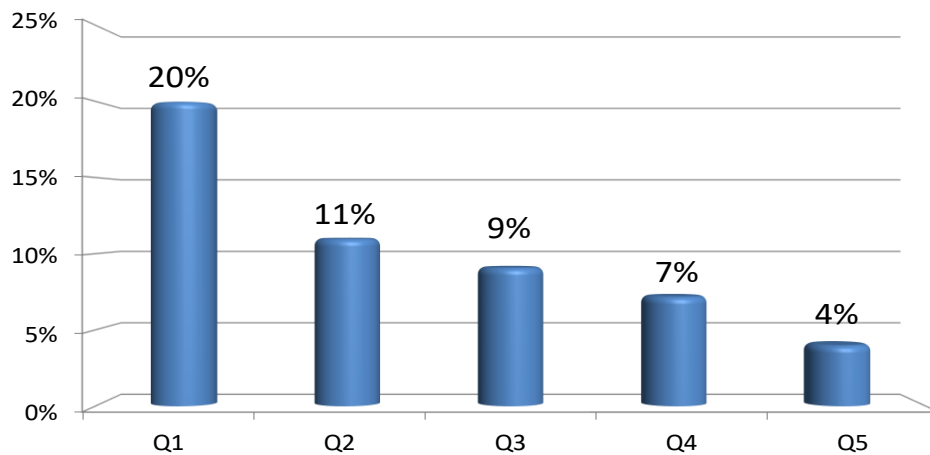


Energy Expenditures by American Families

Energy costs consume one-fifth of the after-tax incomes of America's poorest families, the 26 million households in the lowest income quintile. Increased costs for residential electricity have a more regressive impact on lower-income consumers than cost increases for other basic household necessities including food, gasoline, housing, clothing, and health care.

Energy Expenditures as Percentage of Household After-Tax Income, by Income Quintile



Source: Bureau of Labor Statistics, 2015 Consumer Expenditure Survey (August 2016). Includes electricity, natural gas, other household fuels, and motor gasoline.

November 2016

Executive Summary

This report examines patterns of consumer expenditures for five categories of basic household necessities by income quintile as reported by the U.S. Bureau of Labor Statistics' Consumer Expenditure Survey for 2015. Each income quintile represents approximately 25.7 million American households. The five expenditure categories analyzed are food, housing, clothing, health care, and energy (residential utilities and gasoline).

Key findings of the analysis are:

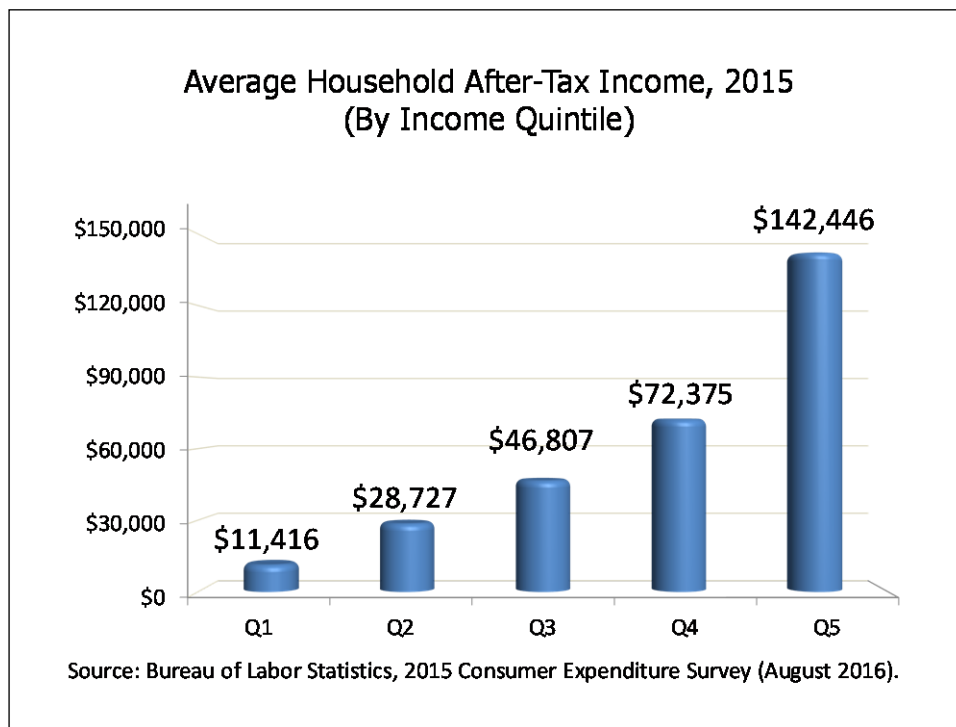
- The average after-tax income of the two lowest income quintiles, representing more than 51 million households, is \$20,072. This is equivalent to a take-home income of less than \$1,700 per month.
- Residential electricity and motor gasoline are the largest energy expenditures for households in all income quintiles.
- Households in the lowest income quintile, with an average after-tax income of \$11,416, spend 20% of their after-tax income on residential utilities and gasoline, while households in the two lowest quintiles spend 16%. This compares with 4% for households in the top income quintile, whose average after-tax income is \$142,446.
- Black and Hispanic households account for 32% of households in the two lowest income quintiles, compared with 14% in the top income quintile. Senior citizens are also overrepresented in the lowest income quintiles.
- The real pre-tax incomes of American households have declined across the three lowest income quintiles since pre-recession 2007 levels, measured in constant 2015 dollars. The largest losses of income are in the two lowest income quintiles, representing families with pre-tax incomes below \$37,600. In contrast, households in the top-5% of incomes experienced a 7% increase in real median incomes between 2007 and 2015, an average increase per household of \$22,570.
- Cost increases affecting residential energy goods and services have the most regressive impact on low-income households. Among all basic necessities, increases in residential electricity prices have the most regressive impact, followed by natural gas and heating oil. Increases in the prices of food, gasoline, housing, health care, and clothing all have less regressive impacts on lower-income families than residential energy price increases.

This report examines consumer expenditures by income quintile as reported in August 2016 by the U.S. Bureau of Labor Statistics' Consumer Expenditure Survey for 2015.ⁱ BLS surveys the income and expenditure patterns of American households and reports its findings by income quintile. Each income quintile represents approximately 25.7 million American households.

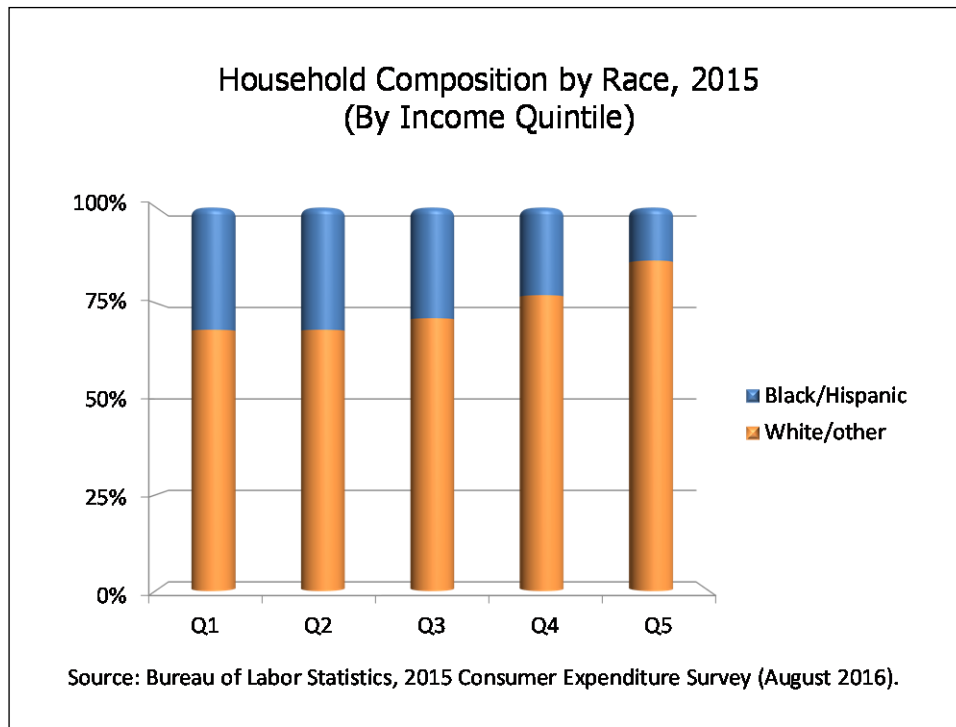
Household incomes

The BLS survey estimates that 128 million U.S. households had an average after-tax income of \$60,448 in 2015. Average income before taxes for all U.S. households, including Social Security and other forms of transfer payments, was \$69,627.

The distribution of average household incomes by income quintile is shown in the chart below. Households in the lowest income quintile had average after-tax incomes of \$11,416. Households in the second income quintile had an average after-tax income of \$28,727. The average after-tax income of the two lowest income quintiles, representing 51 million households, was \$20,072. This is equivalent to a take-home income of less than \$1,700 per month.



Black and Hispanic families are disproportionately represented among the lowest income quintiles. Black and Hispanic households account for 32% of households in the two lowest income quintiles, compared with 14% in the top income quintile. Senior citizens are also overrepresented in the two lowest income quintiles. In 2015, the pre-tax median household income of senior households aged 65 or more was \$38,515, 32% below the U.S. pre-tax median income of \$56,516.ⁱⁱ



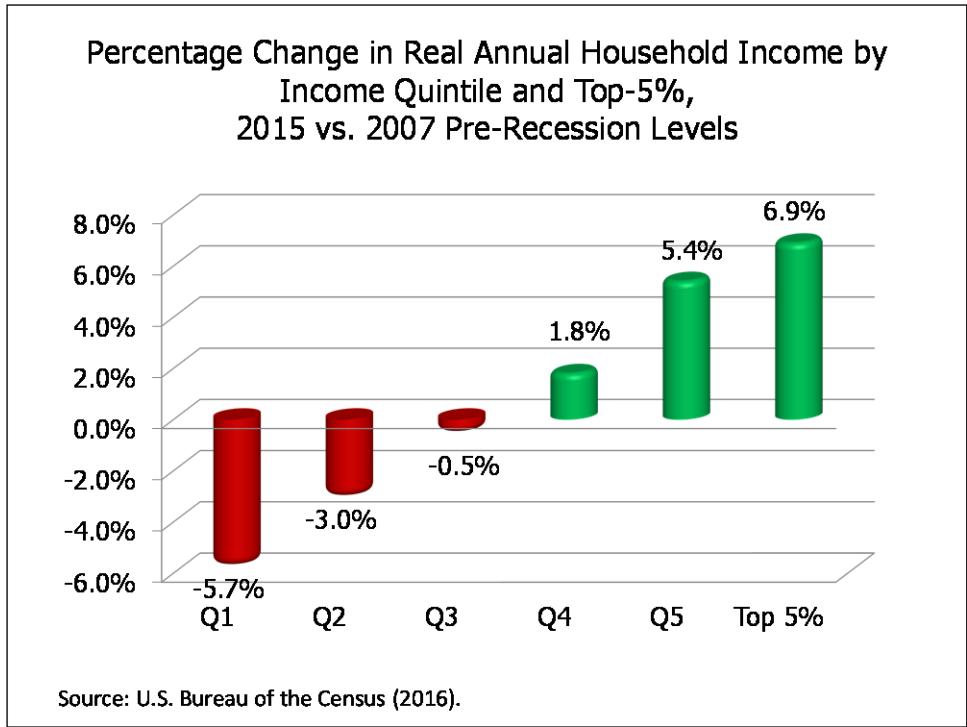
American households enjoyed a 5.2% annual increase in real median family incomes in 2015, the first such increase since 2007.ⁱⁱⁱ Real median household income - the midpoint of the income distribution among all households - was \$56,516 in 2015, compared with \$53,718 in 2014. Even with this increase, real median income remains below the median household income peak of \$57,843 that occurred in 1999.^{iv}

The distribution of household incomes reveals that the real pre-tax incomes of American households have declined across the three lowest income quintiles since pre-recession 2007 levels. As shown below, the largest losses of income are in the two lowest income quintiles, representing families with pre-tax incomes below \$37,600.^v In contrast, households in the top-5% of incomes experienced a 7% increase in real median incomes between 2007 and 2015, an average increase per household of \$22,570.

**Average Real U.S. Pre-tax Household Incomes by Income Quintile
and for the Top-5%, 2007 and 2015
(In constant 2015\$)**

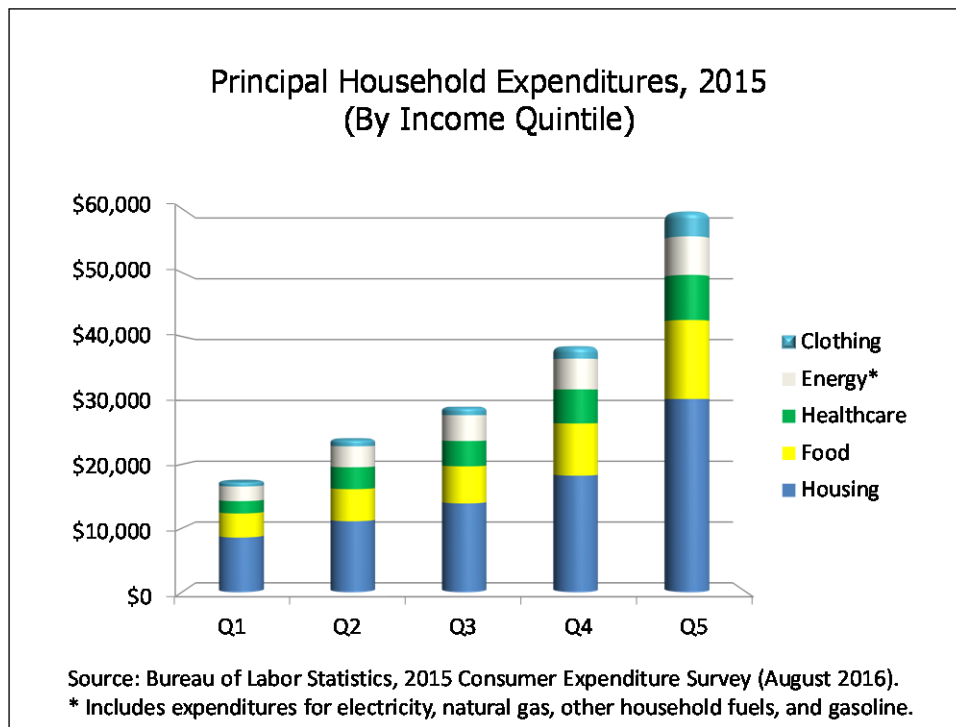
	Q1	Q2	Q3	Q4	Q5	Top-5%
2007	\$13,205	\$33,656	\$57,120	\$90,435	\$192,014	\$328,300
2015	\$12,457	\$32,631	\$56,832	\$92,031	\$202,356	\$350,870
\$ Chg	(\$748)	(\$1,025)	(\$288)	\$1,596	\$10,352	\$22,570

Source: <https://www.census.gov/hhes/www/income/data/historical/household/>



Consumer expenditures

The BLS survey estimates household expenditures for all categories of expenses, from basic necessities such as food and housing to luxury items such as jewelry. The chart below shows the increasing levels of expenditures by income quintile for five categories of basic necessities: housing (rent or mortgage payments), food, energy, health care (including insurance), and clothing. Energy expenditures include those for residential utilities such as electricity, heating oil and natural gas, and motor gasoline.

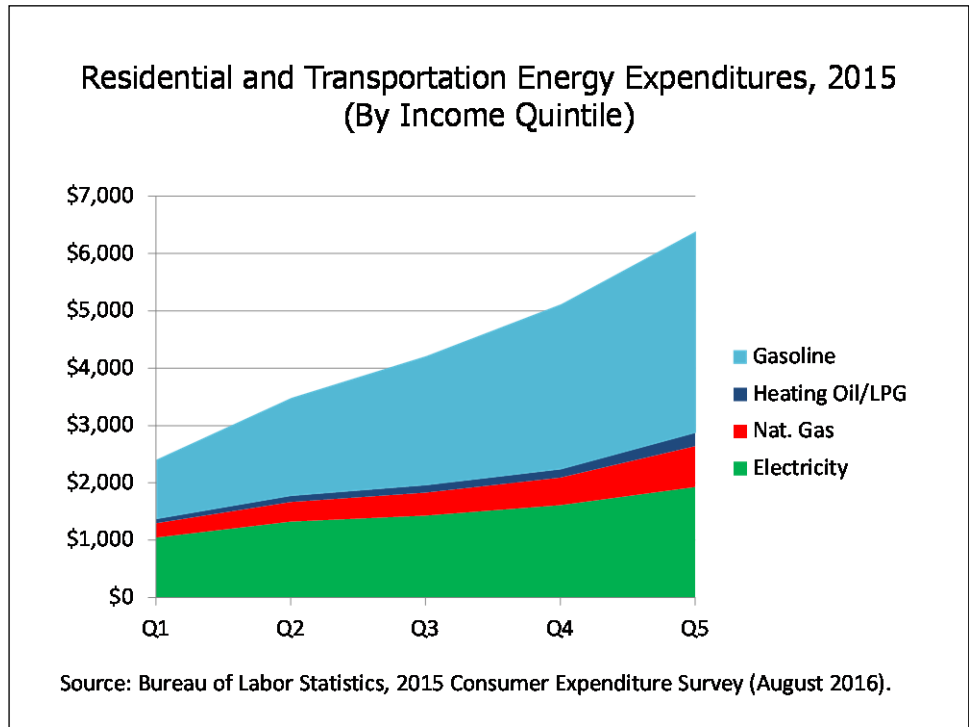


The largest expenditure category across all income quintiles is housing, followed by food. Expenditures for housing average \$16,412 for all households, compared with \$7,023 for food. Energy and health care expenditures are \$4,087 and \$4,342, respectively. Average expenditures for clothing are \$1,846 per household.

Energy expenditure patterns

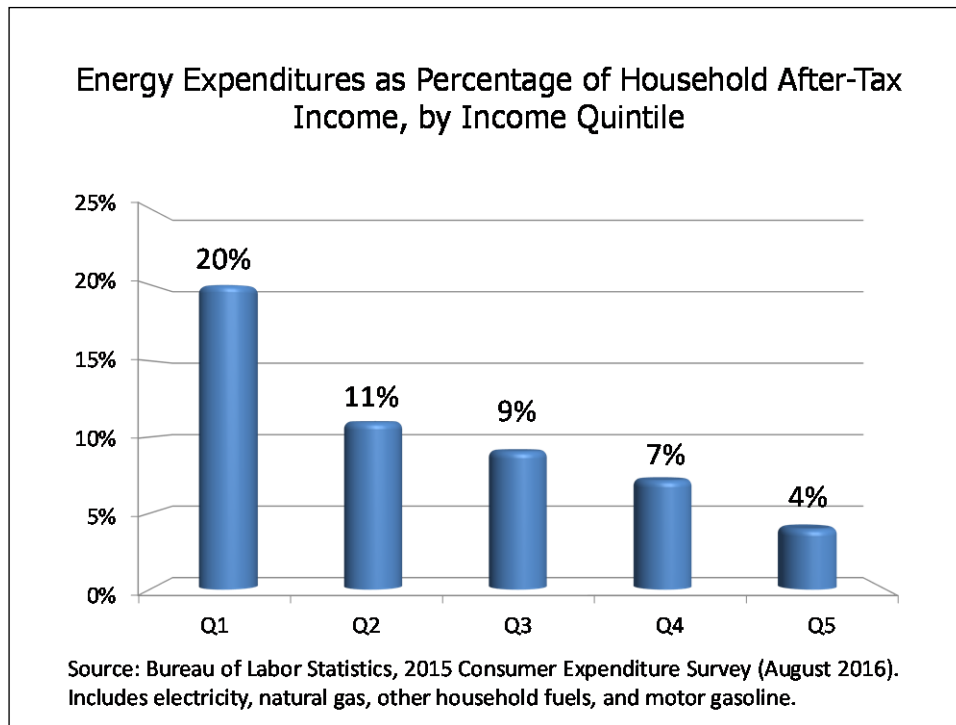
Residential electricity and motor gasoline are the largest energy expenditures for households in all income quintiles. As shown below, expenditures for motor gasoline increase rapidly with higher household income, reflecting increased numbers of vehicles and greater vehicle-miles traveled per household. The average U.S. household had 1.9 vehicles in 2015. Households in the lowest income quintile had 0.9 vehicles per family, while those in the top income quintile had 2.7 vehicles per household.

Household expenditures for electricity increase gradually with higher household income due to larger residential floor space and the increased number and use of appliances and other electrical equipment.^{vi} With higher incomes, consumers also tend to substitute natural gas for electricity in home heating, and to use more efficient appliances, lighting, and space heating and cooling equipment.



Energy cost impacts on family budgets

Households in the lowest income quintile spend 20% of their after-tax income on residential utilities and gasoline, compared with 4% for households in the top income quintile. Households in the two lowest income quintiles, representing 51 million households, spend an average of 16% of their after-tax incomes on residential energy and gasoline. On average, energy expenditures represented 7% of after-tax income for all U.S. households in 2015.

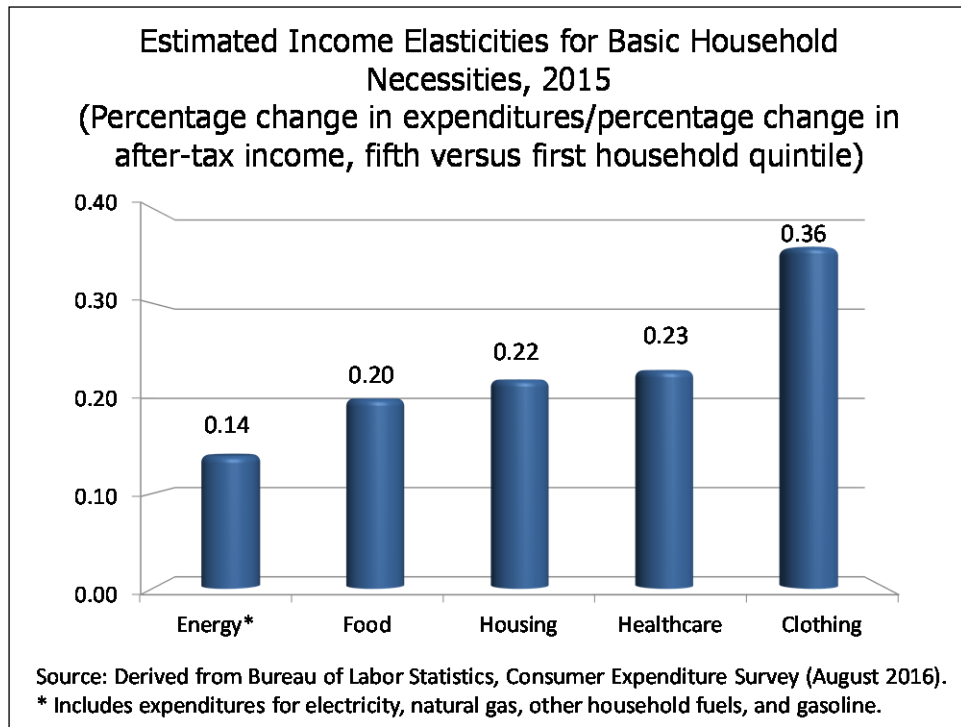


Inadequate Low-Income Energy Assistance

Many low-income consumers qualify for energy assistance programs such as LIHEAP, a federal block grant program that funds state energy assistance programs. LIHEAP appropriations have declined in recent years. The FY 2016 program was funded at \$3.4 billion, compared with \$5.0 billion in FY 2010.^{vii} In FY 2010, LIHEAP provided an average benefit of \$467 per household to 8.1 million households.^{viii} Only 22% of the 37 million low-income households potentially qualified to receive benefits that year participated in the LIHEAP program.

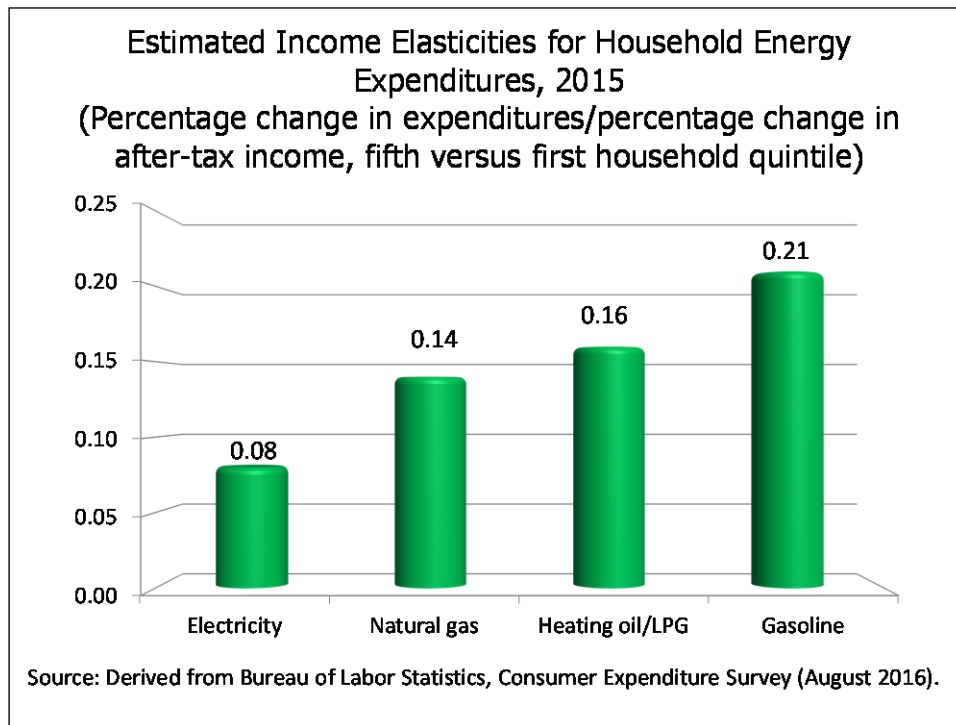
Income and Energy Use

Among consumer expenditures for basic necessities, energy is the least sensitive to changes in household income. The chart below shows the estimated income elasticities for five basic household expenditures. Income elasticity is a measure of the relative increase in expenditures for each of the five categories of basic necessities in relation to increased household incomes. It is calculated by dividing the percentage change in expenditures for each category of basic necessities by the percentage change in average incomes between the lowest and the highest income quintiles.



With rising household incomes, consumers tend to spend more on food, housing, health care, and clothing than on energy. Similarly, when faced with reduced income due to unemployment or other factors, family budgets are likely to cut back expenditures for clothing and other basic necessities to a much greater extent than energy.

Residential electricity expenditures - the most common monthly utility bill - are the least sensitive to changes in income among the principal categories of energy expenditures. As household incomes increase, consumers spend relatively more for heating oil, natural gas, and gasoline than for electricity:



The Regressive Impact of Energy and Other Consumption Taxes

Any increase in the costs of basic household necessities is an effective tax on household income. The BLS Survey provides the basis for estimating the relative regressivity of any consumption-based tax or price increase affecting basic necessities such as food or energy. A carbon tax on energy, an increase in electric prices due to government regulation, or higher sales taxes on food and clothing are consumption-based taxes reducing available after-tax income.

The table below shows the effective reduction of after-tax household incomes by income quintile for an assumed across-the-board 10% increase in the costs of housing, food, clothing, health care, and energy. For all U.S. households, the largest impacts are in housing (2.7%) and food (1.2%), followed by health care (0.7%), energy (0.7%), and clothing (0.3%). These differences are determined by the absolute magnitude of expenditures for each of these basic necessities, and do not account for any price-related response in consumer purchasing behavior.

**Impacts of Assumed 10% Increase in the Costs
of Basic Necessities as a Percentage of After-Tax Income,
by Income Quintile**

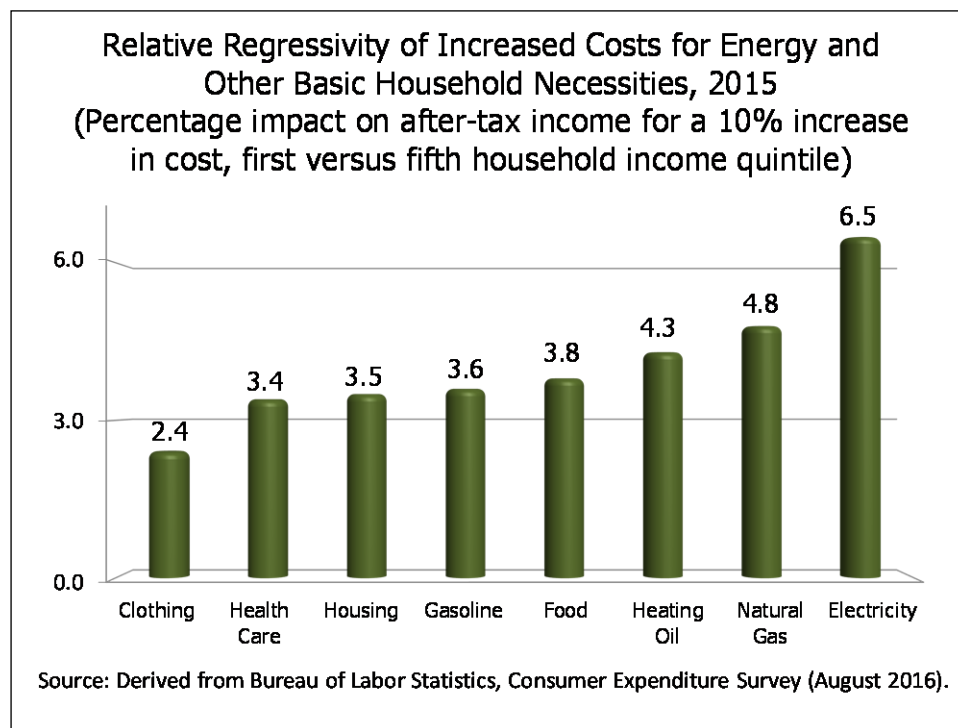
Item	All H/Hs	1st Q	2nd Q	3rd Q	4th Q	5th Q
Housing	2.72%	7.49%	3.86%	2.97%	2.52%	2.12%
Food	1.16%	3.30%	1.75%	1.24%	1.13%	0.87%
Health Care	0.72%	1.69%	1.19%	0.85%	0.74%	0.49%
Clothing	0.31%	0.68%	0.40%	0.28%	0.27%	0.28%
All Energy	0.68%	2.00%	1.14%	0.86%	0.66%	0.42%

Electricity	0.24%	0.89%	0.45%	0.31%	0.22%	0.14%
Heat. Oil	0.02%	0.06%	0.03%	0.02%	0.02%	0.01%
Nat. Gas	0.07%	0.23%	0.12%	0.08%	0.06%	0.05%
Gasoline	0.35%	0.82%	0.53%	0.45%	0.36%	0.23%

Source: Derived from Bureau of Labor Statistics, 2015 Consumer Expenditure Survey (August 2016).

The relative degree of regressivity of increased costs for consumer necessities can be measured by dividing the percentage impacts on after-tax income in the above table for the first and fifth income quintiles. For example, a 10% increase in housing costs would have a negative impact on the after-tax incomes of families in the first income quintile three and a half times greater than families in the highest income quintile (7.49%/2.12%).

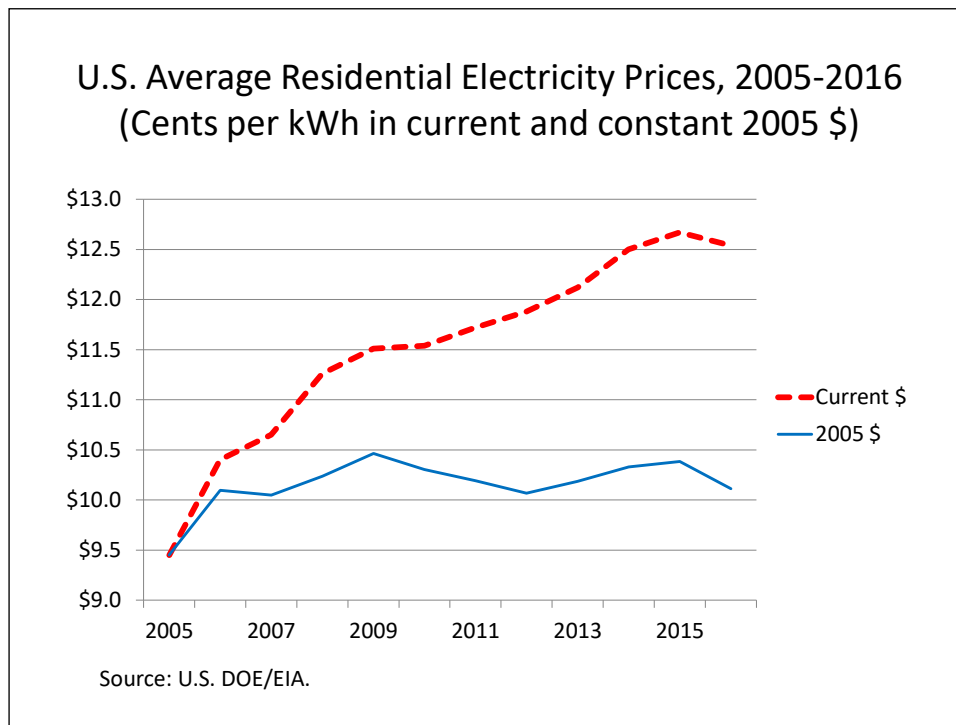
The chart below summarizes the regressivity of increased costs for energy and other basic household necessities, assuming an across-the-board 10% increase in costs:



Cost increases affecting residential energy have the most regressive impact on low-income households. Among energy necessities, increases in residential electricity costs have the most regressive impact, followed by natural gas and heating oil. Increases in the costs of food, gasoline, housing, health care, and clothing all have less regressive impacts on lower-income families than residential energy cost increases.

Policy Implications

The highly regressive nature of electricity price increases, together with recent trends in household electricity prices, underscore the importance of maintaining stable and affordable electric prices for lower- and middle-income consumers. Since 2005, national average electricity prices have increased by 33% in current dollars, and by 7% in constant 2005 dollars (see chart below). U.S. DOE projects that the average price of residential electricity will increase from 12.5 cents per kWh in 2016 to 13.0 cents in 2017.^{ix} Residential natural gas prices are expected to rise by 9% from \$10.18 per thousand cubic feet in 2016 to \$11.10 per tcf in 2017, while home heating oil is projected to increase by 23% from \$2.12 per gallon to \$2.60 per gallon next year.^x



A portion of the increase in residential electricity prices since 2005 is due to the capital and operating costs associated with new emission controls to meet Clean Air Act and other environmental requirements, as well as state laws mandating the construction of renewable energy facilities. The trend toward steadily rising electricity prices is likely to continue:

"We are now in an era of rising electricity prices," said Philip Moeller, a (former) member of the Federal Energy Regulatory Commission, who said the steady reduction in generating capacity across the nation means that prices are headed up. "If you take enough supply out of the system, the price is going to increase."

The problems confronting the electricity system are the result of a wide range of forces: new federal regulations on toxic emissions, rules on greenhouse gases, state mandates for renewable power, technical problems at nuclear power plants and unpredictable price trends for natural gas.^{xi}

These diverging trends - stagnant or declining real family incomes and rising residential electricity prices - will continue to create difficult family budget choices among lower-income families.

Acknowledgment – This report was prepared for ACCCE by Eugene M. Trisko, who has conducted state and national energy cost analyses periodically since 2000. Mr. Trisko is an attorney and energy economist who represents labor and industry clients. He previously served as an energy economist with Robert Nathan Associates, an attorney in the Bureau of Consumer Protection of the U.S. Federal Trade Commission, and as an expert economic witness on utility cost of capital. He may be contacted at emtrisko@earthlink.net.

End notes

ⁱ U.S. Bureau of Labor Statistics, 2015 Consumer Expenditure Survey (August 2016).

ⁱⁱ U.S. Bureau of the Census, *Income and Poverty in the United States, 2015* (September 2016) at Table 1.

ⁱⁱⁱ *Id.*, at 1.

^{iv} *Id.*, at 6.

^v U.S. Bureau of Labor Statistics, 2015 Consumer Expenditure Survey, Table 1101.

^{vi} *See*, U.S. DOE/EIA 2009 Residential Energy Consumption Survey, Table HC2.5, Structural and Geographic Characteristics of U.S. Homes, by Household Income, 2009, and Table HC3.5, Appliances in U.S. Homes, by Household Income, 2009.

^{vii} *See*, Congressional Research Service, LIHEAP: Program and Funding (July 29, 2015).

^{viii} *Id.*, at Table 2.

^{ix} U.S. DOE/EIA, Short-Term Energy Outlook, October 2016, Table 2.

^x *Id.*

^{xi} "U.S. Electricity Prices May Be Going Up for Good," The Los Angeles Times, April 25, 2014.