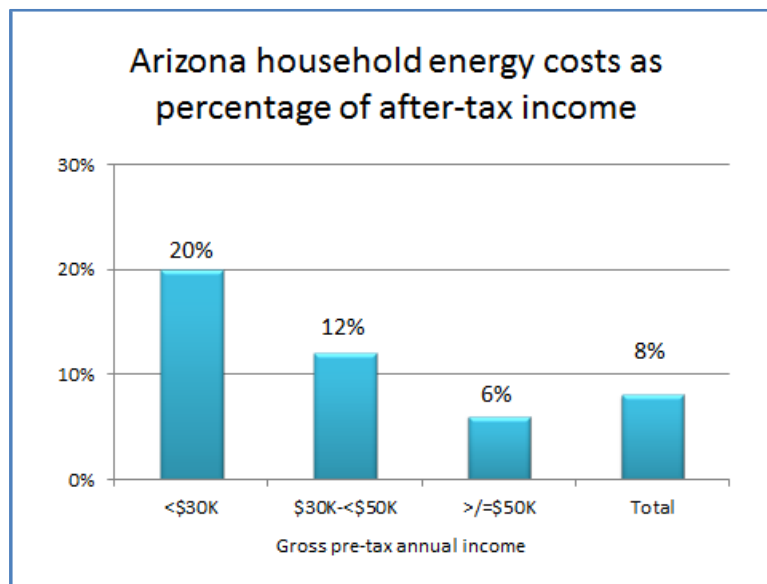


## Energy Cost Impacts on Arizona Families, 2015

High household energy costs and below-average family incomes are straining the budgets of Arizona's lower- and middle-income families. Arizona's 1.2 million households with pre-tax annual incomes below \$50,000, representing 50% of Arizona's families, spend an estimated average of 15% of their after-tax income on residential and transportation energy. Energy costs for 722,000 Arizona households earning less than \$30,000 before taxes represent 20% 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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## Energy Cost Impacts on Arizona Families, 2015

This paper estimates the impact of energy costs on Arizona households in 2015 using energy consumption survey data and energy price data from the U.S. Department of Energy's Energy Information Administration (DOE/EIA).<sup>1</sup> Energy costs are summarized by household income group using the most recent state population and income data from the Bureau of the Census, tax data from the Congressional Budget Office, and Arizona income tax rates.<sup>2</sup>

Key findings include:

- Some 50% of Arizona's families have pre-tax annual incomes of \$50,000 or less, with an average after-tax income among these households of \$23,593. In other words, more than half of Arizona's families have average take-home incomes of less than \$2,000 per month.
- The median pre-tax household income of Arizona families in 2014 was \$50,068, 7% below the national median household income. Median income is the midpoint of family incomes: one-half of families have incomes below the median, while the other one-half of families have incomes above it.
- The Census Bureau reports that 13% of all families in Arizona live below the federal poverty level, while 21% of all households with children less than 18 years old live in poverty.
- New U.S. EPA regulations will cause Arizona electricity prices to rise substantially. National Economic Research Associates projects that electricity prices for Arizona consumers could be 10% higher, on average, each year under EPA's Power Plan rule than they would be without the rule. NERA also projects that peak year Arizona electricity price increases (the largest increase in any single year) could be as much as 12% due to the Power Plan.
- Energy costs are consuming the after-tax household incomes of Arizona's low- and middle-income families at levels comparable to other necessities such as housing, food, and health care. The 722,000 Arizona households earning less than \$30,000, representing 30% of all households, devote an estimated average of 20% of their after-tax incomes to energy.
- The median pre-tax income of Arizona's Hispanic households is \$39,180, 27% below the national median income. Arizona households aged 65 or more, 27% of all households, have a median income 25% below the U.S. median. These relatively low median incomes indicate that Arizona's minority and senior households are among those most vulnerable to energy price increases such as rising household utility bills.

## Arizona Household Incomes

U.S. Census Bureau data on Arizona household incomes in 2014 (the most recent available) provide the basis for estimating the effects of energy prices on consumer budgets. The table below shows estimated 2014 after-tax incomes for Arizona 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 Arizona income tax rates.

Arizona households by pre-tax and after-tax income, 2014

Pre-tax annual income:	<\$30K	\$30- <\$50K	<\$50K	≥\$50K	Total/avg.
Households (Mil.)	0.722	0.491	1.213	1.216	2.429
Pct of total households	29.7%	20.2%	49.9%	50.1%	100.0%
Avg pre-tax income	\$16,244	\$39,771	\$25,768	\$111,089	\$68,103
Effec. fed tax rate %	3.5%	10.6%	6.3%	19.5%	12.9%
Est. state tax rate%	1.5%	3.0%	2.1%	4.5%	3.3%
Est. after-tax income	\$15,444	\$34,362	\$23,593	\$84,428	\$57,050

Some 50% of Arizona families had estimated pre-tax incomes below \$50,000 in 2014. After federal and state taxes, these families had average annual incomes of \$23,593, equivalent to an average monthly take-home income of less than \$2,000. In 2014, the median pre-tax household income of Arizona families was \$50,068, 7% below the national median household income of \$53,657.<sup>3</sup>

The U.S. Census Bureau reports that the real pre-tax incomes of American households have declined across all five income quintiles since 2001, measured in constant 2014 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 14% of their real income between 2001 and 2014. The largest losses of purchasing power – nearly \$3,000 – occurred in the second and third income quintiles, representing lower- and middle-income working families. These 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, 2001-2014  
(In constant 2014\$)

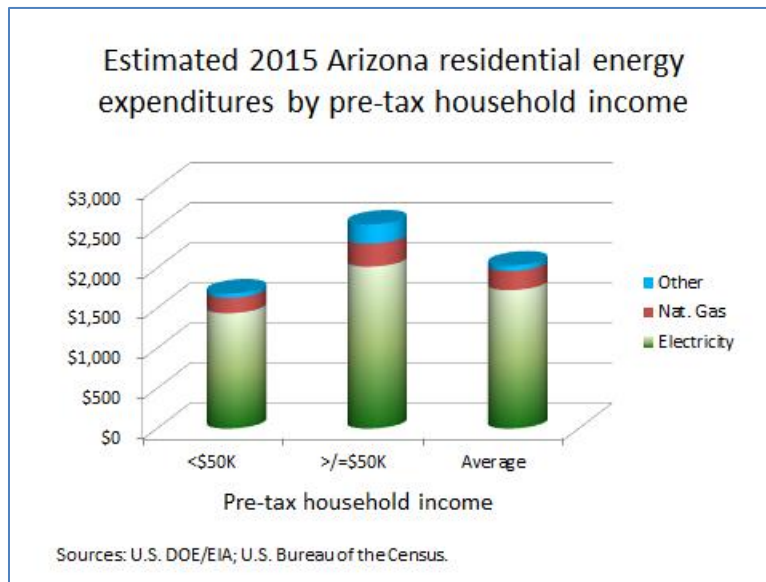
	1Q	2Q	3Q	4Q	5Q
2001	\$13,553	\$34,055	\$57,002	\$88,597	\$195,188
2014	\$11,676	\$31,087	\$54,041	\$87,834	\$194,053
Pct Chg	-14%	-9%	-6%	-1%	-1%
\$ Chg	(\$1,877)	(\$2,968)	(\$2,961)	(\$763)	(\$1,135)

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

## Residential and Transportation Energy Expenses

Arizona households spent an estimated average of \$2,033 for residential energy in 2015. As shown in Chart 1 below, electricity is the dominant residential energy source, accounting for 85% of total Arizona residential energy expenditures for home cooling, heating, and appliances. In addition to natural gas, some Arizona homes also use propane and other heating sources such as wood.

Chart 1



Large electricity price increases are expected under EPA's Power Plan for reducing CO2 emissions from existing power plants. A recent analysis by NERA<sup>4</sup> projects that electricity prices for Arizona consumers could be 10% higher, on average, each year under the Power Plan than they would be without the Power Plan. NERA projects peak year Arizona electricity price increases (the largest increase in any single year) during the period 2022-33 could be as much as 12%. In addition, both NERA and EPA<sup>5</sup>

estimate that consumers nationwide could be required to spend more than \$300 billion to reduce electricity use over the first 12 years of the program.

## Energy Expense Estimates

Estimated household energy expenses for Arizona are based upon DOE/EIA residential electric and natural gas sales data for Arizona through September 2015.<sup>6</sup> Total household energy costs are distributed by income category using DOE/EIA residential energy survey data.

Gasoline prices have declined substantially in the past two years, but the outlook for future gas pump prices is uncertain due to reductions in domestic drilling investments and tensions in the Middle East. EIA's November 2015 Short-Term Energy Outlook estimates national average gasoline prices of \$2.50 per gallon in 2015.

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 estimate of \$2.50 per gallon. Household gasoline consumption is reduced by 15% from 2001 levels, reflecting trends in per capita retail gasoline sales.<sup>7</sup>

The table below summarizes estimated Arizona household energy expenses in 2015 by income group, with the percentage of after-tax income represented by energy costs:

Estimated Arizona household energy costs by income category, 2015

Pre-Tax Annual Income:	<\$30K	\$30- <\$50K	<\$50K	≥\$50K	Average
Residential energy \$	\$1,583	\$1,834	\$1,685	\$2,388	\$2,033
Electric \$	\$1,346	\$1,575	\$1,438	\$2,019	\$1,726
Natural Gas \$	\$185	\$202	\$192	\$287	\$239
Other* \$	\$53	\$58	\$55	\$82	\$68
Gasoline \$	\$1,525	\$2,213	\$1,804	\$3,069	\$2,437
Total energy \$	\$3,109	\$4,047	\$3,489	\$5,457	\$4,470
Energy % of after-tax income	20%	12%	15%	6%	8%

\*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 50% of Arizona households earning less than \$50,000 before taxes spent an estimated 15% of their after-tax income on energy in 2015. While many lower-income consumers

qualify for energy assistance, budgetary support for these government programs has been reduced in recent years.<sup>8</sup>

Arizona families spent an estimated average of \$4,470 on residential and transportation energy in 2015, or 8% of the after-tax family budget. The 722,000 Arizona households earning less than \$30,000 before taxes, representing 30% of households, allocated 20% 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 Arizona’s minorities and elderly residents. Social Security recipients represent 33% 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 Arizona’s 2014 median pre-tax incomes for elderly, Black, and Hispanic households, and compares these with the U.S. median household income of \$53,657.

U.S. and Arizona Median Pre-tax Household Incomes, 2014

	Median Household Income	AZ Pct. Diff. vs. U.S. Median	Pct. of AZ Households
U.S.	\$53,657		
Arizona	\$50,068	-7%	
AZ: Black	\$40,064	-25%	4%
AZ: Hispanic	\$39,180	-27%	22%
AZ: Age 65+	\$40,195	-25%	27%

Source: U.S. Bureau of the Census, American Community Survey 2014 (2015)

Arizona’s Hispanic households have a median income of \$39,180, 27% below the national median income. Arizona households aged 65 or more, 27% of all households, have a pre-tax median income 25% below the U.S. median.

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

## Conclusion

High consumer household energy prices - together with negative real income growth among lower- and middle-income households - underscore the need to maintain affordable energy prices, especially for low- and middle-income Arizona families.

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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](mailto:emtrisko@earthlink.net).

### End Notes

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<sup>1</sup> 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), updated for 2015 residential energy prices. Arizona residential energy costs are based on 2015 state data from U.S. DOE/EIA Electric Power Monthly (November 2015), Natural Gas Monthly (November 2015) and State Energy Data System data for biomass, LPG and miscellaneous fuels available at [www.eia.gov/state/seds](http://www.eia.gov/state/seds). 2015 gasoline price estimates are from DOE/EIA Short Term Energy Outlook (December 2015).

<sup>2</sup> Household incomes in Arizona by income category are derived from the distribution of household income in U.S. Census Bureau, American Fact Finder, Arizona Selected Economic Characteristics: 2014 (2015). 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).

<sup>3</sup> U.S. Census Bureau, American Fact Finder, Arizona Selected Economic Characteristics 2014 (2015).

<sup>4</sup> National Economic Research Associates, Energy and Consumer Impacts of EPA's Clean Power Plan (prepared for ACCCE, November 7, 2015). The average annual 2022-33 and peak year electricity price increases cited here are the average of four NERA mass-based scenarios.

<sup>5</sup> U.S. EPA, Regulatory Impact Analysis of the Clean Power Plan (August 2015).

<sup>6</sup> U.S. DOE/EIA, Electric Power Monthly and Natural Gas Monthly (November 2015).

<sup>7</sup> DOE/EIA data indicate that per capita retail gasoline consumption declined by 15% from 2001 to 2014.

<sup>8</sup> 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>.