

THE HOME ENERGY AFFORDABILITY GAP 2016

(2ND SERIES) PUBLISHED APRIL 2017

Finding #1

Home Energy Affordability Gap: 2011 (base year)	\$38,597,642,593	The Home Energy Affordability Gap Index (2 nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In the total United States this Index was 94.2 for 2016.
Home Energy Affordability Gap: 2016 (current year)	\$36,360,964,509	The Home Energy Affordability Gap Index (2 nd Series) uses the year 2011 as its base year. The Index for 2011 is set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap for has increased since 2011. A current year Index of less than 100 indicates that the Home Energy Affordability Gap has decreased since 2011.
Home Energy Affordability Gap Index (2011 = 100)	94.2	

Finding #2

	Last Year	This Year	
LIHEAP Allocation (\$000's)	\$3,300,004	\$2,969,680	Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in the total United States. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation for the total United States was \$2,969.7 million in 2016 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 3,814,393.
Number of Households <150% FPL	29,264,032	29,189,463	
Heating/Cooling Bills "Covered" by LIHEAP	3,803,982	3,814,393	In comparison, the gross LIHEAP allocation for the total United States in 2015 reached \$3,300.0 million and covered 3,803,982 average annual bills.

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Home Energy Affordability Gap: 2011 (base year)	\$6,428,502,561	The Home Energy Affordability Gap Index (2 nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In the East North Central region this Index was 92.3 for 2016.
Home Energy Affordability Gap: 2016 (current year)	\$5,931,855,087	The Home Energy Affordability Gap Index (2 nd Series) uses the year 2011 as its base year. The Index for 2011 is set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap for has increased since 2011. A current year Index of less than 100 indicates that the Home Energy Affordability Gap has decreased since 2011.
Home Energy Affordability Gap Index (2011 = 100)	92.3	

Finding #2

	Last Year	This Year	
LIHEAP Allocation (\$000's)	\$647,893	\$580,263	Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in the East North Central region. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation for the East North Central region was \$580.3 million in 2016 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 745,266.
Number of Households <150% FPL	4,404,904	4,372,917	
Heating/Cooling Bills "Covered" by LIHEAP	707,830	745,266	

In comparison, the gross LIHEAP allocation for the East North Central region in 2015 reached \$647.9 million and covered 707,830 average annual bills.

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Home Energy Affordability Gap: 2011 (base year)	\$2,659,129,715	The Home Energy Affordability Gap Index (2 nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In the East South Central region this Index was 107.8 for 2016.
Home Energy Affordability Gap: 2016 (current year)	\$2,866,921,258	The Home Energy Affordability Gap Index (2 nd Series) uses the year 2011 as its base year. The Index for 2011 is set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap for has increased since 2011. A current year Index of less than 100 indicates that the Home Energy Affordability Gap has decreased since 2011.
Home Energy Affordability Gap Index (2011 = 100)	107.8	

Finding #2

	Last Year	This Year	
LIHEAP Allocation (\$000's)	\$169,558	\$156,954	Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in the East South Central region. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation for the East South Central region was \$157.0 million in 2016 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 181,054.
Number of Households <150% FPL	2,164,241	2,156,042	
Heating/Cooling Bills "Covered" by LIHEAP	184,430	181,054	

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Home Energy Affordability Gap: 2011 (base year)	\$6,935,724,277	The Home Energy Affordability Gap Index (2 nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In the Mid-Atlantic region this Index was 70.0 for 2016.
Home Energy Affordability Gap: 2016 (current year)	\$4,858,080,728	The Home Energy Affordability Gap Index (2 nd Series) uses the year 2011 as its base year. The Index for 2011 is set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap for has increased since 2011. A current year Index of less than 100 indicates that the Home Energy Affordability Gap has decreased since 2011.
Home Energy Affordability Gap Index (2011 = 100)	70.0	

Finding #2

	Last Year	This Year	
LIHEAP Allocation (\$000's)	\$706,421	\$622,021	Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in the Mid-Atlantic region. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation for the Mid-Atlantic region was \$622.0 million in 2016 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 748,120.
Number of Households <150% FPL	3,431,741	3,438,168	
Heating/Cooling Bills "Covered" by LIHEAP	766,194	748,120	

In comparison, the gross LIHEAP allocation for the Mid-Atlantic region in 2015 reached \$706.4 million and covered 766,194 average annual bills.

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Home Energy Affordability Gap: 2011 (base year)	\$1,298,705,415	The Home Energy Affordability Gap Index (2 nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In the Mountain region this Index was 104.6 for 2016.
Home Energy Affordability Gap: 2016 (current year)	\$1,358,316,843	The Home Energy Affordability Gap Index (2 nd Series) uses the year 2011 as its base year. The Index for 2011 is set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap for has increased since 2011. A current year Index of less than 100 indicates that the Home Energy Affordability Gap has decreased since 2011.
Home Energy Affordability Gap Index (2011 = 100)	104.6	

Finding #2

	Last Year	This Year	
LIHEAP Allocation (\$000's)	\$166,374	\$150,580	Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in the Mountain region. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation for the Mountain region was \$150.6 million in 2016 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 268,115.
Number of Households <150% FPL	2,142,686	2,131,899	
Heating/Cooling Bills "Covered" by LIHEAP	278,218	268,115	In comparison, the gross LIHEAP allocation for the Mountain region in 2015 reached \$166.4 million and covered 278,218 average annual bills.

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Finding #1

Home Energy Affordability Gap: 2011 (base year)	\$2,940,690,791	The Home Energy Affordability Gap Index (2 nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In the New England region this Index was 84.0 for 2016.
Home Energy Affordability Gap: 2016 (current year)	\$2,469,791,754	The Home Energy Affordability Gap Index (2 nd Series) uses the year 2011 as its base year. The Index for 2011 is set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap for has increased since 2011. A current year Index of less than 100 indicates that the Home Energy Affordability Gap has decreased since 2011.
Home Energy Affordability Gap Index (2011 = 100)	84.0	

Finding #2

	Last Year	This Year	
LIHEAP Allocation (\$000's)	\$338,628	\$303,130	Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in the New England region. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation for the New England region was \$303.1 million in 2016 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 255,884.
Number of Households <150% FPL	1,055,548	1,053,509	
Heating/Cooling Bills "Covered" by LIHEAP	241,152	255,884	

In comparison, the gross LIHEAP allocation for the New England region in 2015 reached \$338.6 million and covered 241,152 average annual bills.

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Home Energy Affordability Gap: 2011 (base year)	\$3,205,835,024	The Home Energy Affordability Gap Index (2 nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In the Pacific region this Index was 133.3 for 2016.
Home Energy Affordability Gap: 2016 (current year)	\$4,273,571,910	The Home Energy Affordability Gap Index (2 nd Series) uses the year 2011 as its base year. The Index for 2011 is set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap for has increased since 2011. A current year Index of less than 100 indicates that the Home Energy Affordability Gap has decreased since 2011.
Home Energy Affordability Gap Index (2011 = 100)	133.3	

Finding #2

	Last Year	This Year	
LIHEAP Allocation (\$000's)	\$278,703	\$254,365	Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in the Pacific region. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation for the Pacific region was \$254.4 million in 2016 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 514,096.
Number of Households <150% FPL	4,478,847	4,466,053	
Heating/Cooling Bills "Covered" by LIHEAP	561,896	514,096	

In comparison, the gross LIHEAP allocation for the Pacific region in 2015 reached \$278.7 million and covered 561,896 average annual bills.

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Finding #1

Home Energy Affordability Gap: 2011 (base year)	\$7,992,087,977	The Home Energy Affordability Gap Index (2 nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In the South Atlantic region this Index was 97.4 for 2016.
Home Energy Affordability Gap: 2016 (current year)	\$7,780,979,293	The Home Energy Affordability Gap Index (2 nd Series) uses the year 2011 as its base year. The Index for 2011 is set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap for has increased since 2011. A current year Index of less than 100 indicates that the Home Energy Affordability Gap has decreased since 2011.
Home Energy Affordability Gap Index (2011 = 100)	97.4	

Finding #2

	Last Year	This Year	
LIHEAP Allocation (\$000's)	\$444,592	\$404,482	Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in the South Atlantic region. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation for the South Atlantic region was \$404.5 million in 2016 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 459,341.
Number of Households <150% FPL	5,919,031	5,932,118	
Heating/Cooling Bills "Covered" by LIHEAP	458,723	459,341	

In comparison, the gross LIHEAP allocation for the South Atlantic region in 2015 reached \$444.6 million and covered 458,723 average annual bills.

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Home Energy Affordability Gap: 2011 (base year)	\$2,218,897,046	The Home Energy Affordability Gap Index (2 nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In the West North Central region this Index was 98.7 for 2016.
Home Energy Affordability Gap: 2016 (current year)	\$2,189,734,843	
Home Energy Affordability Gap Index (2011 = 100)	98.7	

Finding #2

	Last Year	This Year	
LIHEAP Allocation (\$000's)	\$335,616	\$303,229	Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in the West North Central region. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation for the West North Central region was \$303.2 million in 2016 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 404,236.
Number of Households <150% FPL	1,825,660	1,809,005	
Heating/Cooling Bills "Covered" by LIHEAP	366,073	404,236	

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Home Energy Affordability Gap: 2011 (base year)	\$4,918,069,787	The Home Energy Affordability Gap Index (2 nd Series) indicates the extent to which the Home Energy Affordability Gap has increased between the base year and the current year. In the West South Central region this Index was 94.2 for 2016.
Home Energy Affordability Gap: 2016 (current year)	\$4,631,712,793	The Home Energy Affordability Gap Index (2 nd Series) uses the year 2011 as its base year. The Index for 2011 is set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap for has increased since 2011. A current year Index of less than 100 indicates that the Home Energy Affordability Gap has decreased since 2011.
Home Energy Affordability Gap Index (2011 = 100)	94.2	

Finding #2

	Last Year	This Year	
LIHEAP Allocation (\$000's)	\$212,220	\$194,655	Existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in the West South Central region. LIHEAP is the federal fuel assistance program designed to help pay low-income heating and cooling bills. The gross LIHEAP allocation for the West South Central region was \$194.7 million in 2016 and the number of average annual low-income heating and cooling bills "covered" by LIHEAP was 238,281.
Number of Households <150% FPL	3,841,374	3,829,752	
Heating/Cooling Bills "Covered" by LIHEAP	239,466	238,281	

NOTES AND EXPLANATIONS

The 2012 Home Energy Affordability Gap, published in May 2013, introduced the 2nd Series of the annual Affordability Gap analysis. The 2012 Home Energy Affordability Gap going forward cannot be directly compared to the Affordability Gap (1st Series) for 2011 and earlier years. While remaining fundamentally the same, several improvements have been introduced in both data and methodology in the Affordability Gap (2nd Series).

The most fundamental change in the Home Energy Affordability Gap (2nd Series) is the move to a use of the American Community Survey (ACS) (5-year data) as the source of foundational demographic data. The Affordability Gap (1st Series) relied on the 2000 Census as its source of demographic data. The ACS (5-year data) offers several advantages compared to the Decennial Census. While year-to-year changes are smoothed out through use of 5-year averages, the ACS nonetheless is updated on an annual basis. As a result, numerous demographic inputs into the Affordability Gap (2nd Series) will reflect year-to-year changes on a county-by-county basis, including:

- The distribution of heating fuels by tenure;
- The average household size by tenure;
- The number of rooms per housing unit by tenure;
- The distribution of owner/renter status;
- The distribution of household size;
- The distribution of households by ratio of income to Poverty Level;

Data on housing unit size (both heated square feet and cooled square feet) is no longer calculated based on the number of rooms. Instead, Energy Information Administration/Department of Energy (EIA/DOE) data on square feet of heated and cooled living space per household member is used beginning with the Home Energy Affordability Gap (2nd Series). A distinction is now made between heated living space and cooled living space, rather than using total living space.

The change resulting in perhaps the greatest dollar difference in the aggregate and average Affordability Gap for each state is a change in the treatment of income for households with income at or below 50% of the Federal Poverty Level. In recent years, it has become more evident that income for households with income below 50% of Poverty Level is not normally distributed. Rather than using the mid-point of the Poverty range (i.e., 25% of Poverty Level) to determine income for these households, income is set somewhat higher (40% of Poverty). By setting income higher, both the average and aggregate Affordability Gap not only for that Poverty range, but also for the state as a whole, will be lower. The Affordability Gaps for other Poverty ranges remain unaffected by this change.

Another change affecting both the aggregate and average Affordability Gap is a change in the definition of “low-income.” The Home Energy Affordability Gap (2nd Series) has increased the definition of “low-income” to 200% of the Federal Poverty Level (up from 185% of Poverty). While this change may increase the aggregate Affordability Gap, it is likely to decrease the average Affordability Gap. Since more households are added to the analysis, the aggregate is likely to increase, but since the contribution of each additional household is less than the contributions of households with lower incomes, the overall average will most likely decrease.

Most of the Home Energy Affordability Gap calculation remains the same. All references to “states” include the District of Columbia as a “state.” Low-income home energy bills are calculated in a two-step process: First, low-income energy consumption is calculated for the following end-uses: (1) space heating; (2) space cooling; (3) domestic hot water; and (4) electric appliances (including lighting and refrigeration). All space cooling and appliance consumption is assumed to involve only electricity. Second, is multiplied by a price per unit of energy by fuel type and end use by time of year. The price

of electricity, for example, used for space cooling (cooling months), space heating (heating months), and appliances (total year) differs to account for the time of year in which the consumption is incurred.

Each state’s Home Energy Affordability Gap is calculated on a county-by-county basis. Once total energy bills are determined for each county, each county is weighted by the percentage of persons at or below 200% of the Federal Poverty Level to the total statewide population at or below 200% of the Federal Poverty Level to derive a statewide result. Bills are calculated by end-use and summed before county weighting. State data are aggregated into regional totals as follows:

East North Central	Illinois, Indiana, Michigan, Ohio, Wisconsin
East South Central	Alabama, Kentucky, Mississippi, Tennessee
Mid-Atlantic	New Jersey, New York, Pennsylvania
Mountain	Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming
New England	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
Pacific	Alaska, California, Hawaii, Oregon, Washington
South Atlantic	Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
West South Central	Arkansas, Louisiana, Oklahoma, Texas

LIHEAP comparisons use gross allotments from annual baseline LIHEAP appropriations as reported by the federal LIHEAP office. They do not reflect supplemental appropriations or the release of LIHEAP “emergency” funds. The number of average heating/cooling bills covered by each state’s LIHEAP allocation is determined by dividing the total base LIHEAP allocation for each state by the average heating/cooling bill in that state, the calculation of which is explained below. No dollars are set aside for administration; nor are Tribal set-asides considered.

State financial resources and utility-specific rate discounts are not considered in the calculation of the Affordability Gap. Rather, such funding should be considered available to fill the Affordability Gap. While the effect in any given state may perhaps seem to be the same, experience shows there to be an insufficiently authoritative source of state-by-state data, comprehensively updated on an annual basis, to be used as an input into the annual Affordability Gap calculation.

Energy bills are a function of the following primary factors:

- Tenure of household (owner/renter)
- Housing unit size (by tenure)
- Heating Degree Days (HDDs) and Cooling Degree Days (CDDs)
- Housing size (by tenure)
- Heating fuel mix (by tenure)
- Energy use intensities (by fuel and end use)

Bills are estimated using the U.S. Department of Energy’s “energy intensities” most-recently published in the DOE’s Residential Energy Consumption Survey (RECS). The energy intensities used for each state are those published for the Census Division in which the state is located. Heating Degree Days (HDDs) and Cooling Degree Days (CDDs) are obtained from the National Weather Service’s Climate Prediction Center on a county-by-county basis for the entire country.

End-use consumption by fuel is multiplied by fuel-specific price data to derive annual bills. State price data for each end-use is obtained from the Energy Information Administration’s (EIA) fuel-specific price reports (e.g., Natural Gas Monthly, Electric Power Monthly). State-specific data on fuel oil and kerosene is not available for all states. For those states in which these bulk fuels have insufficient penetration for

state-specific prices to be published, prices from the Petroleum Administration for Defense Districts (PADD) of which the state is a part are used.

The Home Energy Affordability Gap Index (2nd Series) uses 2011 as its base year. The base year (2011) Index has been set equal to 100. A current year Index of more than 100 thus indicates that the Home Energy Affordability Gap has increased since 2011. A current year Index of less than 100 indicates that the Affordability Gap has decreased since 2011. The Affordability Gap Index was, in other words, re-set in 2011. The Affordability Gap Index (2nd Series) for 2012 and beyond cannot be compared to the Affordability Gap Index (1st Series) for 2011 and before.

The Home Energy Affordability Gap is a function of many variables, annual changes in which are now tracked for nearly all of them. For example, all other things equal: increases in income would result in decreases in the Affordability Gap; increases in relative penetrations of high-cost fuels would result in an increase in the Gap; increases in amount of heated or cooled square feet of living space would result in an increase in the Gap. Not all variables will result in a change in the Affordability Gap in the same direction. The annual Affordability Gap Index allows the reader to determine the net cumulative impact of these variables, but not the impact of individual variables.

Since the Affordability Gap is calculated assuming normal Heating Degree Days (HDDs) and Cooling Degree Days (CDDs), annual changes in weather do not have an impact on the Affordability Gap or on the Affordability Gap Index.

Price data for the various fuels underlying the calculation of the Home Energy Affordability Gap (2nd Series) was used from the following time periods:

<i>Heating prices</i>	
Natural gas	February 2016
Fuel oil ***	Week of 02/08/2016
Liquefied petroleum gas (LPG) ***	Week of 02/08/2016
Electricity	February 2016
Cooling prices	
August 2016	
<i>Non-heating prices</i>	
Natural gas	May 2016
Fuel oil ***	Week of 10/03/2016
Liquefied petroleum gas (LPG) ***	Week of 10/03/2016
Electricity	May 2016

***Monthly bulk fuel prices are no longer published. Weekly bulk fuel prices are published during the heating months (October through March). The prices used are taken from the weeks most reflective of the end-uses to which they are to be applied. Prices from the middle of February best reflect heating season prices. Bulk fuel prices from October best reflect non-heating season prices.