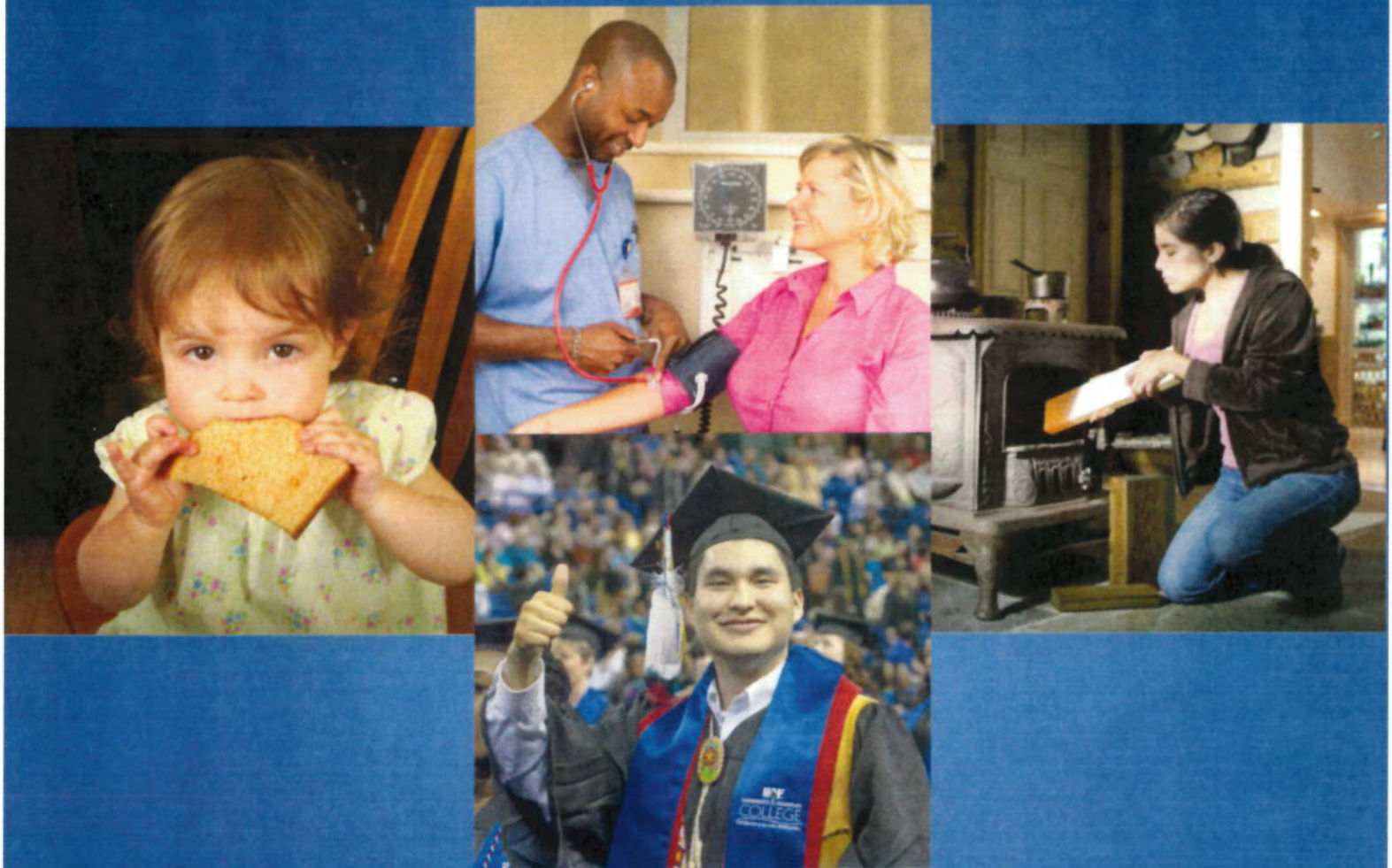


PLENTY AT STAKE: INDICATORS OF AMERICAN ENERGY

INSECURITY



U.S. SENATORS
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113TH CONGRESS

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Dear Reader:

As colleagues on the Senate Committee on Energy and Natural Resources, it is our privilege to help shape the focus and direction of the United States' energy policies. Through both rigorous analysis and practical experience, we believe energy is good, and that access to affordable energy is essential.

Among affordable energy's many benefits is the ability to heat our homes in winter, cool them in summer, and to accomplish with the flip of a switch tasks that took previous generations hours of back-breaking labor. The modern conveniences associated with affordable energy have enabled Americans to make more effective use of our most valuable commodity – our time. In turn, they have made our daily lives easier, to say nothing of the material comforts they provide and the high standard of living they enable. They have also freed us to pursue a variety of interests, including more formal education and careers.

We have come a long way. But we must also recognize that affordable energy is hardly guaranteed – and hardly universal. The lack of affordable energy disproportionately impacts minorities and the working poor, and many families feel the sting of high energy costs. Far too often, residents from our home states of Alaska and South Carolina stop us on the street or write letters detailing their heartbreaking struggle with rising energy prices.

In Aniak, Alaska, a foster mother shared her bill for five gallons of stove oil. She simply could not afford to heat her home and provide other essentials for her children. Her receipt graphically illustrates her plight and resonates with us, as no parent should be forced to decide between home heating and food for the family.

A woman from McClellanville, South Carolina, recently explained how she diligently takes online surveys to get an extra \$25 for groceries - canned food and a small packet of meat - and is still consistently a few hundred dollars short of making rent and paying utilities.

We hear these stories from our home states every day, and even the national press, such as the Los Angeles Times, periodically tells their stories:

“Holy Jiminy Christmas, what we’re going through,” said Dora Napoka, 49, the librarian at the village school [in Tuluksak, Alaska]. “It’s like we have to choose between six

gallons of stove oil or six gallons of gas to go out and get the firewood – or does my baby need infant milk? Which one is more important?”

Many of these troubling stories involve the elderly or disabled – those living on fixed incomes who struggle over whether to spend their precious dollars on much-needed, quality of life medicine or increasing utility bills, like a woman from Columbia, South Carolina recently revealed.

These are just a small sampling of the real life, everyday pain that too many in our home states and around the country are experiencing. Most are not looking for a handout, they’re asking for a hand up – an opportunity to work hard, prosper, and change their life for the better. Yet even a slight increase in energy prices could be devastating to their future aspirations.

Another tragic story came from Lancaster, South Carolina where a woman agonizes over wanting nothing more than to have a good paying job to help pay the rent and power bills. She has to spend so much on her household utilities that she might soon be unable to keep her vehicle, which will make getting a job that much more difficult.

The Mayor of North Pole, Alaska, highlighted how affordable energy can impact a state’s economy in a letter to the editor of the Anchorage Daily News:

“If our residents can’t spend extra money because every month, especially in the winter, they’re scrimping just to pay for heating and lighting their homes, then many of our businesses will also be hurting for lack of sales [...] If a store cuts back or goes out of business, then people are out of work, making it even more difficult for them to pay for essential heat and electricity, and that exacerbates the economic downturn!”

These real-life stories and experiences – along with many others not listed here – compelled us to work together to devise a method to measure the extent of this problem. We are pleased to offer in this paper several new tools, the Indicators of Energy Insecurity (IEIs), which can be used to quantify certain effects of rising household energy costs. As we seek to understand the consequences of higher energy costs, the IEIs will enable us to estimate how many families are pushed below the poverty line, how many lose a significant portion of their spendable budget, and how many are forced to spend more than 10 percent of their income on home energy.

It is important to remember that the individuals and families facing these circumstances because of energy costs are more than just numbers on a chart. These are people: our friends, our neighbors, our coworkers, and our fellow citizens. It should be our goal to keep energy affordable, and ensure that they never face the harsh choice between paying for household energy or other basic necessities.

We hope this paper will initiate a new discussion about American energy insecurity and the dangers associated with rising household energy costs. We welcome your engagement on this important issue, and look forward to a renewed effort to ensure that the benefits of affordable energy flow to more – and ultimately all – Americans.

Sincerely,



Lisa Murkowski
United States Senator



Tim Scott
United States Senator

**PLENTY AT STAKE:
INDICATORS OF AMERICAN ENERGY INSECURITY**

Summary

- A foundational pillar of our American way of life is access to affordable energy. Today nearly all Americans can obtain electricity, home heating and cooling, cooking fuels, refrigeration, potable water, and communications connectivity. The domestic production and availability of natural gas, oil, nuclear power, coal, hydropower, wind, solar, and other renewables provides Americans with energy security, the access to uninterrupted energy sources at an affordable price.
 - However, too many Americans suffer from energy insecurity; they cannot afford the energy required to heat or cool their homes or secure other basic needs such as refrigeration. These Americans are still too often faced with harsh choices between paying for energy and paying for food, medical care, and other necessities.
 - The Indicators of Energy Insecurity (IEIs) described in this paper are intended to enable policymakers to consider, in quantitative terms, how a specific action will affect Americans living in all 50 states and the District of Columbia, and thus provide a new way to evaluate public policies and other events that impact energy prices. When energy prices rise, the IEIs can be used to quantify:
 - The number of households that experience a significant decrease in spendable budget;
 - The number of households pushed below the poverty line; and
 - The average household energy burden, expressed as a percentage of average gross income.
 - The IEIs illuminate a critical goal – affordability – that must be incorporated in our nation’s energy policies.
 - Some of the critical findings of this initial use of the IEIs on approximately 1.35 million U.S. Census Bureau records are that a 10 percent increase in household energy costs leads to approximately:
 - 840,000 people across the U.S. being pushed into poverty;
 - 7 million additional people across the U.S. spending over 10 percent of their gross household income on home energy; and
 - 65 percent of all families spending additional money on home energy that could be used to buy between one and three weeks’ worth of groceries.
- A 10 percent increase in energy costs is certainly possible, as evidenced by a 110 percent increase in electricity prices in Australia in recent years and a 15 percent increase in electricity prices in Germany from early 2011 to early 2013. Additionally, Fairbanks, Alaska, experienced a 66 percent increase in heating oil costs over the past seven years.
- Poorer households are naturally more sensitive to increases in energy costs and are at far greater risk of energy insecurity.

**PLENTY AT STAKE:
INDICATORS OF AMERICAN ENERGY INSECURITY**

The American quality of life continues to be the envy of nations around the world. While many different factors contribute to it, a foundational pillar is our access to affordable energy. Today nearly all Americans can obtain electricity, home heating and cooling, clean cooking fuels, refrigeration, potable water, and communications connectivity. All of these services in turn rely on basic energy resources such as natural gas, oil, nuclear power, coal, hydropower, wind, solar, and other renewables. The domestic availability and production of those resources provides Americans with energy security, the access to uninterrupted energy sources at an affordable price.¹

Even in the land of energy plenty, however, too many Americans suffer from energy insecurity; they cannot afford the energy required to heat or cool their homes or secure other basic needs such as refrigeration. These Americans, while not suffering from extreme “energy poverty,”² are still too often faced with harsh choices between paying for energy and paying for food, medical care, and other basic needs. Their plight forces us to confront two important questions: What is the social cost of increased energy prices? And, conversely, what is the social benefit of lower energy prices?

This paper addresses those questions and provides three ways of quantifying the impacts of rising energy costs on American households and families. When energy prices rise, the Indicators of Energy Insecurity (IEIs) introduced here can be used to quantify:

1. The number of households that experience a significant decrease in spendable budget;
2. The number of households pushed below the poverty line; and
3. The average household energy burden, expressed as a percentage of average gross income.

¹ International Energy Agency and Energy Security as a Grand Strategy (Report from the Energy Security as a Grand Strategy Workshop, May 7-8, 2012. Editors Pamela J. Sydelko, Sheila R. Ronis, and Leah B. Guzowski. Published by Argonne National Laboratory, May 2013).

² Although this paper focuses on American energy insecurity, global energy poverty is a more severe and even more challenging problem. Defined as a lack of access to electricity and clean cooking fuels by the International Energy Agency (<http://www.iea.org/topics/energypoverty/>), global energy poverty impacts more than one billion people around the world. It is associated with a dramatically lower quality of life than we are fortunate to enjoy in America, as those without reliable access to energy face heightened risks of disease, malnourishment, and premature death. The lack of access to energy also inhibits economic growth. It bears noting, in the context of this paper, that many of the federal policies that are relevant for addressing energy poverty are complementary to those associated with energy insecurity. Increasing domestic production of hydrocarbons, for example, and encouraging energy exports to help other nations can not only help moderate if not push down energy prices at home, but also reduce the U.S. trade deficit and create domestic jobs, all of which ameliorate the challenges of energy insecurity.

The IEIs are intended to enable policymakers to see clearly, in quantitative terms, how a specific action will affect Americans living in all 50 states and the District of Columbia, and thus provide a new way to evaluate public policies and other events that impact energy prices. The IEIs illustrate real-world impacts that rising energy prices have on domestic households, including how many Americans will face energy insecurity or outright poverty. Fundamentally, the IEIs illuminate a critical goal – affordability – that must be incorporated in our nation’s energy policies.³

Defining Energy Insecurity

A useful definition of energy insecurity comes not from American law, but from Great Britain’s *Warm Homes and Energy Conservation Act*. It defines energy insecurity to include both fuel poverty, the inability to pay for the heating or cooling required to maintain a home at a reasonable temperature,⁴ and the loss of access to electricity through cessation of service due to non-payment or other factors.

Energy insecurity causes stress for many Americans on a day-to-day basis and negatively impacts increasing portions of the population as energy prices rise. Energy price increases can of course be deliberate, as a result of policies, or unexpected, such as those that resulted from added demand for heating during last winter’s “polar vortex” events.⁵ Residential electricity prices for the first half of 2014, a period impacted by the “polar vortex,” had the highest year-over-year increase since 2009, with overall prices up 3.2 percent and New England’s prices up 11.9 percent.⁶

Individuals and families experiencing energy insecurity commonly make sacrifices to reduce their costs, such as:⁷

- Reducing other household spending by making trade-offs, which can include the diminished ability to buy food or to pay for medical care and education;
- Increasing debt, which can include being late on payments to energy suppliers or increased borrowing from other lenders;

³ See, e.g., *Energy 20/20: A Vision for America’s Energy Future*, Senator Lisa Murkowski, February 4, 2013, <http://www.energy.senate.gov/public/index.cfm/documents-republicans>.

⁴ Warm Homes and Energy Conservation Act, <http://www.legislation.gov.uk/ukpga/2000/31/section/1/enacted>.

⁵ Propane Supply, Energy Information Administration (EIA) Administrator Adam Sieminski, briefing to the U.S. Senate Committee on Energy and Natural Resources, January 28, 2014.

⁶ U.S. Energy Information Administration, August 2014 *Electric Power Monthly*.

⁷ Wallace, A., A. Wright, and P. Fleming, Fuel poverty and household energy efficiency in England. Institute of Energy and Sustainable Development, De Montfort University, January 2008, and Urge-Vorsatz, D., and S.T. Herrero, Employment, energy security and fuel poverty implications of the large-scale, deep retrofitting of the Hungarian building stock, Presented at IEA Fuel Poverty Workshop: Evaluating the Co-Benefits of Low-Income Weatherisation Programmes, Dublin, Ireland, January 2011.

- Switching fuels to less expensive albeit less convenient and with greater emissions options (*e.g.*, from oil to firewood);
- Maintaining low or high indoor temperatures when heating or cooling, respectively; and
- Closing off rooms or sections of a residence to avoid heating or cooling those areas.

The effects of these sacrifices are heightened odds of food insecurity, more frequent relocations, poorer health, decreased educational achievement, and reduced productivity.⁸

Fairbanks, Alaska, is one example of a community that faces energy insecurity challenges. Located in the interior part of the State, its winter temperatures are extremely cold: the average high temperature in January is just three degrees Fahrenheit, while the lowest winter temperature ever recorded is -66 degrees Fahrenheit (not including wind chill).⁹ Clearly, local residents' ability to heat their homes is critical. In recent years, however, the cost of heating oil in Fairbanks has increased dramatically (66 percent between June 2007 and January 2014).¹⁰ As prices have risen, the household energy burden of local residents has increased significantly. To help lower their energy bills, more people have shifted to burning wood for space heating. This has impacted the population in several ways, all of which have had adverse effects on human health.¹¹

While Alaska may appear to be a special case, home heating plays a significant role in energy consumed throughout the United States: over 40 percent of total household energy consumption is for space heating. Other household energy spending breaks down at about 35 percent for lighting, appliances, and electronics; 18 percent for water heating; and six percent for air

⁸ Cook, J., Frank, D., 2008, Food security, poverty, and human development in the United States, *Annals of the New York Academy of Sciences* 1136, 193–209.; Frank, D.A., Heat or Eat: Children's Health Watch, Presented at IEA Fuel Poverty Workshop: Evaluating the Co-Benefits of Low-Income Weatherisation Programmes, Dublin, Ireland, January 2011; Boardman, B., Quality of life benefits (problems) that are hard to measure Presented at IEA Fuel Poverty Workshop: Evaluating the Co-Benefits of Low-Income Weatherisation Programmes, Dublin, Ireland, January 2011; and Home Energy Affordability Gap: 2011, Connecticut Legislative Districts, Prepared for Operation Fuel, Bloomfield, Connecticut, by Colton, R.D. of Fisher, Sheehan & Colton, Belmont, Massachusetts, December 2011.

⁹ <http://www.weather.com/weather/wxclimatology/monthly/graph/USAK0083>.

¹⁰ Calculated from heating oil number one prices obtained from the Alaska Fuel Price Report: Current Community Conditions January 2014, published by the State of Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs and Current Community Conditions: Fuel Prices Across Alaska, June 2007 Update, published by the State of Alaska Department of Commerce, Community, and Economic Development Division of Community Advocacy, Research and Analysis Section.

¹¹ Switching to firewood also increased the time required to heat homes (wood collection, preparation, etc.), and led to increased wood smoke emissions. These emissions have decreased air quality in the city; EPA has declared the city in non-attainment of the National Ambient Air Quality Standards (NAAQS) for fine particulate matter. NAAQS are intended to protect the health of United States citizens.

conditioning.¹² Given that most Americans use those services every day, if not every hour, household energy costs ultimately represent a sizeable expense.

According to the Energy Information Administration (EIA), the average household “spent \$1,945 on heating, cooling, appliances, electronics, and lighting in 2012 [...] 2.7% of household income.”¹³ Energy costs for people above and below the poverty line are very similar in absolute dollars, but, not unexpectedly, wealthier households spend a smaller percentage of their income on energy than poorer households.¹⁴ Poorer households are naturally more sensitive to increases in energy costs and are at far greater risk of energy insecurity.

Indicators of Energy Insecurity

New ways to quantify Americans who are in or at risk of energy insecurity are needed to assess the impacts of potential increases in home energy costs.¹⁵ Accordingly, the following sections detail three methods for quantifying the effects of energy costs on household budgets, the number of families in poverty, and the average household energy burden. The detailed analysis behind these conclusions can be found in Appendix 1.

Household Budget Cuts

An obvious way to map the available household budget after energy costs is to subtract energy spending from gross income. If energy costs increase, the money required to pay those costs comes out of the budget available for other essential needs. Given the essential nature of energy, the associated price increases often crowd-out or eliminate other household essentials including food, clothing, medical care, and education.

Figures 1 and 2 show the direct impacts of increasing household energy costs on family budgets. (Note that we are illustrating the IEI methodology in these figures for South Carolina, which, along with Alaska, is representative of the nation as a whole.) Figure 1 shows the share of households paying more for energy for various ranges of energy price increases. For example, a 10 percent increase in household energy costs results in over 80 percent of all families spending an additional \$100-\$500 per year on energy. If energy costs rise 50 percent, nearly 90 percent of

¹² EIA, Today in Energy, March 7, 2013, <http://www.eia.gov/todayinenergy/detail.cfm?id=10271>. Data from 2009.

¹³ EIA, Today in Energy, April 18, 2013, <http://www.eia.gov/todayinenergy/detail.cfm?id=10891>.

¹⁴ Home Energy Affordability Gap: 2011, Connecticut Legislative Districts, Prepared for Operation Fuel, Bloomfield, Connecticut, by Colton, R.D. of Fisher, Sheehan & Colton, Belmont, Massachusetts, December 2011.

¹⁵ The IEIs do not encompass transportation costs, which consume an additional portion of each household’s income. Transportation costs are significant; for example, the Energy Information Administration reported that “Gasoline expenditures in 2012 for the average U.S. household reached \$2,912, or just under 4% of income before taxes.” (EIA, Today in Energy, February 4, 2013, <http://www.eia.gov/todayinenergy/detail.cfm?id=9831>). The costs included within the IEIs are those associated with fuels and electricity for heating and cooling, cooking, heating water, lighting, using appliances, and other non-transportation usages.

More American Family Budgets Impacted as Energy Costs Increase
Increased Dollar Costs per Household as a Function of Percent Increase in Household Energy Costs
(South Carolina)

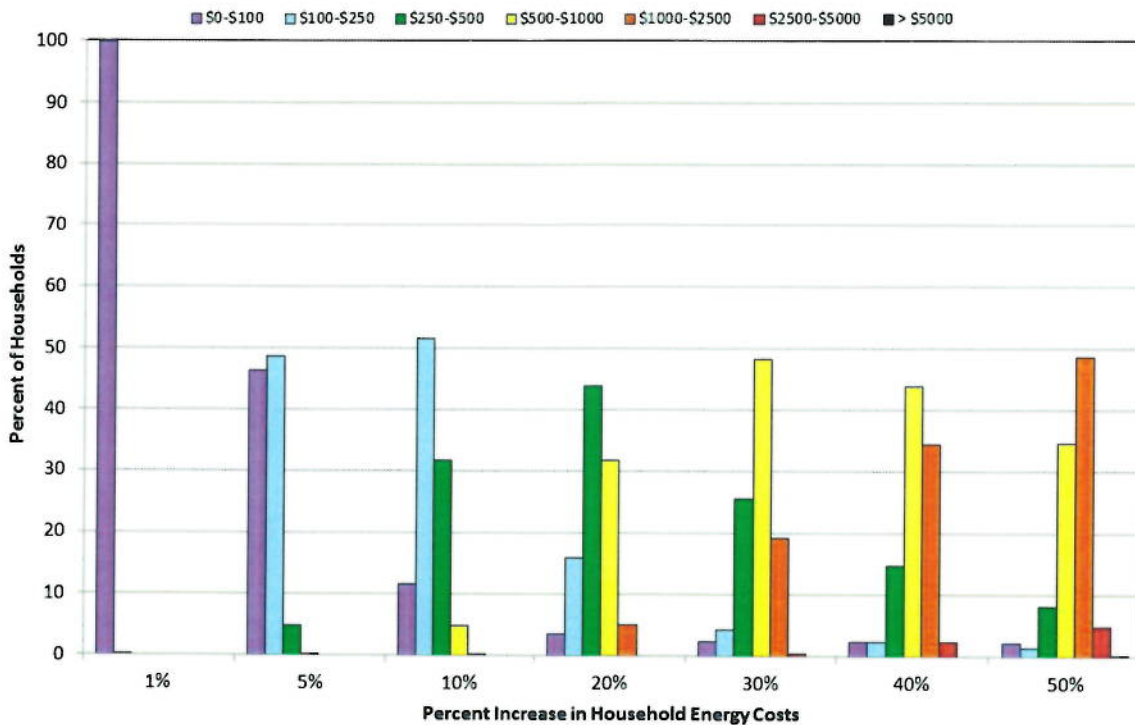


Figure 1. Increase in share of households spending more on the energy budget as a function of increases in energy costs.

households would be spending an additional \$500-\$2500 per year. It bears noting that a 50 percent increase in energy costs is certainly possible, as evidenced by a 110 percent increase in electricity prices recorded in Australia in recent years.¹⁶ Similarly, Germany and the U.K. saw a 15 and 22 percent increase in electricity prices, respectively, from the first half of 2011 to the first half of 2013.¹⁷

Figure 2 illustrates the household budget impacts from Figure 1 in terms of the reduction in the average grocery budget for a family of four.¹⁸ Figure 2 shows that a small increase in energy costs can have a dramatic impact on a family's food budget. A 10 percent increase in energy costs equates to an amount equal to what the household would spend on groceries over a one to three week period.

¹⁶ <http://www.foxnews.com/world/2013/09/06/australian-voters-angry-over-high-electricity-bills-ready-to-punish-government/>.

¹⁷ European Commission, Eurostat, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/File:Half-yearly_electricity_and_gas_prices_first_half_of_year_2011%E2%80%9313_%28EUR_per_kWh%29_YB14.png.

¹⁸ Using the U.S. Department of Agriculture thrifty food plan, the tightest budget plan at \$149.90 per week. The thrifty plan was chosen because it most represents the budgets of those who have the least to spend.

American Families Have Less Food Available When Energy Costs Increase

Number of Weeks of Food a Family of Four Could Purchase with the Money Used to Pay Increased Energy Costs as a Function of the Percent Increase in Household Energy Costs (South Carolina)

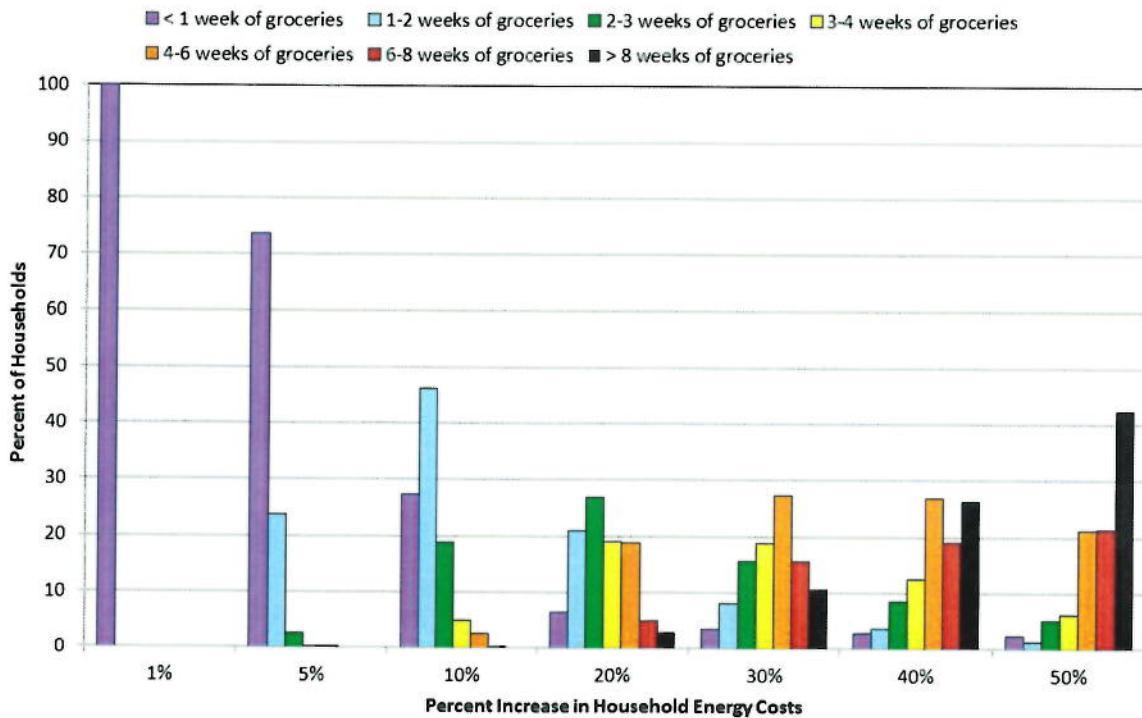


Figure 2. Share of households with specified number of weeks of groceries eliminated by money used to pay higher energy costs. (Grocery budget from USDA thrifty plan, family of four.)

Pushing Households Below The Poverty Line

Another way to look at the impacts of increasing energy costs is to quantify how many families are pushed below the poverty line as household budgets are saddled by additional energy costs.

Figure 3 shows, on a state-by-state basis, the number of individuals falling below the poverty line in the United States when home energy costs are increased by 10 percent. Taken as a whole, more than 300,000 additional households with over 840,000 Americans would be pushed below the poverty line. A 10 percent increase in energy costs was chosen because it is realistic, and could be the result of the enactment of public policies, shifting market conditions, or unexpected events. Higher increases are also possible.

As with the household budget cut described above, Southeastern states are more significantly impacted than the rest of the country.

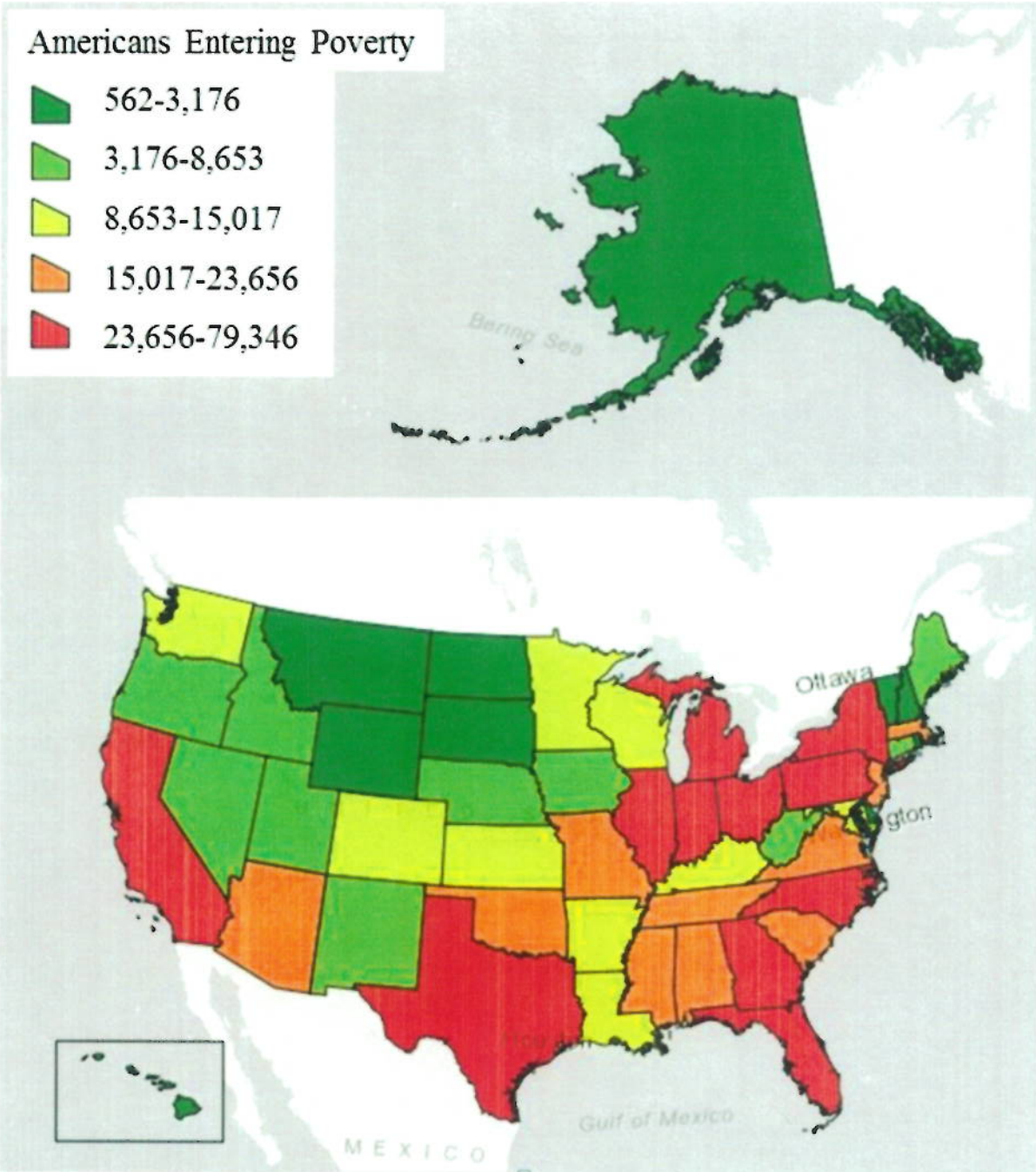


Figure 3. Number of people pushed below the poverty line as home energy costs increase by 10 percent.

Household Energy Burden

The third IEI for illustrating the impacts of energy costs on households is to calculate the increase in a household's energy burden, which can help predict increasing levels of energy insecurity.

Figure 4 shows the average household energy burden in each state as a percentage of total household income.¹⁹ As might be expected, the areas with the highest shares of families in energy insecurity correspond closely with the areas of the highest percentage of families facing a significant budget cut or being forced into poverty due to an increase in home energy costs. These household budgets are already stressed so any additional energy costs resulting from increasing energy prices substantially impacts them.

Importantly, there are a significant number of households in energy insecurity that are not below the poverty line (Figures 5 and 6). This can be seen when the share of households with energy insecurity (*i.e.*, high energy burdens) is divided into two categories based on the poverty line. The first category shows the energy burden only for households below the poverty line (Figure 5); the second shows energy burdens for households above the poverty line (Figure 6).

It is noteworthy that the percentages of households in each category are very similar for most states. The Southern states have higher percentages of households in both poverty and energy insecurity than the rest of the country. The Northeastern states have higher percentages of households in energy insecurity but not in poverty, compared to households in both energy insecurity and poverty. States on the West Coast have lower percentages of households in energy insecurity, both in and not in poverty, than the rest of the country.

Almost three million households or 7 million people will enter energy insecurity across the country if household energy costs increase by 10 percent. For example, the total would be approximately 19,000 and 132,000 households in Alaska and South Carolina, respectively.

¹⁹ $Household\ Energy\ Burden = \frac{Household\ Energy\ Costs}{Household\ Income} \times 100$

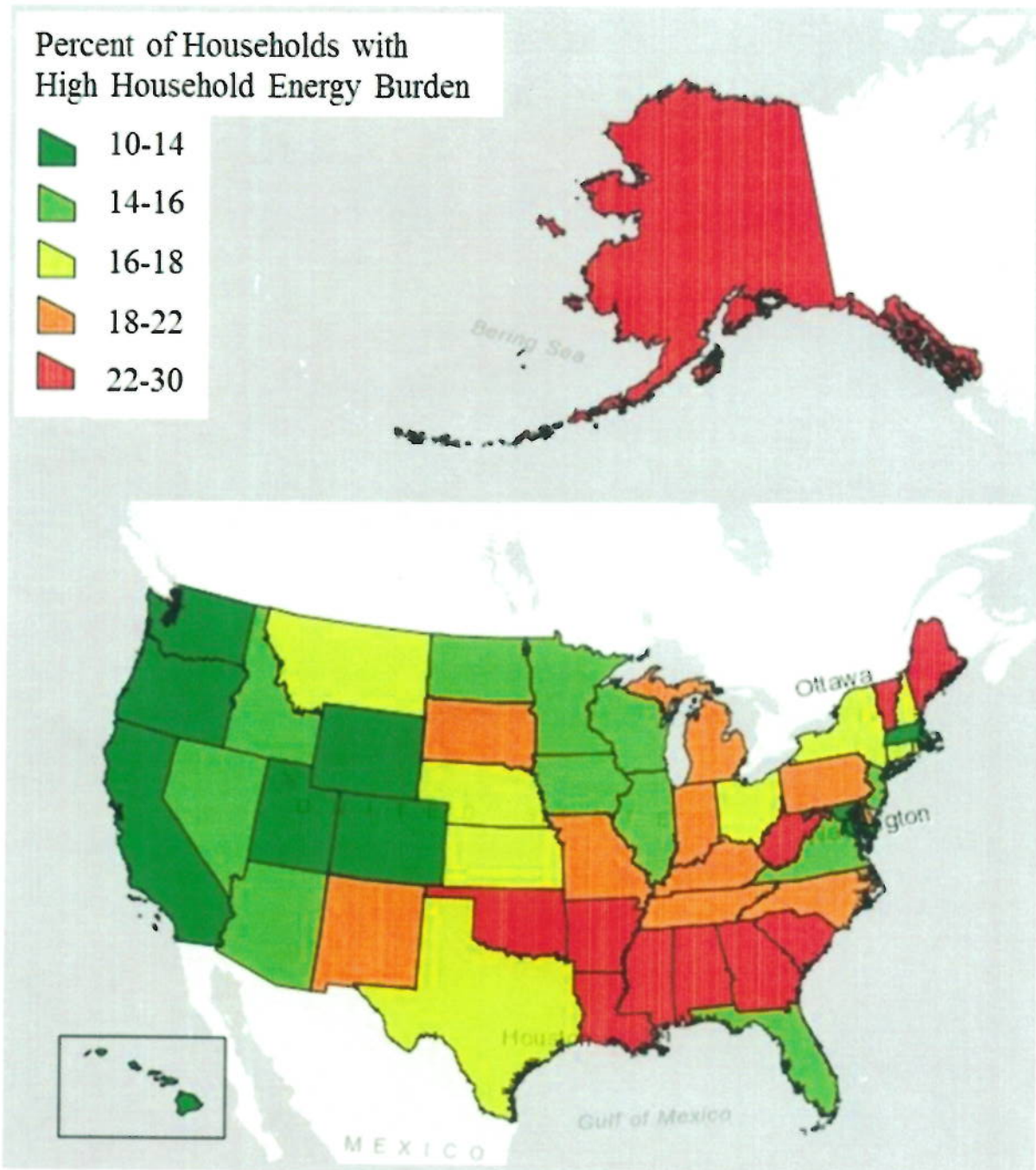


Figure 4. A map showing the spatial distribution of the percentage of households with a high household energy burden (spending more than ten percent of household gross income on home energy) in each state in 2012. The colors represent different quintiles of energy insecurity, with states depicted in red having the highest incidence of energy insecurity.

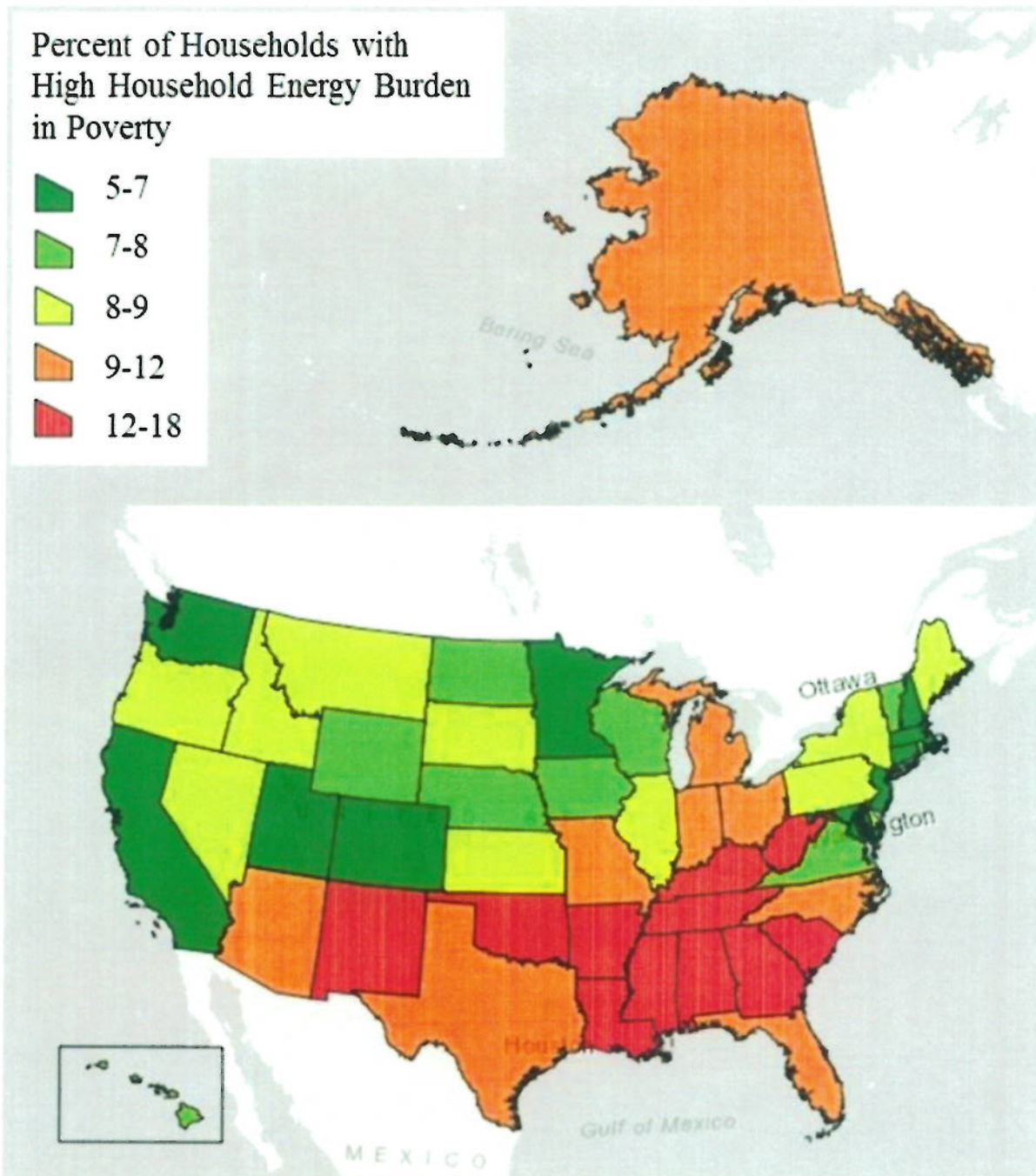


Figure 5. The spatial distribution of households in each state with high household energy burdens and in poverty, expressed as a percentage of total households.

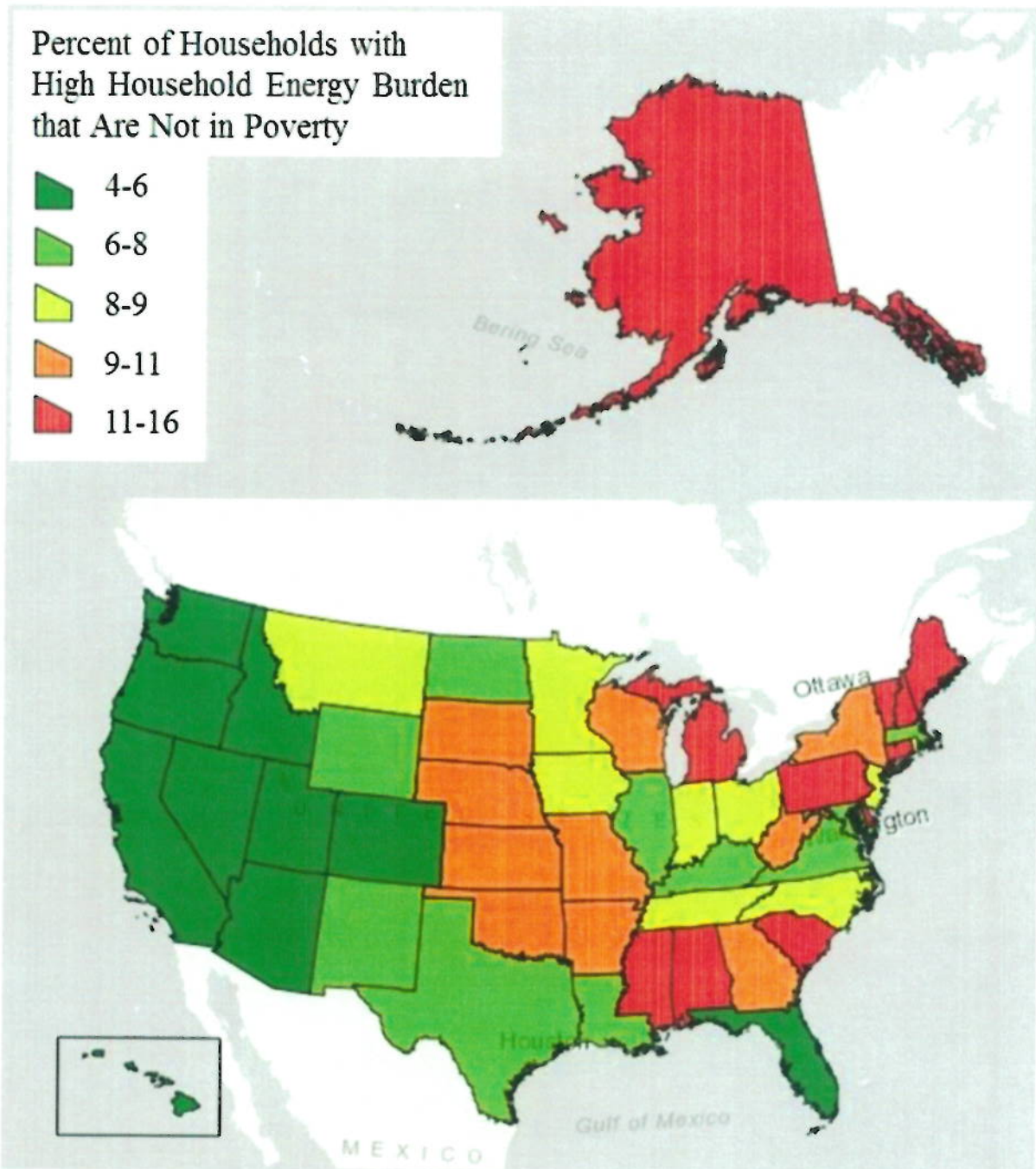


Figure 6. The spatial distribution of households in each state with high household energy burdens that are not in poverty, again expressed as a percentage of total households.

Clearly, rising household income reduces the impact of current or increasing energy costs. As shown in Figures 7 and 8, households with incomes just above the poverty level are most impacted by changes in household energy costs.

**Small Increase in Energy Costs Sends Significant Number of
Non-impovertised Households into Energy Insecurity**
Households with High Household Energy Burden (Initially and After a 10 Percent Increase in Home
Energy Costs) as a Function of Household Income (South Carolina)

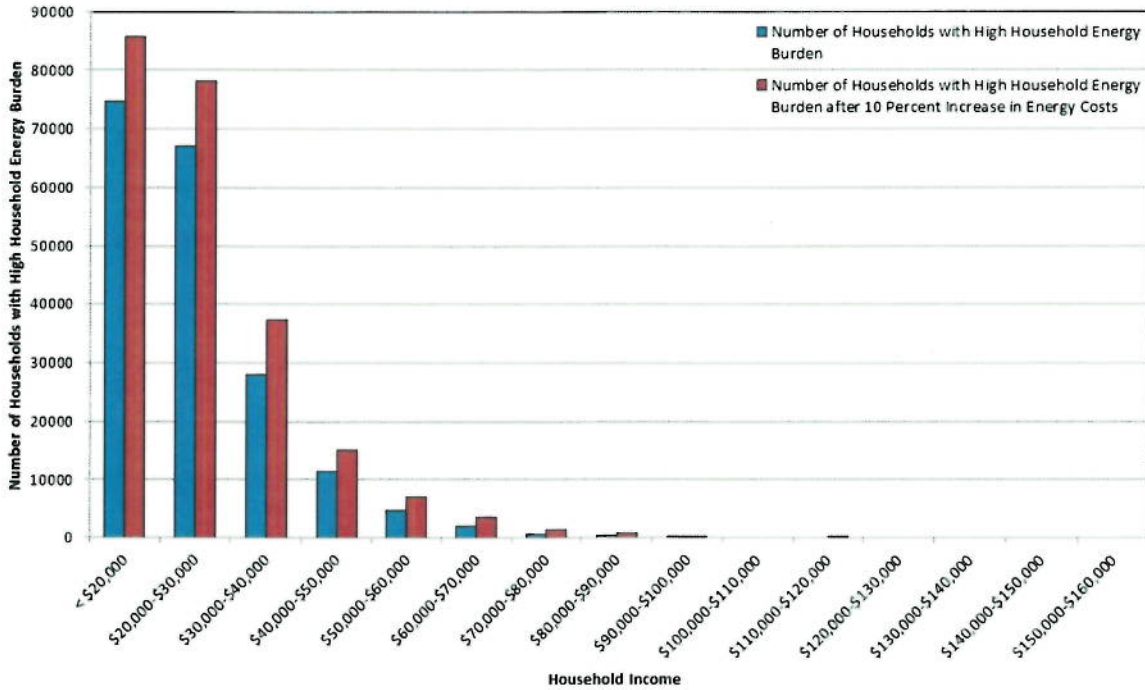


Figure 7. The distribution of households with energy insecurity as measured by high household energy burdens but not in poverty as a function of household income for South Carolina for the original case (blue) and a 10 increase in energy costs (red). South Carolina demonstrates the impact of cooling costs on energy insecurity.

**Small Increase in Energy Costs Sends Significant Number of
Non-impovertised Households into Energy Insecurity**
Households with High Household Energy Burden (Initially and After a 10 Percent Increase in Home
Energy Costs) as a Function of Household Income (Alaska)

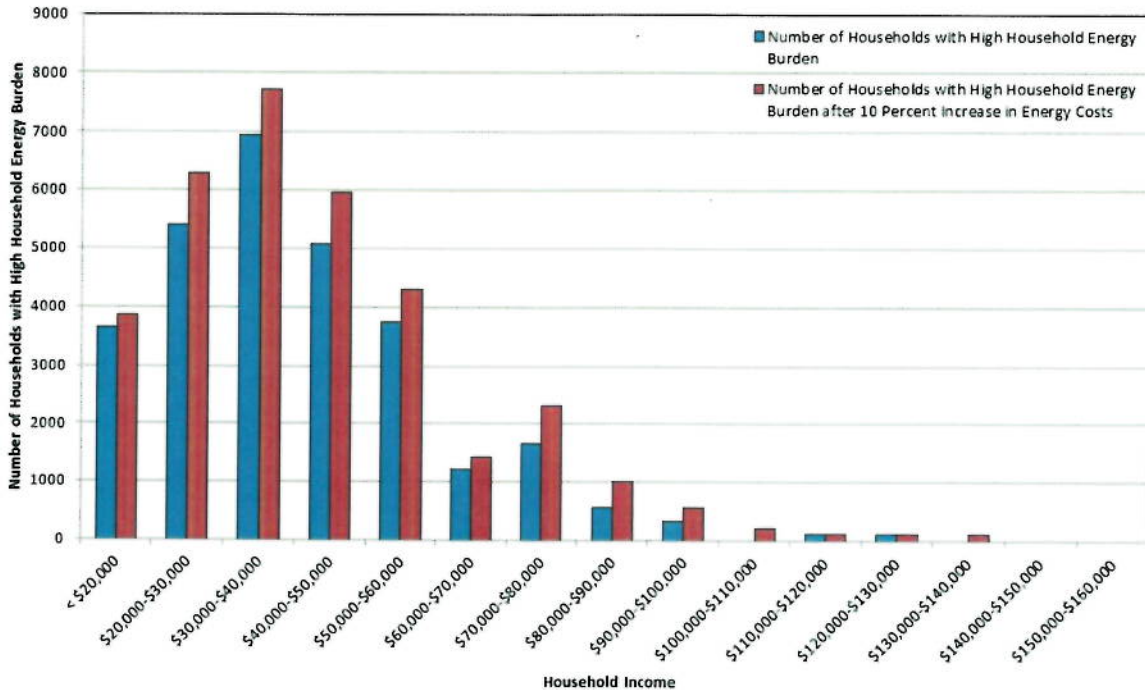


Figure 8. The distribution of households with energy insecurity, as measured by high household energy, but not in poverty as a function of household income for Alaska for the original case (blue) and a 10 percent increase in energy costs (red). Alaska shows a larger number of households with high household energy burdens, even at higher household income levels. The extreme climate of Alaska may be responsible for this effect; it is expensive to heat a dwelling to a comfortable temperature when the outside temperature can fall to -60 degrees Fahrenheit. The cost of fuels is also higher in Alaska than in most other parts of the country.

The Path Forward

As indicators of energy insecurity, the IELs described in this paper provide new methods for estimating how increases in energy costs will affect the population of a specific state as well as the country as a whole. The methods introduced here demonstrate that increasing household energy costs have a broad and significant adverse effect on the poor and near-poor members of American society. Any policy proposal that would tend to increase the cost of energy should therefore be fully evaluated for its impact on energy insecurity, in order to give policymakers a complete picture of its potential consequences. Pushing more families into poverty triggers a number of significant socioeconomic issues, including increased government spending and a growing dependence on government social and safety net programs.

There are of course numerous ways to mitigate impacts of energy cost increases. The first approach includes encouraging – or at least not actively disadvantaging – the supply of low-cost sources of electricity and heating fuels, and taking steps to minimize cost increases arising from emerging energy resources. It can also include financial assistance for qualifying households, although given the history of the federal Low Income Home Energy Assistance Program (LIHEAP) program²⁰ and the federal government's budget challenges, expecting substantially more funding from the federal government to pay higher energy costs for qualifying households is not realistic. Naturally, however, the preferred circumstance is for energy to be affordable and the economy to be strong, enabling citizens to heat and cool their homes without having to depend on federal assistance for such basic needs.

It bears noting that programs to increase energy efficiency and promote conservation can be viable ways to mitigate energy insecurity. However, some caution is needed here given that a program that works in Columbia, South Carolina, may not be effective in Bettles, Alaska, and *vice versa*. And, more relevant to the thesis of this paper, some programs intending to bring down household energy costs do not directly benefit, and in some cases may disadvantage, low-income households. To use Fairbanks, Alaska, as an example, citizens who took advantage of an energy rebate program designed to improve the efficiency of the housing stock were financially secure and could afford the up-front costs associated with the program. Some families interested in the program could not participate in it because they were unable to secure a loan for the up-front energy efficiency improvement costs even though those costs would have been refunded by the program.

The foregoing discussion should prompt a number of key questions at the federal level:

- How best can federal policy help relieve energy insecurity for the American people?
- How can federal policy help decrease (or inhibit increases) in the cost of electricity and other household energy sources?
- How can federal policy help decrease the cost of energy in remote communities?
- What are the barriers to the deployment of less expensive energy sources in Alaska, other sparsely populated states or regions, and other regions, such as the southeast, where the incidence of energy insecurity is high?
- What are the roles and effects of direct federal assistance?

²⁰ Spar, K., Federal Benefits and Services for People with Low Income: Programs, Policy, and Spending, FY2008-FY2009, Congressional Research Service Report R41625, January 31, 2011. LIHEAP is administered by the Department of Health and Human Services. The number of households receiving heating assistance in 2009 was approximately 7.4 million (heating or winter crisis assistance) with roughly 900,000 more receiving cooling assistance. This number represents 23.7 percent of federally eligible households.

- Understanding that the current LIHEAP program only serves fewer than 24 percent of households eligible for assistance and has limited money for weatherization, how can people in poverty improve the weatherization of their housing stock? And,
- How can federal policy more effectively help people suffering an unexpected spike in fuel prices due to circumstances beyond their control (*e.g.*, heating costs from the polar vortex that forced people not normally in energy insecurity into that category)?

Federal, state, and local governments, as well as other non-governmental organizations, have many options to help households decrease their energy insecurity. As households move out of energy insecurity, their improved financial situation will allow them to mitigate the adverse consequences associated with it: they can eat better, afford their medication, send their children to school, and purchase more goods and services. For these reasons, it is important to remain vigilant about keeping energy costs low and lowering them where possible. We can and should decrease energy insecurity in the United States so that all Americans can enjoy an even higher quality of life.

Appendix 1: Methodology

Data Set - American Community Survey

The American Community Survey (ACS) is an ongoing, mandatory, statistical survey that samples a small subset of U.S. households each year in every state and the District of Columbia to determine community characteristics and eligibility for federal programs.²¹ Among the household characteristics collected by the survey are the number of people in the household, number of children under six, number of people over 65, type of housing unit (rental, single family house, trailer, etc.), and information on rent and mortgages. For this analysis the key variables in the ACS housing data set are: 1) the annual household income including all salaries, wages, tips, social security, welfare payments and public assistance, retirement benefits, survivor or disability pensions, rental incomes, interest, dividends, royalties, and any other sources of income (HINCP), and 2) the amount of money each household spends on energy in the form of electricity (ELEP), gas (GASP), and other fuels (FULP).²² The households considered in the analysis are living in non-vacant, non-group homes that are either rented or owned by the household, so families living in apartments, duplexes, attached and detached single family homes, mobile homes, trailers, and boats are all included in the analysis. Over 1.35 million records from 2012 that include data from all 50 states and the District of Columbia were used to perform the analyses.

Groceries – United States Department of Agriculture Thrifty Food Plan

The Official USDA Food Plans: Cost of Food at Home at Four Levels, U.S. Average, June 2014 document provides the basis for quantifying how much money a family spends to provide nutritious meals made at home.²³ The Food Plans give four different price levels for a weekly food cost for a family of four (the thrifty plan, the low-cost plan, the moderate-cost plan, and the liberal plan) based on differences in the specific foods and quantities of foods in each plan. Because the people most impacted by the rising cost of energy will be those with the least disposable income, the thrifty plan (\$149.90 per week for a family of four of two adults between 19 and 50 years old and two children, one of whom is between 6 and 8 years old and the other of whom is between 9 and 11 years old), the most inexpensive food plan, was selected for the analyses. For the specific foods and quantities of foods in the Thrifty Food Plan, see Thrifty Food Plan, 2006.²⁴

²¹ <https://www.census.gov/acs/www/>

²² ELEP and GASP are given on a per month basis while FULP is given on an annual basis.

²³ http://www.cnpp.usda.gov/sites/default/files/usda_food_plans_cost_of_food/CostofFoodJun2014.pdf

²⁴ Thrifty Food Plan, 2006, Report CNPP-19 by Andrea Carlson, Mark Lino, WenYen Juan, Kenneth Hanson, and P. Peter Basiotis, of the Center for Nutrition Policy and Promotion (except for Dr. Hanson who is with the Economic Research Service), U.S. Department of Agriculture, April 2007

Poverty – United States Department of Health & Human Services 2014 Poverty Guidelines

The income levels for each state used to determine if a household is in poverty are the poverty guidelines updated periodically by the U.S. Department of Health and Human Services.²⁵ For 2014, the guidelines are as follows:

**2014 POVERTY GUIDELINES FOR THE
48 CONTIGUOUS STATES
AND THE DISTRICT OF COLUMBIA**

Persons in family/household	Poverty guideline
For families/households with more than 8 persons, add \$4,060 for each additional person.	
1	\$11,670
2	15,730
3	19,790
4	23,850
5	27,910
6	31,970
7	36,030
8	40,090

**2014 POVERTY GUIDELINES FOR
ALASKA**

Persons in family/household	Poverty guideline
For families/households with more than 8 persons, add \$5,080 for each additional person.	
1	\$14,580
2	19,660
3	24,740
4	29,820
5	34,900
6	39,980
7	45,060
8	50,140

²⁵ <http://aspc.hhs.gov/poverty/l4poverty.cfm>

2014 POVERTY GUIDELINES FOR HAWAII

Persons in family/household	Poverty guideline
For families/households with more than 8 persons, add \$4,670 for each additional person.	
1	\$13,420
2	18,090
3	22,760
4	27,430
5	32,100
6	36,770
7	41,440
8	46,110

While the U. S. Department of Health & Human Services includes energy costs when it establishes poverty guidelines, the poverty thresholds were not developed as an itemized budget with specific dollar amounts for each type of household expenditure category.

Calculations

The following calculations are performed for every data record that meets the non-vacant, non-group home criteria for inclusion in the analyses. For several analyses, the number of households meeting a criterion, such as “driven into poverty,” in each data file is determined by applying the formula to each household in the data file and then counting the number of households that meet the criterion. The number of households meeting a criterion can also be divided by the number of total households in the data file to determine the percentage of households meeting that criterion.

$$\text{Household energy costs for a year} = [(\text{ELEP} + \text{GASP}) * 12] + \text{FULP}$$

$$\text{Increase in energy costs in dollars} = \text{Household energy costs} \times \frac{\% \text{ increase in cost}}{100}$$

$$\text{Increase in energy costs in weeks of groceries} = \frac{\text{increase in energy costs in dollars}}{\text{cost per week of groceries}}$$

Household in poverty if HINCP < poverty guideline for number of people in the household

Household with revised income in poverty if (HINCP – increase in energy costs in dollars) < poverty guideline for number of people in the household

Number of households driven into poverty = number of households with revised income in poverty – number of households in poverty

$$\text{Household Energy Burden} = \frac{\text{Household Energy Costs}}{\text{Household Income}} \times 100$$