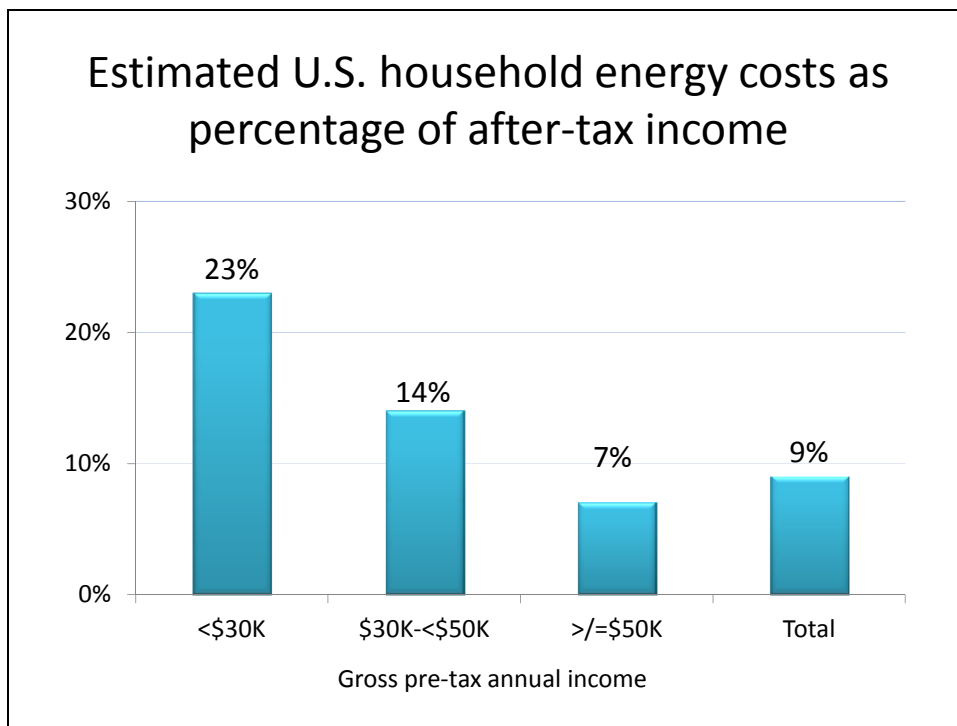


Energy Cost Impacts on American Families

Rising electricity prices and declining family incomes are straining the budgets of America's lower- and middle-income families. U.S. households with pre-tax annual incomes below \$50,000, representing 48% of the nation's households, spend an estimated average of 17% of their after-tax income on residential and transportation energy. Energy costs for the 29% of households earning less than \$30,000 before taxes represent 23% of their after-tax family incomes, before accounting for any energy assistance programs. Minorities and senior citizens are among the most vulnerable to energy price increases due to their relatively low household incomes.



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This paper assesses the impact of energy costs on U.S. households using energy consumption survey data and energy price data and projections from the U.S. Department of Energy's Energy Information Administration (DOE/EIA).¹ Energy costs are summarized by household income group using data from the Bureau of the Census, tax data from the Congressional Budget Office, and state income tax rates.² Due to recent volatility in energy markets, energy expenditure estimates are based on DOE/EIA energy price projections for 2016.

Key findings include:

- Some 48% of American families have pre-tax annual incomes of \$50,000 or less, with an average after-tax income among these households of \$22,732, less than \$1,900 per month. In other words, nearly half of U.S. families - some 59 million households - have average take-home income of less than \$1,900 per month.
- Energy costs are consuming the after-tax household incomes of America's lower- and middle-income families at levels comparable to other necessities such as housing, food, and health care. The 48% of households earning less than \$50,000 devote an estimated average of 17% of their after-tax incomes to residential and transportation energy.
- American consumers have benefitted in recent months from lower gasoline prices, but rising oil prices are now reducing consumer savings at the gas pump. Meanwhile, residential electricity prices are rising due to the costs of compliance with U.S. EPA and other regulations, and other factors such as fuel and capital costs. Residential electricity represents 69% of total household utility bills.
- A 2011 survey of low-income households for the National Energy Assistance Directors Association reveals some of the adverse health and welfare impacts of high energy costs. Low-income households reported these responses to high energy bills:
 - 24% went without food for at least one day.
 - 37% went without medical or dental care.
 - 34% did not fill a prescription or took less than the full dose.
 - 19% had someone become sick because their home was too cold.
- The relatively low median incomes of minority and senior households indicate that these groups are among those most vulnerable to energy price increases. Median income is the midpoint, where one-half of households have incomes above this amount, and one-half have incomes below it. The median pre-tax income of Black households, representing 13% of U.S. households, is 33% below the U.S. median income of \$51,939. The median income of Hispanic households, 13% of all households, is 21% below the national median income. American households aged 65 or more, 23% of all households, have a median income 31% below the U.S. median.

U.S. Household Incomes

U.S. Census Bureau data on household incomes in 2013 (the most recent available) provide the basis for estimating the effects of energy prices on consumer budgets. The table below shows estimated 2013 after-tax incomes for U.S. families in different income brackets. The Congressional Budget Office has calculated effective total federal tax rates, including individual income taxes and payments for Social Security and other social welfare programs. State income taxes are estimated from current state income tax rates.

U.S. households by pre-tax and after-tax income, 2013

| Pre-tax annual income: | <\$30K | \$30- <\$50K | <\$50K | ≥\$50K | Total/avg. |
|--------------------------|----------|-----------------|----------|-----------|------------|
| Households (Mil.) | 35.8 | 23.1 | 59.0 | 64.0 | 123.0 |
| Pct. of total households | 29% | 19% | 48% | 52% | 100.0% |
| Avg. pre-tax income | \$15,931 | \$39,158 | \$25,043 | \$116,503 | \$72,641 |
| Effec. fed tax rate % | 4.2% | 11.0% | 6.9% | 19.7% | 19.4% |
| Est. state tax % | 0.5% | 3.5% | 2.4% | 6.3% | 4.4% |
| Est. after-tax income | \$15,003 | \$33,480 | \$22,732 | \$86,212 | \$55,344 |

Some 48% of U.S. families, 59 million households, had estimated pre-tax incomes below \$50,000 in 2013. After federal and state taxes, these families had average annual incomes of \$22,732, equivalent to an average monthly take-home income of less than \$1,900.

The U.S. Census Bureau reports that the real pre-tax incomes of American families have declined across all five income quintiles since 2001, measured in constant 2013 dollars.³ The loss of real pre-tax incomes is due to a number of factors, including the lack of real wage growth among most American workers,⁴ the loss of high-wage jobs in manufacturing and other industry sectors,⁵ and the increased share of relatively low-paying jobs in service sectors such as retail trade and food services.⁶

As shown in the table below, the largest losses of income are in the two lowest income quintiles. Households in the lowest quintile lost 13% of their real income between 2001 and 2013. Declining real incomes increase the vulnerability of lower- and middle-income households to energy price increases such as rising utility bills.

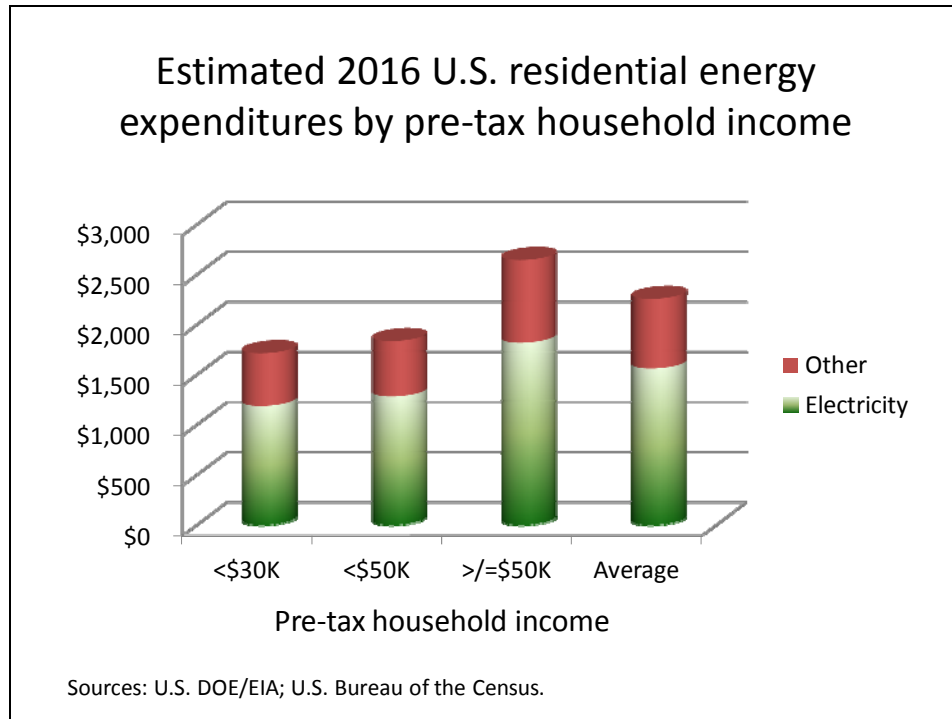
Average real U.S. household incomes by income quintile, 2001-2013
(In 2013 \$)

| | 1Q | 2Q | 3Q | 4Q | 5Q |
|---------|-----------|-----------|-----------|-----------|-----------|
| 2001 | \$13,336 | \$33,510 | \$56,090 | \$87,944 | \$192,063 |
| 2013 | \$11,651 | \$30,509 | \$52,322 | \$83,519 | \$185,206 |
| Pct Chg | -13% | -9% | -7% | -5% | -4% |
| \$ Chg | (\$1,685) | (\$3,001) | (\$3,768) | (\$4,425) | (\$6,857) |

Residential and Transportation Energy Expenses

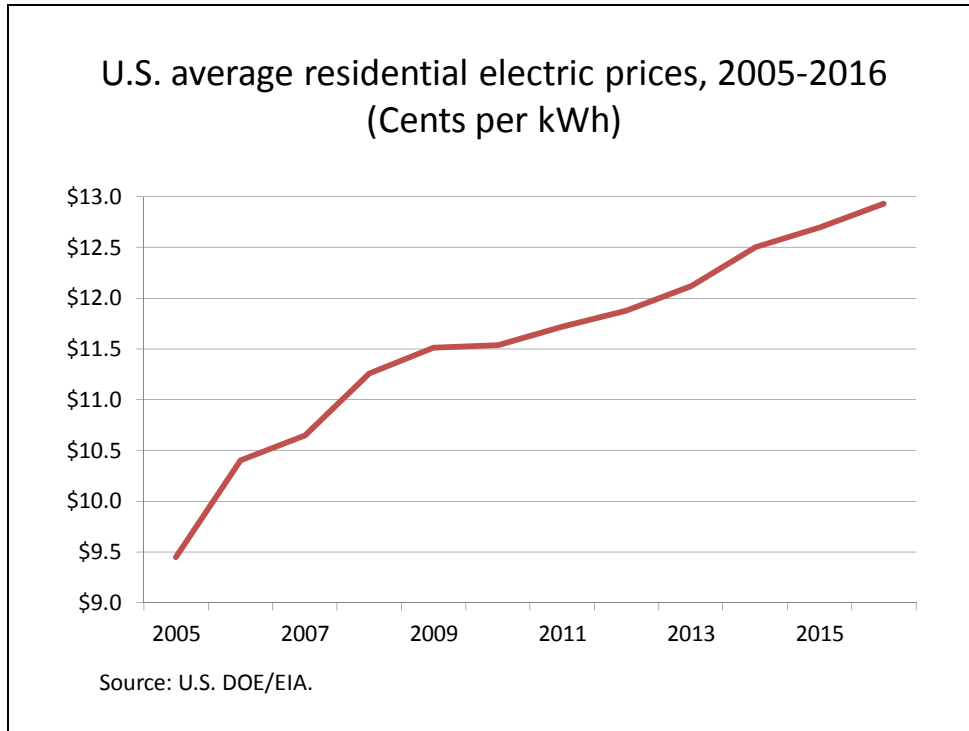
U.S. households are projected to spend an estimated average of \$2,256 for residential energy in 2016.⁷ As shown in Chart 1 below, electricity is the dominant residential energy source, accounting for 69% of total U.S. residential energy expenditures for home heating, cooling, and appliances. In addition to natural gas, some U.S. homes also use heating oil, propane, and other heating sources such as wood.

Chart 1



In 2014, the average price of residential electricity in the U.S. was 32% above its level in 2005 (see Chart 2), compared with a 22% increase in the Consumer Price Index during this period. DOE/EIA projects continued escalation of residential electricity prices due to the costs of compliance with environmental regulations and other factors, including fuel, capital, and operating and maintenance costs. Moreover, EIA,⁸ National Economic Research Associates,⁹ and others¹⁰ project that electricity prices will increase even more because of EPA's proposed Clean Power Plan.

Chart 2



Energy Expense Estimates

Estimated household energy expenses for the U.S. are based upon DOE/EIA residential energy price projections for 2016.¹¹ Total household energy costs are distributed by income category using DOE/EIA residential energy survey data.

Following sharp price declines since late 2014, gasoline prices have begun to increase in response to higher oil prices. EIA's May 2015 Short-Term Energy Outlook projects national average gasoline prices of \$2.52/gallon in 2015, rising to \$2.71/gallon in 2016. This 2016 projection is based upon EIA's estimate of an average \$66/barrel price for West Texas Intermediate crude oil in 2016, with an average imported crude oil price of \$62/barrel. These projections may be conservative in view of the ongoing reduction of domestic drilling investments caused by lower oil prices. Baker Hughes reports that domestic oil and gas drill rig counts have declined by 52% since May 2014.¹²

DOE/EIA's 2001 Survey of Household Vehicles Energy Use (2005) provides data on regional gasoline use by household income category. These regional gasoline consumption data are updated using EIA's 2016 national average retail gasoline price projection of \$2.71 per gallon. Household gasoline consumption is reduced by 15% from 2001 levels, reflecting trends in per capita retail gasoline sales.¹³

The table below summarizes estimated U.S. household energy expenses in 2016 by income group, with the percentage of after-tax income represented by energy costs:

Estimated U.S. household energy costs by pre-tax income category

| Pre-Tax Annual Income: | <\$30K | \$30- <\$50K | <\$50K | ≥\$50K | Average |
|------------------------------|---------|-----------------|---------|---------|---------|
| Residential energy \$ | \$1,712 | \$1,990 | \$1,834 | \$2,644 | \$2,256 |
| Electric \$ | \$1,187 | \$1,406 | \$1,282 | \$1,818 | \$1,561 |
| Other* \$ | \$526 | \$584 | \$553 | \$826 | \$695 |
| Gasoline \$ | \$1,729 | \$2,569 | \$2,059 | \$3,447 | \$2,781 |
| Total energy \$ | \$3,441 | \$4,559 | \$3,893 | \$6,091 | \$5,037 |
| Energy % of after-tax income | 23% | 14% | 17% | 7% | 9% |

*Other includes natural gas, heating oil, LPG, and wood.

The share of household income spent for energy falls disproportionately on lower- and middle-income families earning less than \$50,000 per year before taxes. The 59 million U.S. households earning less than \$50,000 before taxes spend an estimated 17% of their after-tax income on energy.

While many lower-income consumers qualify for energy assistance, budgetary support for these government programs has been pared back in recent years.¹⁴ Most of the \$3.0 billion of funds available to states under the federal LIHEAP program are concentrated on relief for low-income home heating customers in the Northeast. In comparison to the \$3.0 billion available under LIHEAP, total residential energy costs for the 36 million households with pre-tax incomes less than \$30,000 are estimated at \$62 billion in 2016, including \$43 billion in electricity costs.

The average U.S. family will spend an estimated \$5,037 on residential and transportation energy in 2016, or 9% of the after-tax family budget. The 36 million U.S. households earning less than \$30,000 before taxes, representing 29% of households, will allocate, on average, an estimated 23% of their after-tax incomes to energy.

These findings are consistent with the most recent consumer expenditure survey by the Bureau of Labor Statistics.¹⁵ BLS reports that total expenditures for residential utilities and gasoline are 9% of the average American after-tax household budget. BLS's survey also indicates that energy costs for residential utilities and gasoline rank among those for other basic necessities such as rent, education, clothing, and health care:

BLS 2013 annual consumer expenditure survey
findings for selected expenditure categories,
all U.S. households

| Expenditure | Annual \$2013 | Pct. of Average After-Tax Household Income |
|--------------------------------|---------------|--|
| Food | \$6,602 | 12% |
| Rent | \$3,324 | 6% |
| Health care | \$3,631 | 6% |
| Mortgage interest | \$3,078 | 5% |
| Gasoline | \$2,611 | 5% |
| Residential utilities & fuels* | \$1,957 | 4% |
| Clothing | \$1,604 | 3% |
| Education | \$1,138 | 2% |

*Excluding water, telephone, and cell phone service.

The large share of after-tax income devoted to energy by lower-income households poses difficult budget choices among food, health care and other basic necessities. A 2011 survey of low-income households for the National Energy Assistance Directors Association (NEADA) reveals many of the adverse health and welfare implications of high energy costs. Ninety-two percent of the NEADA survey participants reported pre-tax household incomes of \$30,000 or less. Principal findings of the survey include:

Households reported that they took several actions to make ends meet:

- 39% closed off part of their home.
- 23% kept their home at a temperature that was unsafe or unhealthy.
- 21% left their home for part of the day.
- 33% used their kitchen stove or oven to provide heat.

Many survey respondents had problems paying for housing in the past five years, due at least partly to their energy bills:

- 31% did not make their full mortgage or rent payment.
- 6% were evicted from their home or apartment.
- 4% had a foreclosure on their mortgage.
- 14% moved in with friends or family.
- 4% moved into a shelter or were homeless.
- 13% got a payday loan in the past five years.

Many of the respondents faced significant medical and health problems in the past five years, partly as a result of high energy costs:

- 24% went without food for at least one day.
- 37% went without medical or dental care.
- 34% did not fill a prescription or took less than the full dose.
- 19% had someone become sick because their home was too cold.¹⁶

Disproportionate Impacts on Minorities and Senior Citizens

The impacts of high energy costs are falling disproportionately on minorities and senior citizens. Black and Hispanic households together represent 26% of U.S. households. Elderly households represent 23% of American households. Unlike young working families with the potential to increase incomes by taking on part-time work or increasing overtime, many fixed income seniors are limited to cost-of-living increases that may not keep pace with energy prices.

The table below summarizes 2013 median pre-tax incomes for elderly and minority households, and compares these with the U.S. median household income of \$51,939.

U.S. median pre-tax household incomes, 2013

| | Median Household Income | Pct. Diff. Vs. U.S. Median | Pct. of Households |
|----------|-------------------------|----------------------------|--------------------|
| U.S. | \$51,939 | | 100% |
| Black | \$34,598 | -33% | 13% |
| Hispanic | \$40,963 | -21% | 13% |
| Age 65+ | \$35,611 | -31% | 23% |

Source: U.S. Bureau of the Census, Current Population Reports Supplement (2014).

These relatively low median incomes - ranging from 21% to 33% below the national median - indicate that minority and senior households are among those most vulnerable to energy price increases such as rising household utility bills.

Conclusion

High consumer energy prices - together with negative real income growth among lower- and middle-income households - underscore the need to maintain affordable energy prices, especially for lower- and middle-income U.S. families. Maintaining the relative affordability of electricity and other energy sources is essential to the wellbeing of America's lower- and middle-income families.

Acknowledgment: This paper was prepared for ACCCE by Eugene M. Trisko, an energy economist and attorney in private practice. Mr. Trisko has served as an attorney in the Bureau of Consumer Protection at the Federal Trade Commission and as an expert economic witness before state public utility commissions. He represents labor and industry clients in environmental and energy matters. Mr. Trisko can be contacted at emtrisko@earthlink.net.

End Notes

¹ Data on residential energy consumption patterns by income category are derived from U.S. Department of Energy, Energy Information Administration, 2009 Survey of Residential Energy Consumption (2012). 2016 gasoline price projections are from DOE/EIA Short Term Energy Outlook (May 2015).

² Household incomes by income category are calculated from the distribution of household income in U.S. Census Bureau, Current Population Reports, Supplement (2014). Federal income tax rates are from Congressional Budget Office, "The Distribution of Household Income and Federal Taxes, 2010 with Estimates for 2013," (December 2013). Effective federal tax rates for the income categories employed in this report were interpolated from CBO's 2013 tax rates by income quintile. State tax data are estimated from state tax rates compiled by the Tax Foundation (2014).

³ See, <https://www.census.gov/hhes/www/income/data/historical/household/>.

⁴ See, H. Shierholz and L. Mishel, A Decade of Flat Wages - The Key Barrier to Shared Prosperity and a Rising Middle Class (Economic Policy Institute, August 21, 2013), available at: <http://www.epi.org/publication/a-decade-of-flat-wages-the-key-barrier-to-shared-prosperity-and-a-rising-middle-class/>.

⁵ The U.S. lost 5.7 million manufacturing jobs in the decade of the 2000s, the largest decline of manufacturing jobs since the 1980s, while total manufacturing output declined by 11%. The sectors with large output losses included motor vehicles (-45%), textiles (47%) and apparel (-40%). Increased foreign competition is cited as one factor underlying these trends. See, e.g., <http://www.industryweek.com/global-economy/why-2000s-were-lost-decade-american-manufacturing>.

⁶ The share of U.S. employment in service sectors increased from 76% in 1990 to 84% in 2010, while the share of employment in goods-producing sectors declined from 20% to 13%. See, C. Haksaver and B. Render, The Important Role Services Play in an Economy (2013), excerpted at <http://www.ftpress.com/articles/article.aspx?p=2095734&seqNum=3>.

⁷ Residential energy expenditures are estimated from DOE/EIA 2009 Residential Energy Consumption Survey (2012) updated for 2013 household demographics and DOE/EIA's 2016 projections of residential energy costs for electricity, natural gas, LPG, and home heating oil in EIA's Short-Term Energy Outlook (May 2015).

⁸ DOE/EIA, Analysis of the Impacts of the Clean Power Plan (May 2015).

⁹ National Economic Research Associates, Potential Energy Impacts of the Proposed Clean Power Plan (prepared for ACCCE, October 2014).

¹⁰ See, e.g., Energy Ventures Analysis, Inc., EPA Clean Power Plan: Costs and Impacts on U.S. Energy Markets (prepared for National Mining Association, October 2014).

¹¹ U.S. DOE/EIA, Short-Term Energy Outlook (May 2015).

¹² Drilling rig data as of May 8, 2014 and May 8, 2015. *See*, <http://phx.corporate-ir.net/phoenix.zhtml?c=79687&p=irol-rigcountsoverview>

¹³ DOE/EIA and Census Bureau data indicate that per capita retail gasoline consumption declined by 15% from 2001 to 2014. *See*, D. Short, Gasoline Sales and Our Changing Culture (April 22, 2015), available at <http://www.advisorperspectives.com/dshort/updates/Gasoline-Sales.php>

¹⁴ Federal funding for the Low Income Home Energy Assistance Program (LIHEAP) has declined from \$4.5 billion in FY2011 to \$3.0 billion in FY2015. *See*, <http://www.liheapch.acf.hhs.gov/Funding/funding.htm>.

¹⁵ Bureau of Labor Statistics, 2013 Consumer Expenditure Survey, Table 1202, Annual expenditure means, shares, standard errors and coefficient of variation (2014).

¹⁶ NEADA, National Energy Assistance Survey Report (November 2011) at ii.