability sampling, which is necessary to ensure the integrity and representativeness of sample survey results. The implementation of statistical sampling procedures provides the basis for the statistical analysis of sample data.

- **Non-sampling error.** In addition to sampling error, data users should realize that other types of errors may be introduced during any of the various complex operations used to collect and process survey data. For example, operations such as editing, reviewing, or keying data from questionnaires may introduce error into the estimates. These and other sources of error contribute to the non-sampling error component of the total error of survey estimates. Non-sampling errors may affect the data in the following two ways: (1) errors that are introduced randomly, which increase the variability of the data; and (2)

systematic errors, which are consistent in one direction and introduce bias into the results.

The "standard error" estimates sampling errors and some types of non-sampling errors. The standard error is a measure of the deviation of a sample estimate from the average of all possible samples. The sample estimate and the estimated standard error permit the construction of interval estimates with a prescribed confidence that the interval includes the average result of all possible samples. Standard errors are not included in this report.

Current Population Survey

The Current Population Survey (CPS) is a national household sample survey which is conducted monthly by the Census Bureau, U.S. Department of Commerce. CPS data in certain previous *LIHEAP Annual Reports to Congress* have been referred to as March CPS data. In the past, the Census Bureau expanded the sample size and added a number of socio-economic questions to the March survey. The Census Bureau referred to this particular CPS supplement as the March CPS. Beginning in 2001, the Census Bureau made several substantive changes to the March CPS, as described in the *LIHEAP Report to Congress for FY 2002*. The Census Bureau refers to the revised supplement as the Annual Social and Economic Supplement (ASEC). This supplement represents a break in the March CPS data series. Detailed information about the changes in design and methodology is available in the Census Bureau's *Current Population Survey Technical Paper 63RV* (March 2002), which can be found online at http://www.census.gov/prod/2002pubs/tp63rv.pdf.

The CPS ASEC includes data that allow one to identify household demographic characteristics. It also is the best source of annual national data for estimating the numbers of LIHEAP income eligible households and the numbers of LIHEAP income eligible vulnerable households. The data that were used to prepare performance statistics for FY 2015 became available in October 2015.

Residential Energy Consumption Survey

The Residential Energy Consumption Survey (RECS) is a national household sample survey which is conducted every four years by the Energy Information Administration (EIA) of the U.S. Department of Energy (DOE). It is designed to provide reliable data at the national and Census regional level. 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.

The survey consists of the following three parts:

- **Household interviews**. 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.

- **Rental agent interviews**. EIA interviews rental agents for households where rent includes some portion of their energy bill. This information augments the information from those households that may not be knowledgeable about the fuels used for space heating or water heating.

- **Energy supplier questionnaires**. 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.

The 2009 RECS is the thirteenth in a series of surveys. For the 2009 RECS, approximately 12,083 households were interviewed, including 724 verified LIHEAP recipient households. Home energy data have been adjusted to FY 2015 with respect to changes in weather and fuel prices.

For information about the RECS sample design, see EIA's publication, *Sample Design for the Residential Energy Consumption Survey*, DOE/EIA-0555 (94)/1, Washington, DC, August 1994. This publication is available at:
http://www.eia.gov/consumption/residential/data/archive/pdf/DOE%20EIA-0555(94)-1.pdf.

The data on home energy usage and costs from the 2009 RECS are available from the EIA website at: 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 data to derive home energy estimates are as follows:

- The RECS uses a representative national household sample, providing statistically reliable estimates for all, non-low income, and low income households.

- The 2009 RECS included a supplemental sample of LIHEAP recipient households that is representative of the population of LIHEAP heating and cooling assistance recipient households.

- The RECS includes usage data for all residential fuels.

- Energy suppliers provide information on actual residential energy consumption and expenditures of households sampled by the RECS in order to eliminate the inaccuracy of self-reported data.

- Regression analyses of data from the RECS 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:

- The 2009 RECS data for CY 2009 were updated to FY 2015 (October 1, 2014, to September 30, 2015), using procedures that adjust the 2009 data to reflect the weather and fuel prices for FY 2015. These procedures are comparable to those used for the FY 1986 - FY 2014 annual LIHEAP Reports to Congress. However, the reader should exercise caution in comparing the data in this report with data in annual LIHEAP Reports to Congress prior to FY 1986, in which consumption and expenditure data were predicted on 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 especially true of the LIHEAP recipient household groups and the liquefied petroleum gas and kerosene heating subgroups. This affects the reliability of the estimates for such subgroups.

- The household is a basic reporting unit for the RECS and LIHEAP. The RECS employs the Census Bureau's definition of household (i.e., a household includes 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 these definitions.

- The Current Population Survey Annual Social and Economic Supplement (CPS ASEC), conducted by the Census Bureau, provides, at national and regional levels, data on total household income as a specific dollar amount whereas RECS provides household income data within dollar intervals. CPS's larger sample size and method of collecting income data result in more accurate income data than RECS income data. 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 report.[1]

- Households were classified in the 2009 RECS as eligible or ineligible for LIHEAP based on whether their income was above or below the maximum of the LIHEAP income eligibility criteria under section 2605(b)(2)(B) of the LIHEAP Act, 42 U.S.C. § 8624(b)(2)(B) (the greater of 150 percent of HHSPG or 60 percent of the SMI).[2] The estimates of such households do not include those whose incomes may have exceeded the statutory income standards but which received LIHEAP benefits because they were categorically eligible for LIHEAP under section 2605(b)(2)(A) of the LIHEAP Act, 42

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

[2] Households were classified as low income on the basis of (in addition to 150 percent of HHSPG) 60 percent of SMI.

U.S.C. § 8624(b)(2)(A). Conversely, the estimates of LIHEAP recipient households include survey respondents who were reported as LIHEAP recipients by state LIHEAP administrative data but who reported incomes higher than the maximum statutory income in the RECS.

Average Home Energy Consumption and Expenditures

Average heating and cooling consumption and expenditure estimates for FY 2015 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 2015 heating degree days, cooling degree days, and price inflators applied to the original expenditure data, as well as the 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.

Energy Burden

Energy burden measures the percentage of income that households pay for home energy. Thus, it 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 energy. However, for a group of households, there are different ways to compute energy burden and different interpretations of the resulting energy burden statistics. The purpose of this section is to examine the different energy burden statistics and discuss the interpretation of each.

Computational Procedures

There are two ways to compute mean (average) energy burden for a given group of households. The first is the "mean individual burden" approach and the second is the "mean group burden" approach. While these approaches appear to be similar, they give quite different values.

Using the "mean individual burden" approach, mean energy burden is computed as follows: (1) the ratio of energy expenditures to annual income for each household in the group is computed; and (2) the mean of these ratios is computed for the group. However, for some households, residential energy expenditures appear to exceed income. Elderly households living on their savings are an example of such households. For such households, the energy burden has been limited to 100 percent.

For example, consider a group that contains four households with energy burdens of four, five, seven, and eight percent. 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 six percent.

Using the "mean group burden" approach, energy burden is computed as follows: (1) total energy expenditures for all households and total income for all households in the group are

computed; and (2) the ratio of total energy expenditures to total income is computed for the group. 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. Dividing the $4,000 in total energy bills by $100,000 in total income results in a mean group burden of four percent.

According to the 2009 RECS, the mean residential energy burden for all LIHEAP income eligible households in 2009 using the mean individual burden approach was 18.7 percent and using the mean group burden approach was 9.6 percent. The disparity between the two statistics stems from the fact that the lowest income households spend a greater share of their income on residential energy than do higher income households. 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.

If the relationship between income and residential energy expenditures were linear (i.e., if a 10 percent increase in income were associated with a 10 percent increase in residential energy expenditures), then the two statistics would be equal. However, because 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). This leads to a substantial difference between the two statistics.

Statistical Measures

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 is the sum of a given set of values divided by the number of values in the set; whereas the median is the value that is at the center (i.e., at the point at which an equal number are greater as are smaller) of an ordered distribution of such values.

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

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 than the RECS does and has a larger sample size than the RECS.

As a result, the RECS categorizes more households than justified as LIHEAP income eligible. Based on the 2009 RECS, the estimate of LIHEAP income eligible households for CY 2009 was 39.7 million. Based on the 2010 CPS ASEC, the estimate of LIHEAP income eligible households for CY 2009 was 37.1 million. Since some households that were not LIHEAP income eligible were categorized by the RECS as LIHEAP income eligible, the RECS overestimated the average energy expenditures for LIHEAP income eligible households.

The estimates of average energy burden also may be overstated because the RECS, like other surveys, understates income. Comparisons between the estimates of the number of LIHEAP income eligible households from the 1990 RECS and the 1991 March CPS suggest that the probable range of the overestimate in mean group energy burden is from five to ten percent.

Data Interpretation

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

The key difference between mean individual burden and mean group burden is that mean individual burden focuses on the experience of individual households, whereas mean group burden focuses 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) and the mean group burden furnishes more information on how a group of households is affected by energy 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, although 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 mean individual burden and median individual burden is that mean individual burden furnishes information on all LIHEAP income eligible households at the expense of overstating what is happening to the "average" LIHEAP income eligible household, whereas median individual burden 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, one usually limits the analysis to a comparison of one statistic between groups, the choice of which is dictated by which of the following types of analysis are being conducted:

- If *funding levels* are being examined, then the *mean group burden* is probably preferable. This statistic furnishes information on the aggregate energy cost of LIHEAP income eligible households and the portion of income for this group that is spent on energy. Using this statistic permits a direct examination of the relationship between total energy costs and total LIHEAP funding. In general, a mean is a more complete statistic than a median.

- If *targeting* decisions are being examined, then the *mean individual burden* or the *median individual burden* is probably preferable. Each of these statistics furnishes 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.

Projections of Energy Consumption and Expenditures

HHS projected energy consumption (in Btus) and expenditures by adjusting such amounts for each household in the RECS micro data file from the RECS year to the year of this report. The RECS reported consumption for CY 2009; whereas this report covers FY 2015. HHS based such adjustments on changes in weather and prices from CY 2009 to FY 2015; in so doing, HHS assumed that households didn't change their energy use behavior (that is, their tendency to seek a specific indoor temperature) as a result of weather, price, or other changes.

HHS first projected consumption. It did so by adjusting CY 2009 heating and cooling end use consumption estimates (from the RECS)[3] for changes in heating degree days (HDDs) and cooling degree days (CDDs) from CY 2009 to FY 2015 using the following formula:

FY 2015 projected cons.   =   (2009 estimated heat cons. * HDD change) +
(2009 estimated cooling cons.* CDD change) +
(2009 estimated water heat cons. + 2009 estimated appliance cons.)

HHS next projected expenditures. It did so by adjusting CY 2009 actual expenditures for projected changes in consumption and actual changes in fuel prices from CY 2009 to FY 2015. It did so through the following formula, which it applied to each household and the applicable fuel:

Preliminary exp.   =   2009 exp. * (FY 2015 projected cons. / 2009 actual cons.)

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[3] EIA developed the CY 2009 end use consumption estimates using data from the 2009 RECS. 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 use, housing characteristics, weather, and demographics.

Final exp.   =   preliminary exp. * price factor

Table A-2 shows the price changes in the form of national price factors that HHS used to make its projections. The price factors show the actual change in the average price of a fuel from CY 2009 to FY 2015. For example, electricity prices increased by about 9.7 percent from CY 2009 to FY 2015.

Table A-2.   National residential energy price factors for FY 2015

Fuel	Price factors for FY 2015 projections[1]
Electricity	1.0970
Natural gas	0.8623
Fuel oil / kerosene	1.1702
Liquefied petroleum gas (LPG)	1.0767

[1] 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 2015, and electricity consumption data is from the *Electric Power Monthly*, November 2015. Natural gas price and consumption data used for calculating price factors are from the *Monthly Energy Review*, December 2015. Fuel oil/kerosene price data for calculating prices factors are from the U.S. City Average, Fuel Oil #2, Consumer Price Index of the Bureau of Labor Statistics, Series ID APU000072511. LPG price data were obtained from the Energy Information Administration website (http://www.eia.doe.gov). Fuel oil/kerosene and LPG consumption data are from the *Monthly Energy Review*, December 2015.

HHS used national price factors rather than state price factors to project expenditure data for FY 2015. It did so because the use of national price factors causes little difference in such projections. HHS determined this to be the case for FY 1993/1994. For that period, the state electricity price factors varied between 0.3 percent and 1.2 percent; whereas the national average price factor was 0.8 percent. Likewise, the state natural gas price factors varied between 1.7 percent and 2.8 percent; whereas the national average price factor was two percent.

Copies of the following forms and reports are publicly available at the URLs below:

- Section M (formerly Section K, the section which pertains to energy assistance) of the 2009 RECS household questionnaire (http://www.eia.gov/survey/form/eia_457/form.pdf)

- *LIHEAP Household Report for Federal Fiscal Year 2015* (https://liheappm.acf.hhs.gov/sites/default/files/private/training/pm_webinar/FY2015_Household_Report_Long_Form_Template.pdf)

- *LIHEAP Performance Data Form for Federal Fiscal Year 2015 - Grantee Survey Section* (https://liheappm.acf.hhs.gov/sites/default/files/private/grantee_tools/requirements/FY2015_LIHEAP_Performance_Data_Form_Template.pdf)