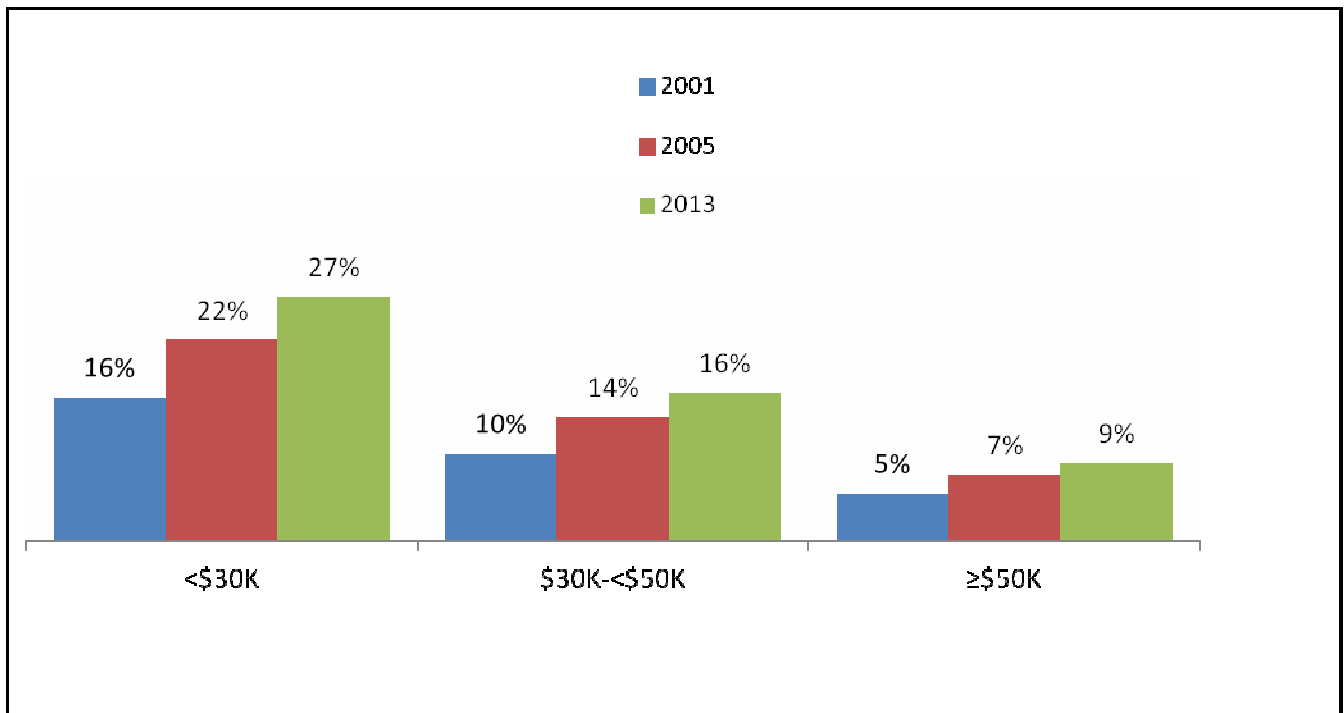


## Energy Cost Impacts on American Families, 2001-2013



Energy Costs as Percentage of Nominal After-Tax Household Income

January 2013

[www.americaspower.org](http://www.americaspower.org)

## Summary of Findings

This report analyzes consumer energy cost increases since 2001 for all U.S. households and examines the pattern of energy expenditures among four income levels and for senior and minority families in 2013. It relies on historical energy consumption survey data and current energy price forecasts from the U.S. Department of Energy's Energy Information Administration (EIA).<sup>1</sup> Energy costs are summarized in nominal (then-current) dollars by household income category for U.S. households in 2001, 2005, and 2013, using data from EIA and the U.S. Bureau of the Census.<sup>2</sup> Energy price projections for 2013 are based on the DOE/EIA Short-Term Energy Outlook released in December 2012.

Energy expenditures as a percentage of nominal after-tax income are estimated after the effects of federal and state income taxes and federal social insurance payments. The 2013 projections in this report are based on U.S. Bureau of the Census household income and population data for 2011 (the most recent available) and projected energy prices for 2013.

Key findings of this report are:

- Approximately one-half of U.S. households have average pre-tax annual incomes below \$50,000. Real median household income has declined by 8% since 2007, and is nearly 9% lower than the median household income peak (\$53,252) in 1999. The declining median income of American households over the past decade marks the reversal of a 50-year trend of rising American family incomes.
- Family incomes are not keeping pace with the rising costs of energy. In 2001, households with gross annual incomes below \$50,000 spent an average of 12% of their average after-tax income of \$21,635 on residential and transportation energy. In 2013, these households are projected to spend an average of 20% of their average after-tax income of \$22,591 on energy. For low- and middle-income families, energy costs are now consuming a portion of after-tax household income comparable to that traditionally spent on major categories such as housing, food, and health care.
- In FY2011, federal funding for the Low Income Home Energy Assistance Program (LIHEAP) was cut from \$5.1 billion to \$4.7 billion. In FY2012, Congress again reduced annual funding for LIHEAP to \$3.5 billion. Based on the residential energy costs estimated in this study, a \$3.5 billion funding level for LIHEAP would offset less than 6% of residential energy bills for households with incomes below \$30,000.

- Higher gasoline prices account for three-fourths of the increased cost of energy for consumers since 2001. Average U.S. household expenditures for gasoline will grow by 122% in nominal dollars from 2001 to 2013, based on EIA gasoline price projections for 2013. In comparison, residential energy costs for heating, cooling, and other household energy services will increase on average by 46%, from \$1,493 in 2001 to a projected \$2,177 per household in 2013.
- Residential electricity has maintained relatively low and stable average annual price increases compared with residential natural gas and gasoline. Electricity prices have increased by 54% in nominal dollars since 1990, below the rate of inflation, while the nominal prices of residential natural gas and gasoline have nearly doubled and tripled, respectively, over this period.
- Virtually all of the residential electricity price increases over the past two decades have occurred since 2000. These increases are due in part to additional capital, operating and maintenance costs associated with meeting clean air and other environmental standards.
- Lower-income families are more vulnerable to energy costs than higher-income families because energy represents a larger portion of their household budgets, reducing the amount of income that can be spent on food, housing, health care, and other necessities. Nearly one-third of U.S. households had gross annual incomes less than \$30,000 in 2011. Energy costs accounted for an average of 27% of their family budgets, before taking into account any energy assistance.
- The Census Bureau finds that real median household incomes for both white and minority households have not returned to their pre-2001 recession peaks. For non-Hispanic whites, median household income in 2011 was 7.0% below its peak of \$59,604 in 1999. Real median household income for Blacks was 16.8% lower (from \$38,747 in 2000). Household incomes for Asians were 10.6% lower (from \$72,821 in 2000), and 10.8% lower for Hispanics (from \$43,319 in 2000.)
- In 2011, 62% of Hispanic households and 66% of Black households had average annual incomes below \$50,000, compared with 45% of white households and 39% of Asian households. These income inequalities magnify the burdens of energy price increases on Black and Hispanic households.
- Fixed-income seniors are a growing proportion of the U.S. population, and are among the most vulnerable to energy cost increases due to their relatively low average incomes. In 2011, the median gross income of 26.8 million households with a principal householder aged 65 or older was \$33,118, one-third below the national median household income.

## Energy Costs for U.S. Families, 2001–2013

Energy costs for residential utilities and gasoline are straining low- and middle-income family budgets. As Table 1 illustrates, the average American family with an after-tax income of \$53,092 will spend an estimated \$5,907 on energy in 2013, or 11% of the family budget. The 60.5 million households earning less than \$50,000—representing 49.9% of U.S. households—will devote an estimated 20% of their after-tax incomes to energy, compared with an average of 9% for households with annual incomes above \$50,000. For the 27.7 million lower-income families with pre-tax incomes between \$10,000 and \$30,000, energy expenditures in 2013 will consume 23% of average after-tax incomes, compared with 14% in 2001.

The summary income and energy expenditure data in Table 1 are based on U.S. Bureau of the Census pre-tax household income data for 2011 (the most recent available) and energy prices for 2013 projected by DOE/EIA. 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.<sup>3</sup> Federal tax rates for 2013 are based on CBO’s estimates for 2009, the most recent year available, adjusted for payroll and other tax increases in the American Taxpayer Relief Act of 2012.<sup>4</sup> State income taxes are estimated from current state income tax rates

**Table 1. Estimated Household Energy Expenditures as a Percentage of Income, 2013**

Pre-tax income	<\$10K	\$10K-<\$30K	\$30K<\$50K	<\$50K	≥\$50K	Average
Est. average after-tax income	\$4,726	\$18,261	\$33,297	\$22,591	\$84,828	\$53,092
Percentage of households	7.6%	22.9%	19.4%	49.9%	50.1%	100.0%
Residential energy	\$1,622	\$1,719	\$1,937	\$1,789	\$2,568	\$2,177
Transportation fuel	\$1,991	\$2,473	\$3,497	\$2,798	\$4,688	\$3,730
Total energy	\$3,613	\$4,192	\$5,434	\$4,587	\$7,256	\$5,907
Energy pct. of after-tax income	76.5%	23.0%	16.3%	20.3%	8.6%	11.1%

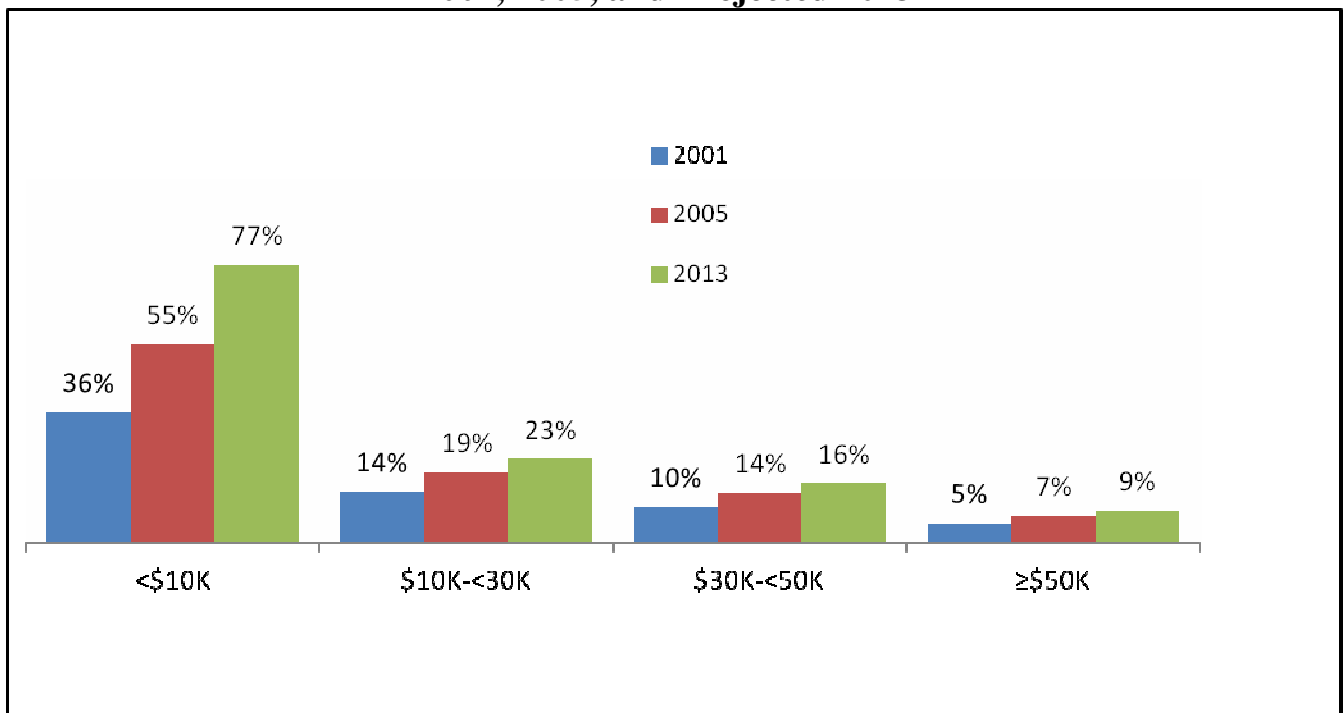
*Source:* Appendix Table 1.

Many lower-income families qualify for federal or state energy assistance. However, these programs are unable to keep up with the increase in household energy costs. In FY2011, federal funding for the Low Income Home Energy Assistance Program (LIHEAP) was cut from \$5.1 billion to \$4.7 billion.<sup>5</sup> In FY2012, Congress again

reduced annual funding for LIHEAP to \$3.5 billion.<sup>6</sup> Based on DOE/EIA’s 2009 Residential Energy Consumption Survey (2012), a \$3.5 billion funding level for LIHEAP would offset less than 6% of residential energy bills for lower-income households with incomes below \$30,000.

The portion of household incomes devoted to energy has increased substantially since 2001 (see Chart 1). In 2001, 62 million families with gross annual incomes less than \$50,000 (2001\$) spent an average of 12% of their after-tax income on residential and transportation energy. In 2013, energy will account for an average of 20% of the after-tax income of the 60 million American families in this income category. Energy cost burdens are greatest on the poorest families, those earning less than \$10,000. Their average energy bills will more than double, from 36% of estimated after-tax income in 2001 to 77% in 2013. These estimates do not account for any government or private energy assistance that these families may receive, and thus do not reflect actual personal energy consumption expenditures.

**Chart 1**  
**Energy Costs as Percentage of Nominal After-Tax Household Income, 2001, 2005, and Projected 2013**

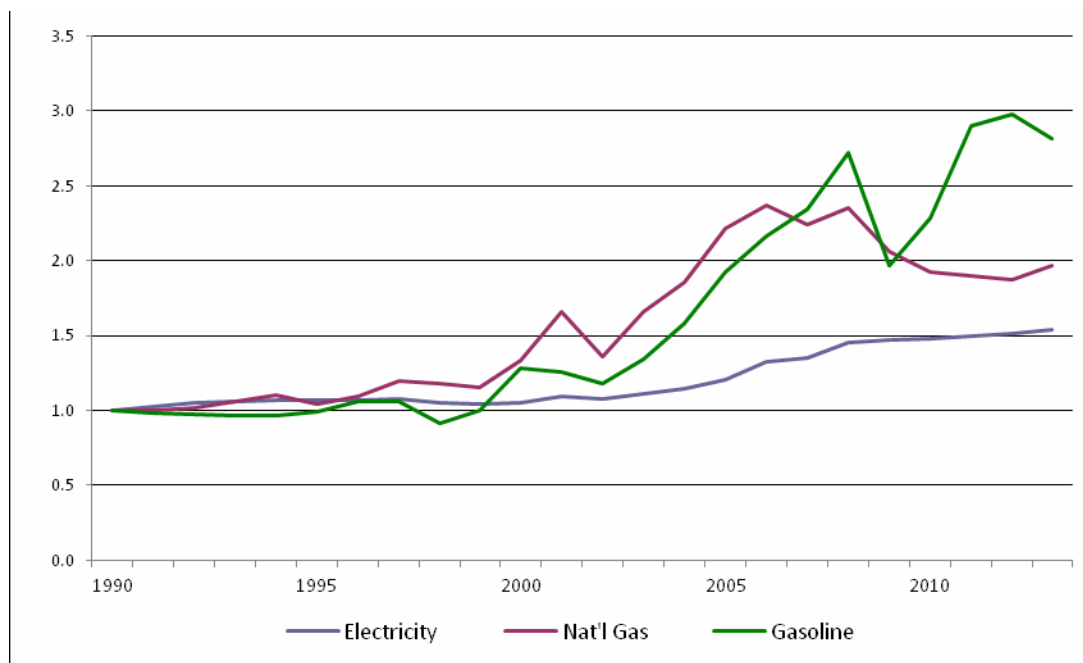


Source: Appendix Table 1.

## Relative Energy Price Increases

Among key consumer energy products, electricity has increased at the lowest rate measured in nominal dollars over the past two decades. Chart 2 provides an index of consumer energy prices in nominal dollars since 1990. Prices for residential natural gas and gasoline have nearly doubled and tripled, respectively, while residential electricity prices increased by 54%, well below the 76% rate of inflation based on the Consumer Price Index between 1990 and 2012.<sup>7</sup>

**Chart 2**  
**Price Trends of Consumer Energy Products in Nominal Dollars, 1990-2013**  
**(Index 1990 = 1.0)**



*Sources:* U.S. DOE/EIA, Annual Energy Review 2010 and Short-Term Energy Outlook (December 2012).

Unlike other consumer energy products, electricity has maintained relatively low rates of price increase below the overall rate of inflation. However, as Chart 2 indicates, virtually all of the residential electricity price increases over the past two decades have occurred since 2000. From 1990 to 2000, electricity prices increased by just 5% in nominal dollars. However, between 2001 and 2013, residential electric prices are projected to increase by 40% to a national average of 12.0 cents per kWh. These increases are due in part to additional capital, operating and maintenance costs associated with meeting U.S. EPA clean air and other environmental standards.<sup>8</sup>

Current and prospective EPA rules are expected to result in additional electricity price increases in many areas of the country. For example, EPA estimates the annual costs of compliance with one recent Clean Air Act regulation – the utility Mercury and Air Toxics Standards rule – at \$9.6 billion (\$2007) in 2016.<sup>9</sup> The projected annual cost of this rule is 45% greater than EPA’s \$6.6 billion (\$2006) estimate of the costs of compliance with all utility Clean Air Act requirements in 2010.<sup>10</sup>

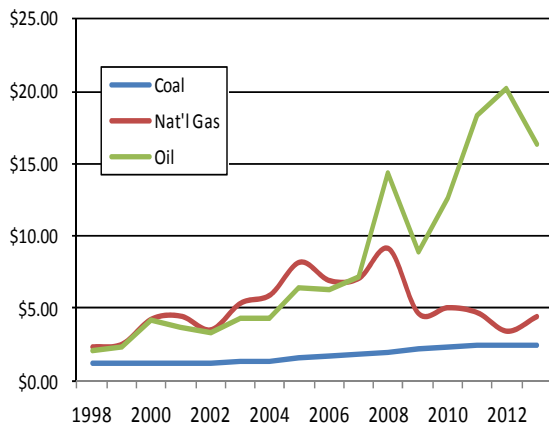
### Electric Utility Fuel Cost Trends

The relatively modest long-term rate of price increase for residential electricity reflects, in part, the electric utility industry’s reliance on domestic coal for a substantial portion of its energy supplies. As Chart 3 illustrates, coal prices at electric utilities have remained stable relative to competing fuels such as natural gas and petroleum.<sup>11</sup> Natural gas prices have declined sharply in the past five years due to increased supply, and have helped to restrain the rate of residential electricity price increases.

EIA forecasts that domestic coal will cost \$2.44 per million British Thermal Units (MMBTU) delivered to power plants in 2013.<sup>12</sup> The cost of natural gas at utility plants in 2013 is projected at \$4.47/MMBTU, a 29% increase over 2012 delivered gas prices.<sup>13</sup> These natural gas price increases will tend to increase the utilization of lower-cost coal.

EIA projects that natural gas wellhead prices will remain below \$5 per MMBTU (in 2011\$) through 2025.<sup>14</sup> Natural gas wellhead prices are forecasted to reach \$6.32 (2011\$) per MMBTU in 2035, and \$7.83 per MMBTU in 2040.<sup>15</sup> Minemouth coal prices are projected to increase at a lower average annual rate, from \$2.18 per MMBTU in 2012 to \$2.94 per MMBTU in 2035 and \$3.08 per MMBTU in 2040 (in 2011\$).<sup>16</sup>

**Chart 3**  
**Electric Utility Fuel Costs, 1998-2013**  
**(Nominal \$ per Million BTU)**



Source: DOE/EIA, Electric Power Annual (2010) and Short-Term Energy Outlook (December 2012).

## **Consumer Energy Cost Estimates**

The distribution of U.S. households by income categories provides the basis for estimating the effects of energy prices on consumer budgets in 2013. EIA's quadrennial Surveys of Residential Energy Consumption<sup>17</sup> are the principal sources for estimating energy expenditures for residential heating, cooling, electricity, and other household energy services. For this report, the most recent EIA 2009 survey (2012) is updated with Census Bureau 2011 population data and EIA's December 2012 forecast of 2013 residential energy prices.

EIA's 2001 Survey of Household Vehicles Energy Use<sup>18</sup> provides benchmark data on transportation energy costs by household income category based on gallons of gasoline used per household. These gasoline consumption data are updated using Census Bureau 2011 population data and EIA's December 2012 national average retail gasoline price forecast for 2013 of \$3.43 per gallon.

It is assumed that household gasoline usage in 2013 will be 10.1% below the levels of the EIA 2001 survey, reflecting a population-adjusted decline of motor gasoline sales over this period. The more recent 2009 National Highway Transportation Survey (2011) confirms the aggregate gasoline expenditure estimates for 2013 in this report.<sup>19</sup>

### **Residential and Transportation Energy Expenses**

The principal residential energy expenses are for electricity and natural gas for heating, cooling, lighting, and appliances. Some homes also use propane fuel (LPG) and other heating sources, such as home heating oil, kerosene, and wood.

Gasoline accounts for the largest single increase in consumer energy costs over the past decade. In 2013, the average U.S. family will spend an estimated \$3,730 on gasoline, compared with \$1,680 in 2001 – an average increase of \$2,049 per household.

The increase in gasoline prices follows a long-term trend of increased market shares of pickup trucks and sport utility vehicles (SUVs), and an increase in the average number of vehicles owned per household.<sup>20</sup> While average vehicle efficiency has been improving in recent model years,<sup>21</sup> many families continue to own low-efficiency vehicles with low trade-in values. Improved vehicle quality, coupled with the recession, is increasing the average age of vehicles on the road.<sup>22</sup>

The impacts of residential and transportation energy costs on low- and middle-income families are summarized in Table 2 and in Appendix Table 1. Residential energy costs have increased on average by 46% since 2001, from \$1,493 to \$2,177 per household. Consumer costs for gasoline grew by 122% during this period, accounting for 76% of



the overall \$2,688 increase in total household energy costs since 2001.

**Table 2. Estimated After-Tax Income and Energy Costs by Income Category, 2001, 2005, and Projected 2013**  
(In nominal dollars)

Pre-tax annual income:	<\$10K	\$10K- <\$30K	\$30K- <\$50K	<\$50K	≥\$50K	Totals
<b>Est. avg. after-tax income</b>						
2001	\$5,532	\$17,520	\$32,380	\$21,635	\$76,861	\$47,127
2005	\$5,238	\$17,450	\$32,259	\$21,879	\$78,178	\$47,771
2013	\$4,726	\$18,261	\$33,297	\$22,591	\$84,828	\$53,092
<b>Residential energy \$</b>						
2001	\$1,039	\$1,260	\$1,456	\$1,299	\$1,836	\$1,493
2005	\$1,351	\$1,498	\$1,733	\$1,565	\$2,173	\$1,850
2013	\$1,622	\$1,719	\$1,937	\$1,789	\$2,568	\$2,177
<b>Transport energy \$</b>						
2001	\$934	\$1,160	\$1,638	\$1,306	\$2,195	\$1,680
2005	\$1,513	\$1,878	\$2,652	\$2,119	\$3,554	\$2,790
2013	\$1,991	\$2,473	\$3,497	\$2,798	\$4,688	\$3,730
<b>Total energy \$</b>						
2001	\$1,973	\$2,420	\$3,094	\$2,605	\$4,031	\$3,218
2005	\$2,863	\$3,375	\$4,385	\$3,684	\$5,725	\$4,640
2013	\$3,613	\$4,192	\$5,434	\$4,587	\$7,256	\$5,907

Source: Appendix Table 1.

### Household Energy Cost Impacts

As energy costs have risen over the past decade, the real, inflation-adjusted incomes of American families have declined. The U.S. Census Bureau reports in its latest assessment of income and poverty that real median household income declined by 1.5% between 2010 and 2011, a second consecutive year of declining family incomes. Real median household income has declined by 8% since 2007, and is nearly 9% lower than the median household income peak (\$53,252) in 1999.<sup>23</sup>

The official poverty rate in 2011 remained virtually unchanged from its all-time historic high of 15% recorded in 2010.<sup>24</sup> The Census Bureau finds that 46.2 million Americans lived in poverty in 2011. For children under the age of 18, the poverty rate was 22%.<sup>25</sup> Poverty is more pervasive among some minority groups: more than 27% of Blacks and 25% of Hispanics lived in poverty in 2011.<sup>26</sup>

Therefore, increasing energy costs are straining low- and middle-income family budgets. Heating, cooling, and transportation are necessities of life, and increased energy costs are impacting low- and middle-income family budget choices among energy and other necessities such as health care, housing, and nutrition.

### **The Shrinking Middle Class**

The decline of American household incomes over the past decade marks the reversal of a long-term trend of increasing incomes across all segments of society. A recent Pew Research study of middle-class income trends since 1950 found that:

For the half century following World War II, American families enjoyed rising prosperity in every decade—a streak that ended in the decade from 2000 to 2010, when inflation-adjusted family income fell for the middle income as well as for all other income groups, according to U.S. Census Bureau data. ...

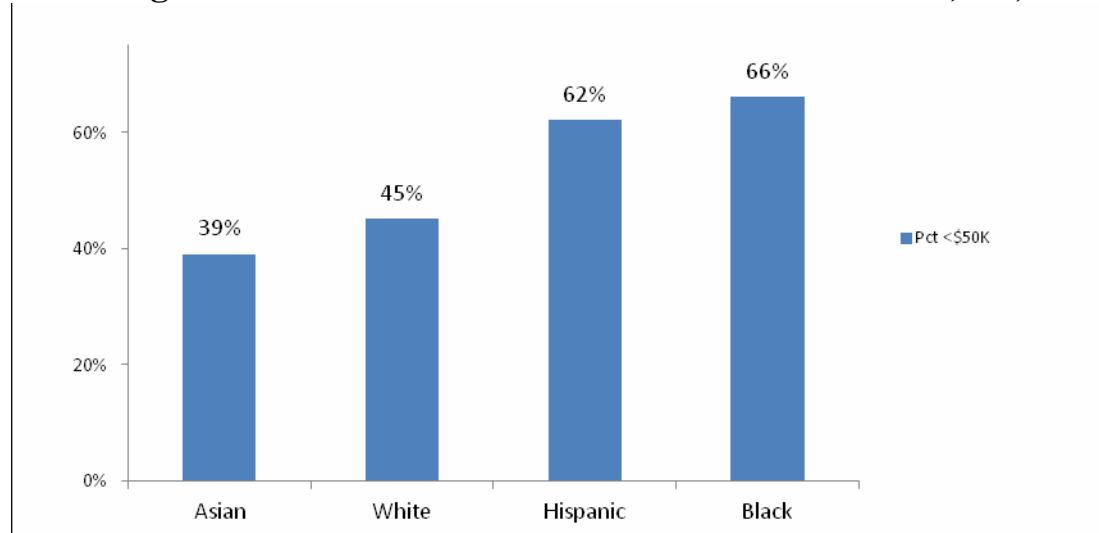
(T)hose in the upper-income tier now take in a much larger share of U.S. aggregate household income than they did four decades ago, while those in the middle tier take in a much lower share. ... (U)pper-income households accounted for 46% of U.S. aggregate household income in 2010, compared with 29% in 1970. Middle-income households claimed 45% of aggregate income in 2010, compared with 62% in 1970. Lower-income households had 9% of aggregate income in 2010 and 10% in 1970.<sup>27</sup>

The steady decline of household incomes since the 1999 peak of real median household income has contributed to the rising share of energy costs for typical family budgets. These impacts are most pronounced among households earning less than the national median income of approximately \$50,000.

### **Energy Cost Impacts on Minorities**

EIA's residential energy consumption surveys do not provide energy consumption expenditures by income group combined with minority status. However, as illustrated in Chart 4, the unequal distribution of household incomes is a principal factor leading to disproportionate energy cost impacts on many minority families. More than 60% of Hispanic households and two-thirds of Black households had pre-tax household incomes below \$50,000 in 2011, compared with 39% for Asian families and 45% for white households.

**Chart 4**  
**Percentage of Households with Pre-Tax Incomes below \$50,000, 2011**



*Source:* U.S. Bureau of the Census, Current Population Survey Annual Social and Economic Supplement (2012).

The Census Bureau finds that real median household incomes for both white and minority households have not returned to their pre-2001 recession peaks.<sup>28</sup> For non-Hispanic whites, median household income in 2011 was 7.0% below its peak of \$59,604 in 1999. Real median household income for Blacks was 16.8% lower (from \$38,747 in 2000). Household incomes for Asians were 10.6% lower (from \$72,821 in 2000), and 10.8% lower for Hispanics (from \$43,319 in 2000.)

**Table 3. Distribution of U.S. Households by Pre-tax Annual Income, 2011**

Pre-tax annual income	<\$10K	\$10-<\$30K	\$30-<\$50K	<\$50K	≥\$50K	Totals
<b>Percentage of households</b>						
Asian	7%	16%	16%	39%	61%	100%
Black	16%	31%	20%	66%	34%	100%
Hispanic	10%	28%	24%	62%	38%	100%
White	5%	21%	19%	45%	55%	100%
U.S. average	8%	23%	19%	50%	50%	100%
<b>Avg. pre-tax income</b>						<b>Average</b>
Asian	\$3,215	\$19,758	\$38,878	\$24,533	\$124,783	\$85,644
Black	\$4,968	\$19,014	\$38,862	\$21,646	\$93,539	\$44,802
Hispanic	\$4,830	\$19,721	\$38,712	\$24,653	\$97,567	\$52,352
White	\$5,005	\$19,763	\$39,315	\$25,778	\$113,991	\$73,439
U.S. average	\$4,862	\$19,657	\$38,989	\$24,924	\$114,323	\$69,677

*Source:* U.S. Bureau of the Census, Current Population Reports – 2011 Annual (2012).

Table 3 (above) summarizes 2011 household incomes for Asian, Black, Hispanic, and white families by gross annual income bracket. The average incomes of Hispanic and Black households were 29% and 39% lower, respectively, than the average income of white households. Asian households, on the other hand, had average annual incomes 23% higher than the U.S. average income of \$69,677. Based on these income inequality data, disproportionate numbers of Black and Hispanic families are more vulnerable to energy price increases than Asian or white families.

### **Impacts on Senior Citizens**

In 2011, 29% of U.S. households received Social Security benefits. The average basic Social Security income of these 33 million households was \$16,645.<sup>29</sup> Some 61% of households receiving Social Security benefits also received other retirement income in 2011 averaging \$22,969.<sup>30</sup>

The U.S. Census Bureau reports that the median income of 27 million households with a principal householder aged 65 or older was \$33,118 in 2011, or 34% below the national household median income of \$50,054.<sup>31</sup>

Lower-income senior households that depend mainly on fixed incomes are among those most vulnerable to energy price increases. Food, health care, and other necessities compete with energy costs for a share of the household budget. The \$33,118 median income of senior U.S. households means that half of these households depend on incomes below this level.

## **Conclusion**

Energy costs have increased substantially as a fraction of annual family budgets since 2001, with the largest impacts occurring among low- and middle-income households. The rapid escalation of consumer energy prices, along with stagnant income growth, magnifies the importance of energy costs to all American families. The unequal distribution of incomes in the United States imposes disproportionate energy cost burdens on tens of millions of minority and senior households.

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Acknowledgment – This report was prepared for ACCCE by Eugene M. Trisko, who has conducted these analyses annually since 2000. Mr. Trisko is an attorney and energy economist who represents labor and industry clients. He previously served as an attorney in the Bureau of Consumer Protection of the U.S. Federal Trade Commission and as an expert witness on utility cost of capital.

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## Notes

<sup>1</sup> Data on residential energy consumption patterns by income are derived from U.S. Department of Energy, Energy Information Administration, “Survey of Residential Energy Consumption,” (2001, 2005 and 2009 surveys), available at <http://www.eia.doe.gov/emeu/recs/contents.html>. Data for 2009 energy consumption by household income are updated to estimated 2013 values based on changes in household income and population, and changes in consumer residential energy prices between 2009 and 2013 from EIA’s “Short-Term Energy Outlook” (December 2012).

<sup>2</sup> Household incomes by gross income category are calculated from the 2011 distribution of household income in U.S. Bureau of the Census, Current Population Survey, “Annual Social and Economic Supplement” (2012).

<sup>3</sup> Congressional Budget Office (CBO), “Effective Federal Tax Rates Under Current Law, 2001 to 2014” (August 2004); “Effective Federal Tax Rates 1979-2006” (April 2009). Effective federal tax rates for the income categories in this paper were interpolated from CBO’s tax rates by income quintile based on the distribution of 2001, 2005 and 2011 household incomes. State income tax rates were estimated from tax rates summarized in Federation of Tax Administrators, [http://www.taxadmin.org/fta/rate/ind\\_inc.html](http://www.taxadmin.org/fta/rate/ind_inc.html).

<sup>4</sup> Effective federal tax rates for 2013 are estimated from CBO’s estimates for 2009 adjusted for payroll and other tax increases in the American Taxpayer Relief Act of 2012 (January 1, 2013), as analyzed by the Urban-Brookings Tax Policy Center (January 1, 2013, ATRA versus patched 2012 base.) See, <http://www.taxpolicycenter.org/numbers/displayatab.cfm?Docid=3755&DocTypeID=1>.

<sup>5</sup> See, <http://www.neada.org/appropriations/index.html>.

<http://www.acf.hhs.gov/programs/ocs/resource/low-income-home-energy-assistance-program-provides-help-for-struggling>

<sup>6</sup> See, <http://www.acf.hhs.gov/programs/ocs/resource/low-income-home-energy-assistance-program-provides-help-for-struggling>

<sup>7</sup> U.S. Bureau of Labor Statistics, CPI Inflation Calculator, available at <http://data.bls.gov/cgi-bin/cpicalc.pl>

<sup>8</sup> See, U.S. EPA, “The Benefits and Costs of the Clean Air Act from 1990 to 2020” (2011) at Table 3-2 (electric utility direct annual compliance costs increased from an estimated \$1.4 billion (\$2006) in 2000 to \$6.6 billion (\$2006) in 2010.) Since 2000, the utility sector has complied with the federal acid rain program enacted in the 1990 Clean Air Act Amendments, EPA’s 1998 Ozone Transport Rule reducing nitrogen oxide emissions in 19 eastern states, Phase I of EPA’s 2005 Clean Air Interstate Rule requiring further reductions of sulfur dioxide and nitrogen oxide emissions in the eastern U.S., and a variety of other federal and state air and water quality standards.

<sup>9</sup> U.S. EPA, “Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards,” (December 2011) at ES-14.

<sup>10</sup> U.S. EPA, “The Benefits and Costs of the Clean Air Act,” *supra*.

<sup>11</sup> U.S. DOE/EIA, “Electric Power Annual 2010,” (historical tables, 2011) and “Short-Term Energy Outlook,” (December 2012).

<sup>12</sup> U.S. DOE/EIA, “Short-Term Energy Outlook” (December 2012), Table 2.

<sup>13</sup> *Id.*

<sup>14</sup> U.S. DOE/EIA, “Annual Energy Outlook 2013 Early Release,” (December 2012).

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> U.S. DOE/EIA, “Residential Energy Consumption Survey, 2009,” (2012). Data in this report for households with incomes below \$60,000 were provided to the author by EIA.

<sup>18</sup> U.S. DOE/EIA, “Household Vehicles Energy Use: Latest Data & Trends” (November 2005), available at [http://www.eia.doe.gov/emeu/rtecs/nhts\\_survey/2001/](http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/).

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<sup>19</sup> U.S. Department of Transportation, National Household Travel Survey, Summary of Travel Trends (June 2011) at Table 34 (average household gasoline expenditures increased from \$1,275 in 2001 (2001\$) to \$3,308 (2009\$) in 2009.) The average price of gasoline in the NHTS 2009 survey was \$2.96/gallon, 16% less than the \$3.43/gallon price that EIA projects for 2013. Adjusted by the change in average gasoline prices, the 2009 NHTS data imply average 2013 household gasoline expenditures of \$3,837, compared with the \$3,730 estimate in this report. The 2009 NHTS does not provide gasoline expenditure or consumption data by household income category.

<sup>20</sup> *Id.*, at Fig. 1, Tables 1, 20.

<sup>21</sup> *See*, U.S. EPA, Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends:1975 Through 2011 (March 2012) at iv, available at <http://www.epa.gov/otaq/cert/mpg/fetrends/2012/420s12001a.pdf>.

<sup>22</sup> R.L. Polk & Co. reports that the average age of automobiles on the road was 10.8 years as of the second quarter of 2012, reflecting a rising trend for the past 10 years. *See*, <http://blog.polk.com/blog/blog-posts-by-lonnie-miller/americans-are-holding-their-vehicles-longer-is-it-good-for-loyalty>.

<sup>23</sup> U.S. Census Bureau, “Income, Poverty, and Health Insurance Coverage in the United States: 2011” (2012), at 5.

<sup>24</sup> *Id.*, Table 3.

<sup>25</sup> *Id.*

<sup>26</sup> *Id.*

<sup>27</sup> Pew Research Center, “The Lost Decade of the Middle Class” (August 22, 2012) at 9-10 (footnotes omitted.) Pew defines middle income households as those with incomes 67% to 200% of the median household income.

<sup>28</sup> U.S. Census Bureau, “Income, Poverty, and Health Insurance Coverage in the United States: 2011” (2012), at 8.

<sup>29</sup> U.S. Census Bureau, “American Community Survey – 2011 American Community Survey 1-Year Estimates,” (2012).

<sup>30</sup> *Id.*

<sup>31</sup> U.S. Census Bureau, “Income, Poverty, and Health Insurance Coverage in the United States: 2011” (2012), Table 1.

**APPENDIX TABLE 1 - 2001, 2005 AND PROJECTED 2013 HOUSEHOLD INCOME AND ENERGY EXPENSES**

**2001 HOUSEHOLD ENERGY EXPENSES BY INCOME CATEGORY - ALL U.S. HOUSEHOLDS**

	<\$10K	\$10K-<\$30K	\$30K-<=\$50K	>=\$50K	TOTALS	SUBTOTALS		
						<\$30K	<\$50K	>=\$50K
Households (Mil.)	9.8	28.9	23.6	47.0	109.3	38.7	62.3	47.0
Pct of total households	9.0%	26.4%	21.6%	43.0%	100.0%	35.4%	57.0%	43.0%
Avg pre-tax income	\$5,733	\$19,707	\$39,201	\$107,649	\$60,488	\$16,168	\$24,893	\$107,649
Effec. fed tax rate %	2.0%	9.0%	14.9%	22.3%	21.0%	7.2%	10.1%	22.3%
Est. state tax rate%	1.5%	2.6%	4.0%	6.3%	4.4%	2.3%	3.0%	6.3%
Est. after-tax income	\$5,532	\$17,520	\$32,380	\$76,861	\$45,127	\$14,624	\$21,635	\$76,861
Residential energy \$	\$1,039	\$1,260	\$1,456	\$1,836	\$1,493	\$1,204	\$1,299	\$1,836
Residential electric \$	\$628	\$772	\$922	\$1,172	\$938	\$736	\$806	\$1,172
Other resid. energy \$	\$411	\$488	\$534	\$664	\$555	\$469	\$493	\$664
Transport energy \$	\$934	\$1,160	\$1,638	\$2,195	\$1,680	\$1,103	\$1,306	\$2,195
Total energy \$	\$1,973	\$2,420	\$3,094	\$4,031	\$3,218	\$2,307	\$2,605	\$4,031
Energy % of after-tax inc.	35.7%	13.8%	9.6%	5.2%	7.1%	15.8%	12.0%	5.2%
Resid. % of after-tax inc.	18.8%	7.2%	4.5%	2.4%	3.3%	8.2%	6.0%	2.4%
Trans. % of after-tax inc.	16.9%	6.6%	5.1%	2.9%	3.7%	7.5%	6.0%	2.9%

**2005 HOUSEHOLD ENERGY EXPENSES BY INCOME CATEGORY - ALL U.S. HOUSEHOLDS**

	<\$10K	\$10K-<\$30K	\$30K-<=\$50K	>=\$50K	TOTALS	<\$30K	<\$50K	>=\$50K
Pct of total households	8.2%	24.6%	20.5%	46.8%	100.0%	32.8%	53.2%	46.8%
Avg pre-tax income	\$5,400	\$19,695	\$39,388	\$106,947	\$63,344	\$16,112	\$25,055	\$106,947
Effec. fed tax rate %	2.0%	8.8%	14.1%	20.6%	20.1%	7.1%	9.8%	20.6%
Est. state tax rate%	1.0%	2.6%	4.0%	6.3%	4.5%	2.2%	2.9%	6.3%
Est. after-tax income	\$5,238	\$17,450	\$32,259	\$78,178	\$47,771	\$14,614	\$21,879	\$78,178
Residential energy \$	\$1,351	\$1,498	\$1,733	\$2,173	\$1,850	\$1,461	\$1,565	\$2,173
Residential electric \$	\$785	\$914	\$1,098	\$1,361	\$1,150	\$882	\$965	\$1,361
Other resid. energy \$	\$566	\$583	\$635	\$812	\$699	\$579	\$600	\$812
Transport energy \$	\$1,513	\$1,878	\$2,652	\$3,554	\$2,790	\$1,786	\$2,119	\$3,554
Total energy \$	\$2,863	\$3,375	\$4,385	\$5,728	\$4,640	\$3,247	\$3,684	\$5,728
Energy % of after-tax inc.	54.7%	19.3%	13.6%	7.3%	9.7%	22.2%	16.8%	7.3%
Resid. % of after-tax inc.	25.8%	8.6%	5.4%	2.8%	3.9%	10.0%	7.2%	2.8%
Trans. % of after-tax inc.	28.9%	10.8%	8.2%	4.5%	5.8%	12.2%	9.7%	4.5%

**PROJECTED 2013 HOUSEHOLD ENERGY EXPENSES BY INCOME CATEGORY - ALL U.S. HOUSEHOLDS**

	<\$10K	\$10K-<\$30K	\$30K-<=\$50K	>=\$50K	TOTALS	<\$30K	<\$50K	>=\$50K
Pct of total households	7.6%	22.9%	19.4%	50.1%	100.0%	30.5%	49.9%	50.1%
Avg pre-tax income	\$4,862	\$19,657	\$38,989	\$114,323	\$69,677	\$15,958	\$24,925	\$114,323
Effec. fed tax rate %	1.8%	4.5%	10.6%	19.5%	19.2%	3.8%	6.5%	19.5%
Est. state tax rate%	1.0%	2.6%	4.0%	6.3%	4.6%	2.2%	2.9%	6.3%
Est. after-tax income	\$4,726	\$18,261	\$33,297	\$84,828	\$53,092	\$14,997	\$22,591	\$84,828
Residential energy \$	\$1,622	\$1,719	\$1,937	\$2,568	\$2,177	\$1,687	\$1,789	\$2,568
Residential electric \$	\$1,093	\$1,130	\$1,311	\$1,682	\$1,437	\$1,116	\$1,195	\$1,682
Other resid. energy \$	\$529	\$589	\$626	\$886	\$740	\$571	\$594	\$886
Transport energy \$	\$1,991	\$2,473	\$3,497	\$4,688	\$3,730	\$2,342	\$2,798	\$4,688
Total energy \$	\$3,613	\$4,192	\$5,434	\$7,256	\$5,907	\$4,029	\$4,587	\$7,256
Energy % of after-tax inc.	76.5%	23.0%	16.3%	8.6%	11.1%	26.9%	20.3%	8.6%
Resid. % of after-tax inc.	34.3%	9.4%	5.8%	3.0%	4.1%	11.2%	7.9%	3.0%
Trans. % of after-tax inc.	42.1%	13.5%	10.5%	5.5%	7.0%	15.6%	12.4%	5.5%

Sources: Population and income data from U.S. Bureau of the Census, Current Population Survey Supp. (2001, 2005, 2012 eds.) Residential energy costs are based on U.S. DOE Residential Energy Consumption Survey (2001, 2005, 2009 eds.) 2013 projections based on changes in 2009-2013 residential energy prices from U.S. DOE/EIA Annual Energy Review 2011 and Short-Term Energy Outlook (December 2012). Transportation energy expenditures are estimated from U.S. DOE/EIA, Household Vehicle Energy Use: Latest and Trends (Nov 2005) and DOE/EIA Short-Term Energy Outlook (December 2012). Gasoline use per household in 2013 is reduced by 10.1% from 2001 levels based on DOE/EIA data on total gasoline consumption adjusted by households. Average effective federal tax rates are estimated from Congressional Budget Office, Effective Federal Tax Rates Under Current Law, 2001-2014 (August 2004), and Effective Federal Tax Rates, 1979-2006 (April 2009). Tax rates for 2013 are based on CBO 2009 effective rates compiled by the Tax Policy Foundation for 1979-2009 (October 24, 2012), adjusted for changes in the American Taxpayer Relief Act of 2012. State tax rates are estimated from [www.taxadmin.org/fta/rate/ind\\_inc.html](http://www.taxadmin.org/fta/rate/ind_inc.html) (various years).