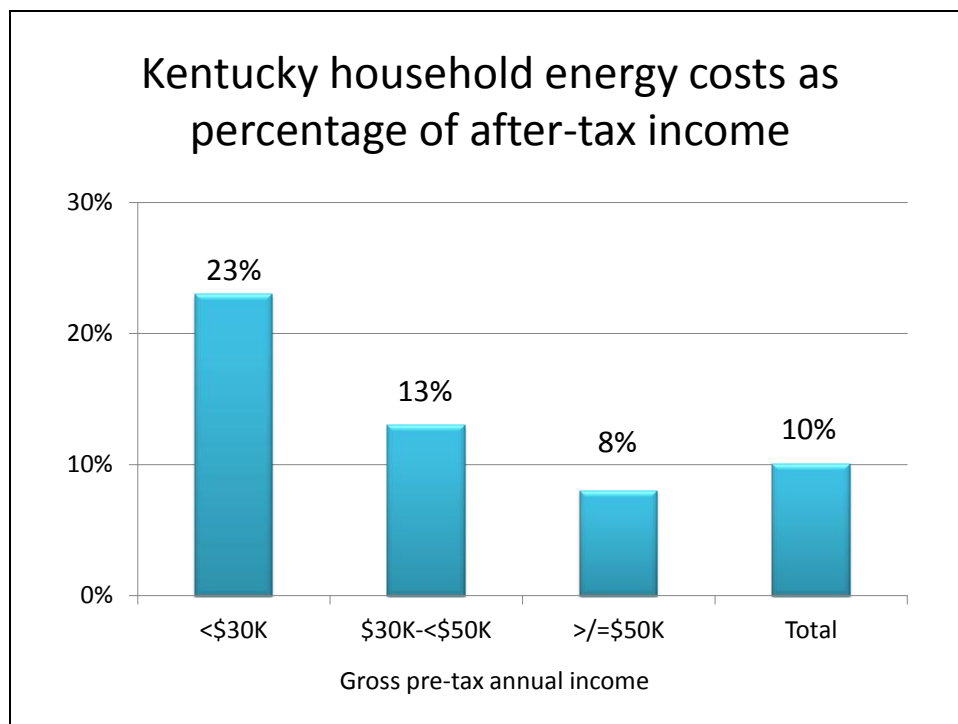


Energy Cost Impacts on Kentucky Families

High electricity prices are straining the budgets of Kentucky's lower- and middle-income families. Kentucky households with pre-tax annual incomes below \$50,000, representing 56% of Kentucky's population, spend an estimated average of 17% of their after-tax income on residential and transportation energy. Energy costs for the 35% of households earning less than \$30,000 before taxes represent 23% of their after-tax family incomes, before accounting for any energy assistance programs. Kentucky's minorities and senior citizens are among the most vulnerable to energy price increases due to their relatively low household incomes.



Energy Cost Impacts on Kentucky Families

This paper assesses the impact of energy costs on Kentucky 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 Kentucky data from the U.S. Bureau of the Census, tax data from the Congressional Budget Office, and Kentucky income tax rates.²

Key findings include:

- Some 56% of Kentucky's families have gross annual incomes of \$50,000 or less, with an average after-tax income among these households of \$22,164, less than \$1,900 per month. In other words, more than half of Kentucky families have take-home income of less than \$1,900 per month.
- The median pre-tax household income of Kentucky families in 2013 was \$43,399, 16% below the national median household income. Median income is the midpoint of the distribution of family incomes: one-half of families have incomes below the median, while the other one-half of families have incomes above it.
- Measured in constant 2005 prices, residential electricity prices in Kentucky are 25% above 2005 levels. Average residential electric bills in Kentucky increased by 9% between 2013 and 2014, reflecting increased prices and consumption.
- New U.S. EPA regulations will cause Kentucky electricity prices to rise substantially. National Economic Research Associates projects that electricity prices for Kentucky consumers will be 12% higher, on average, each year under EPA's proposed Clean Power Plan (CPP) than they would be without the rule. NERA projects peak year Kentucky electricity price increases of as much as 34%.
- Energy costs are consuming the after-tax household incomes of Kentucky's low- and middle-income families at levels comparable to other necessities such as housing, food, and health care. The 56% of Kentucky households earning less than \$50,000 before taxes devote an estimated average of 17% of their after-tax incomes to residential and transportation energy.
- Kentucky's minority and elderly households have pre-tax median incomes far below the U.S. median. The median income of Kentucky's Black families is 43% below the U.S. median household income. Kentucky householders aged 65 or more, 23% of all households, have a pre-tax median income of \$32,964, 37% below the U.S. median. These relatively low pre-tax median incomes indicate that Kentucky's minority and senior households are among those most vulnerable to energy price increases such as rising household utility bills.

Kentucky Household Incomes

U.S. Census Bureau data on Kentucky 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 Kentucky 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 Kentucky income tax rates.

Kentucky households by pre-tax and after-tax income, 2013

Pre-tax annual income:	<\$30K	\$30- <\$50K	<\$50K	≥\$50K	Total/avg.
Households (Mil.)	0.604	0.350	0.954	0.753	1.706
Pct. of total households	35.4%	20.5%	55.9%	44.1%	100.0%
Avg. pre-tax income	\$15,652	\$39,760	\$24,497	\$103,337	\$59,323
Effec. fed tax rate %	3.4%	10.6%	6.0%	19.5%	12.0%
Est. state tax %	2.9%	4.5%	3.5%	5.5%	4.4%
Est. after-tax income	\$14,668	\$33,756	\$22,164	\$77,503	\$49,623

Some 56% of Kentucky families had estimated pre-tax incomes below \$50,000 in 2013. After federal and state taxes, these families had average annual incomes of \$22,164, equivalent to an average monthly take-home income of less than \$1,900. In 2013, the median pre-tax household income of Kentucky families was \$43,399, 16% below the national median household income of \$52,250.³

The U.S. Census Bureau reports that the average pre-tax incomes of American households have declined across all five income quintiles since 2001, measured in constant 2013 dollars. As shown in the table below, the largest percentage 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 low- 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 constant 2013 \$)

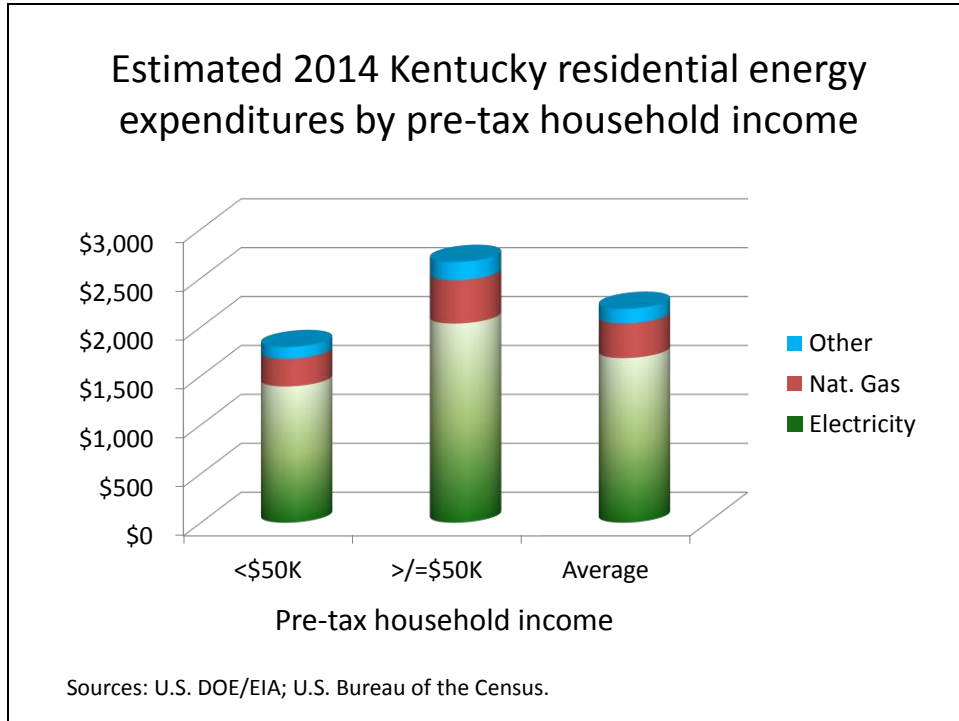
	1Q	2Q	3Q	4Q	5Q
2001	\$13,336	\$33,510	\$56,090	\$87,944	\$192,063
2013	\$11,651	\$30,509	\$52,322	\$83,519	\$185,206
Pct Chg	-13%	-9%	-7%	-5%	-4%
\$ Chg	(\$1,685)	(\$3,001)	(\$3,768)	(\$4,425)	(\$6,857)

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

Residential and Transportation Energy Expenses

Kentucky households spent an estimated average of \$2,186 for residential energy in 2014. As shown in Chart 1 below, electricity is the largest residential energy source, accounting for 77% of total Kentucky residential energy expenditures for home heating, cooling and appliances. In addition to natural gas, some Kentucky homes also use propane and other heating sources such as wood.

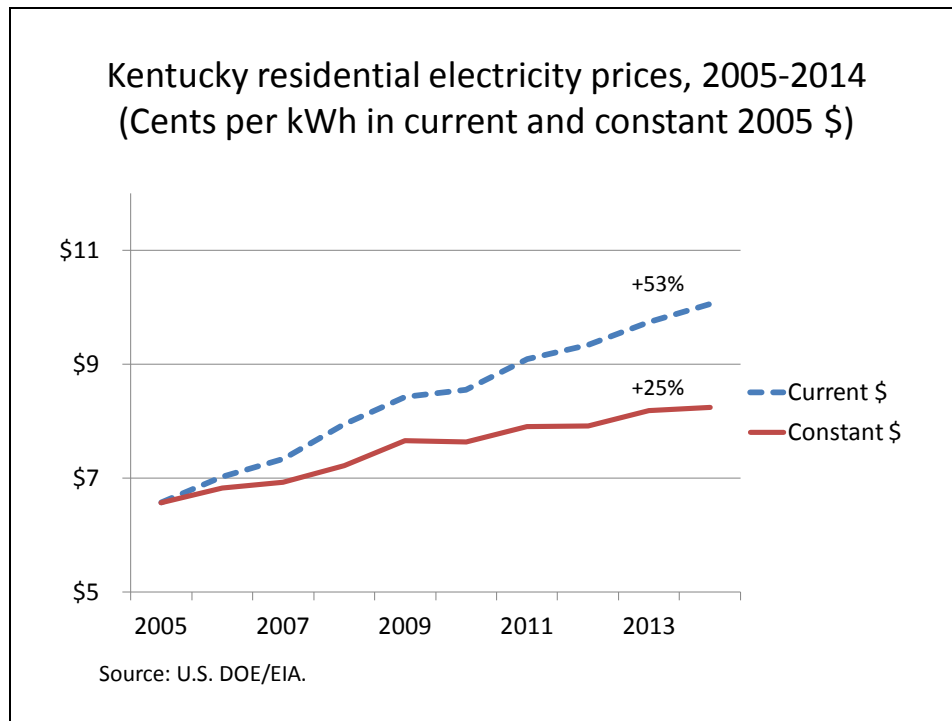
Chart 1



The price of residential electricity in Kentucky is 25% above its level in 2005 measured in real, inflation-adjusted terms (see Chart 2). The price of residential electricity has increased by 53% since 2005 in current prices. Average residential electric bills in Kentucky increased by 9% between 2013 and 2014, reflecting increased prices and consumption.

Large electricity price increases are expected under EPA's proposed Clean Power Plan (CPP) for reducing CO₂ emissions from existing power plants. A recent analysis by NERA⁴ estimates that electricity prices for Kentucky consumers will be at least 12% higher, on average, each year under the CPP than they would be without the CPP. NERA projects peak year Kentucky electricity price increases during the period 2017-31 of as much as 34%. Consumer prices for natural gas also are projected to rise due to EPA's carbon rule, requiring utilities to switch from low-cost coal to higher-cost natural gas. In addition, NERA estimates that consumers nationwide could be required to spend more than \$500 billion to reduce electricity use to meet EPA's targets.

Chart 2



Energy Expense Estimates

Estimated household energy expenses for Kentucky are based upon DOE/EIA residential electric and natural gas sales data for Kentucky through September 2014.⁵ Total household energy costs are distributed by income category using DOE/EIA residential energy survey data.

Gasoline prices have declined substantially in recent months, but the decline of pump prices has not matched the ~50% reduction in world oil prices between June and December 2014.⁶ EIA's December 2014 Short-Term Energy Outlook estimates national average gasoline prices of \$3.47/gallon in 2014, declining to \$2.60/gallon in 2015. This 2015 projection appears reasonable based on potential actions by OPEC nations to reduce oil production in response to falling oil prices, and the ongoing reduction of domestic drilling investment caused by lower oil prices.

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 2015 national average retail gasoline price projection of \$2.60 per gallon. Household gasoline consumption is reduced by 17% from 2001 levels, reflecting trends in household-adjusted retail gasoline sales.⁷

The table below summarizes estimated Kentucky household energy expenses by income group, with the percentage of after-tax income represented by energy costs:

Estimated Kentucky household energy costs by income category

Pre-Tax Annual Income:	<\$30K	\$30- <\$50K	<\$50K	≥\$50K	Average
Residential energy \$	\$1,700	\$1,961	\$1,796	\$2,665	\$2,186
Electric \$	\$1,311	\$1,535	\$1,393	\$2,036	\$1,683
Natural Gas \$	\$274	\$299	\$283	\$443	\$354
Other* \$	\$115	\$126	\$119	\$186	\$149
Gasoline \$	\$1,733	\$2,549	\$2,032	\$3,457	\$2,662
Total energy \$	\$3,433	\$4,510	\$3,828	\$6,122	\$4,848
Energy % of after-tax income	23%	13%	17%	8%	10%

*Other includes 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 56% of Kentucky households earning less than \$50,000 spend an estimated 17% of their after-tax income on residential and transportation energy. While many lower-income consumers qualify for energy assistance, budgetary support for these government programs has been pared back in recent years.⁸

Kentucky families spend an estimated average of \$4,848 on residential and transportation energy, or 10% of the average family budget. The 604,000 Kentucky households earning less than \$30,000 before taxes, representing 25% of households, allocate 23% of their after-tax incomes to energy. The large share of after-tax income devoted to energy poses difficult budget choices among food, health care and other basic necessities.

Disproportionate Impacts on Minorities and Senior Citizens

The impacts of high energy costs are falling disproportionately on Kentucky's minorities and elderly residents. Social Security recipients represent 34% of the state's 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 Kentucky's 2013 pre-tax median incomes for elderly and minority households, and compares these with the U.S. median household income of \$52,250.

U.S. and Kentucky Median Pre-tax Household Incomes, 2013

	Median Household Income	KY Pct. Diff. Vs. U.S. Median	Pct. of Households
U.S.	\$52,250		
Kentucky	\$43,399	-17%	
KY: Black	\$29,703	-43%	8%
KY: Hispanic	\$35,358	-32%	2%
KY Age 65+	\$32,964	-37%	24%

Source: U.S. Bureau of the Census, American Community Survey 2013 (2014)

Kentucky's minority and elderly households have median incomes substantially below the U.S. median. The median income of Black families is 43% below the U.S. median income. Kentucky householders aged 65 or more, 24% of all households, have a pre-tax median income of \$32,964, 37% below the U.S. median.

These relatively low pre-tax median incomes indicate that Kentucky's minority and senior households are among those most vulnerable to energy price increases such as rising household utility bills.

Conclusion

Rising electricity prices - together with negative real income growth among lower- and middle-income households - underscore the need to maintain affordable energy prices, especially among low- and middle-income families. Maintaining the relative affordability of electricity and other energy prices is essential to the wellbeing of Kentucky's lower-income citizens.

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 from U.S. Department of Energy, Energy Information Administration, 2009 Survey of Residential Energy Consumption (RECS). Kentucky residential energy costs are based on 2014 state data from U.S. DOE/EIA Electric Power Monthly (October 2014), Natural Gas

Monthly (October 2014) and State Energy Data System data for biomass, LPG and miscellaneous fuels available at www.eia.gov/state/seds. 2015 gasoline price projections are from DOE/EIA Short Term Energy Outlook (December 2014).

² Household incomes in Kentucky by income category are derived from the distribution of household income in U.S. Census Bureau, American Fact Finder, Kentucky Selected Economic Characteristics: 2013 (2014). Federal income tax rates are from Congressional Budget Office, "Effective Federal Tax Rates Under Current Law, 2001 to 2014," (August 2014). Effective federal tax rates for the income categories employed in this paper were interpolated from CBO's tax rates by income quintile and adjusted for changes in the American Taxpayer Relief Act of 2013. State tax data are estimated from state tax rates compiled by the Tax Foundation (2012).

³ U.S. Census Bureau, American Fact Finder, Kentucky Selected Economic Characteristics 2013 (2014).

⁴ National Economic Research Associates, Potential Energy Impacts of the EPA Proposed Clean Power Plan (prepared for ACCCE, *et al.*, October 2014). The average 2017-31 and peak year electricity price increases cited here are for NERA's State Unconstrained BB1-4 case, using all four of EPA's proposed building blocks

⁵ U.S. DOE/EIA, Electric Power Monthly and Natural Gas Monthly (October 2014).

⁶ NYMEX West Texas Intermediate and Intercontinental Exchange data (Brent Crude) for June 1-December 14, 2014.

⁷ DOE/EIA data indicate that retail gasoline consumption in barrels per day declined by 17% from 2001 to 2013 on a household-adjusted basis, with little change from 2013 to 2014.

⁸ 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>.