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Short and Long-Term Perspectives: The Impact on Low-Income Consumers of Forecasted Energy Price Increases in 2008 and a Cap-and-Trade Carbon Policy in 2030

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EXECUTIVE SUMMARY

The Department of Energy's Energy Information Administration (EIA) recently released its short term forecast for residential energy prices for the winter of 2007–2008. The forecast indicates increases in costs for low-income consumers in the year ahead, particularly for those using fuel oil to heat their homes. In the following analysis, the Oak Ridge National Laboratory has integrated the EIA price projections with the Residential Energy Consumption Survey (RECS) for 2001 in order to project the impact of these price increases on the nation's low-income households by primary heating fuel type, nationally and by Census Region. The report provides an update of bill estimates provided in a previous study, "The Impact Of Forecasted Energy Price Increases On Low-Income Consumers" (Eisenberg, 2005). The statistics are intended for use by policymakers in the Department of Energy's Weatherization Assistance Program and elsewhere who are trying to gauge the nature and severity of the problems that will be faced by eligible low-income households during the 2008 fiscal year.

In addition to providing expenditure forecasts for the year immediately ahead this analysis uses a similar methodology to give policy makers some insight into one of the major policy debates that will impact low-income energy expenditures well into the middle decades of this century and beyond. There is now considerable discussion of employing a cap-and-trade mechanism to first limit and then reduce U.S. emissions of carbon into the atmosphere in order to combat the long-range threat of human-induced climate change. The Energy Information Administration has provided an analysis of projected energy prices in the years 2020 and 2030 for one such cap-and-trade carbon reduction proposal that, when integrated with the RECS 2001 database, provides estimates of how low-income households will be impacted over the long term by such a carbon reduction policy.

THE YEAR AHEAD

The price increases for natural gas and home heating oil are part of an escalation in the price of carbon-based fuels over more than a decade that has outpaced the increase in purchasing power of low-income households. The long-term problem is further exacerbated by sharp energy price increases experienced in recent years, in part due to the impact of Hurricanes Katrina and Rita on petroleum and natural gas supplies in 2005, and high international petroleum prices and market uncertainty as the 2007–2008 heating season begins. The mid-range EIA price forecast foresees an increase in price of 27 percent for residential natural gas and 46 percent for propane in 2008 compared to 2004 and of 75 percent over that time frame for home heating oil.

The total aggregate cost of residential energy for low-income consumers, defined in the study as expenditures for all household energy uses by those with incomes meeting the federal eligibility standard for the Low Income Home Energy Assistance Program (LIHEAP) and D.O.E. Weatherization, will increase by $3.1 billion during this fiscal year compared to last year, from approximately $58 billion to $61.1 billion, based on EIA price estimates and National Oceanographic and Atmospheric Administration (NOAA) projections of a near-normal winter.

The estimated increase in aggregate annual residential energy costs for low-income consumers from 2001 through FY 2008 totals $18.8 billion, an increase of over 44 percent. The impact of these rising energy costs across time can be measured for individual households in the form of rising energy burdens, defined as the ratio of residential energy expenses divided by household income. From 2001 through 2005, the most recent year for which data is available, the average residential energy burden for low-income households rose from 12.6 percent to 14.6 percent of income. For non-low-income

households the average burden was 3.1 percent of income in 2001 and remained essentially unchanged at 3.2 percent of income in 2005.

The current price increases are expected to hit households using fuel oil particularly hard this winter. The average residential energy bill for low-income households heating with home heating oil, approximately 6 percent of the total, is expected to rise by 11 percent to $2,895 this coming year. It is important to note that in recent weeks the price of crude oil has far exceeded the projections employed by EIA in making its winter fuel price estimates. Crude oil is now (December 2007) selling for over $95 per barrel compared to estimates in the $74 dollar range employed by EIA in their October forecast. It is not yet clear whether these higher prices are going to be sustained for the heating season or if the EIA forecast will yet prove true. However, should these higher prices be sustained through the winter the price increases for home heating oil could be 30–40 cents per gallon higher than the 17-cent-per-gallon year-to-year increase estimated by EIA in their October report.

For those who use propane as their primary heat source, approximately 5 percent of all low-income households, the increase is expected to be 8 percent to $2,545. For the 53 percent of low-income households that heat with natural gas the increase will be 5 percent to $1,915. For those households heating with electricity, the increase is projected to be 4 percent to $1,381. Please see Table ES.1 for details.

Table ES.1. Mean low-income residential energy expenditures per household by primary heating fuel

(Nominal dollars)

Year	Natural gas	Propane	Fuel oil	Electricity	All
2001	$1,360	$1,634	$1,626	$1,013	$1,270
2006	$1,815	$2,141	$2,461	$1,252	$1,682
2007	$1,832	$2,358	$2,601	$1,334	$1,742
2008	$1,915	$2,545	$2,895	$1,381	$1,834

Average costs for heating and cooling only, will also increase on a percentage and dollar basis. Electricity is the source of cooling energy for almost all low-income households that have air conditioning, now comprising a majority of all these households, even in the Northeast. For households heating with natural gas the increase in heating and cooling costs is projected at 6 percent, rising from $793 to $847. Households heating with propane will find their heating and cooling costs rising from $1,066 last year to $1,210 in the year ahead. Those heating with fuel oil will face an average heating and cooling bill of $1,405 in FY 2008, compared to $1,175 in FY 2007. For those heating with electricity heating and cooling costs will rise to $527 from $503 last year.

There will be substantial differences in the impact of these increases by Census Region. For example, approximately 80 percent of low-income households in the Midwest heat with natural gas and nearly all the rest heat with propane or fuel oil. The average residential energy bill for low-income consumers in the Midwest Region heating with all three fuel types will exceed $2,000 in the year ahead. In the Northeast more than 26 percent of low-income households use fuel oil for heat and they will face an average residential energy bill of $2,902 in the coming year, including a heating and cooling bill of $1,356. By contrast, the average residential energy bill for low-income consumers in the West and heating with electricity is estimated to be $918.

The impact of high energy prices is not confined to the coldest parts of the country. In the South Region low-income natural gas consumers will experience an average residential energy expenditure of $2,005, roughly comparable to the $2,050 average projected for those heating with gas in the Midwest. This includes a heating and cooling bill of $834. This is because, though energy usage in the South is lower than in the Midwest, the price of electricity and natural gas is projected to be higher in the former region. For those in the South who heat with propane the total residential energy expenditure will average $2,334 including a heating and cooling bill of $1,034.

It is important to keep in mind that the statistics reported in this analysis are averages for low-income households by primary heating fuel type and region. These averages mask considerable variation within these large blocks of consumers. Many low-income households, indeed a majority in each category, will face bills that are at or below the averages for that category. On the other hand, very substantial numbers will face bills well above these averages, in some cases totaling $3–4,000 and even higher. Millions of such households may be challenged to keep the heat and lights on while still paying for other basic necessities.

THE IMPACT OF CARBON CONTROL: A FIRST LOOK

In July of 2007 The Department of Energy's Energy Information Administration (EIA) released its impact analysis of "The Climate Stewardship and Innovation Act of 2007," known as S. 280. This legislation, cosponsored by Senators Joseph Lieberman and John McCain, was designed to significantly cut U.S. greenhouse gas emissions over time through a "cap-and-trade" system that would gradually but extensively reduce such emissions over many decades using a mechanism that is briefly described below. This legislation is one of several proposals that have emerged in recent years to come to grips with this nation's role in causing human-induced global climate change.* The analysis of this proposal produced by EIA provided an opportunity to integrate the EIA price projections, derived from the National Energy Modeling System (NEMS), into an Oak Ridge National Laboratory data base derived from the EIA Residential Energy Consumption Survey for 2001 in order to produce a preliminary impact assessment of these types of policies on low-income consumers.

Previous analysis of green house gas reduction policies by the Congressional Budget Office and others has demonstrated that the cost of reducing carbon emissions will tend to be regressive, impacting lower-income consumers more severely on a percentage basis than it would upper or middle income households. The new EIA data, integrated with the Residential Energy Consumption Survey for 2001, helps identify the potential impacts on low-income household electric bills, where most of the impact will be felt, as well as how this impact might vary by primary fuel source and region. These estimates project what the household impact of the policy might be for consumers with current fuel use and consumption patterns.

CAP-AND-TRADE

Many U.S. policy makers now believe that in order to slow and eventually stop the impact of greenhouse gases on the world's climate that the United States must slow and then greatly reduce its own use of these carbon-based fuels. Among the proposals that have been made to achieve this objective is the use of a "cap-and-trade" system that would set a limit or cap on greenhouse gas emissions, measured in tons of CO^2 equivalent emitted each year and gradually reduce that limit over

*These include the recommendations of the National Commission on Energy Policy incorporated into draft legislation by Senator Bingaman, S. 309 introduced by Senator Sanders, S. 317 by Senator Feinstein, S. 485 by Senator Kerry, S. 2191 Senators Lieberman and Warner, H. R. 620 by Representative Olver, and H.R. 1590 by Representative Waxman.

time. Producers or users of fossil fuels would be required to hold permits to enable them to emit covered gases, each permit entitling the holder to emit a ton of CO^2 equivalent. The impact of such a system would begin small but would become significant over time depending on many factors such as the price of alternative energy sources, the introduction of new cost-effective sustainable energy technologies, the rate of economic growth, and the potential to off-set carbon emissions through energy efficiency or carbon sequestration. EIA has estimated that, under S. 280, one of the major proposals for a cap-and-trade program under consideration, the cost of a permit, called an "allowance," will rise to $22.20 by 2020 and $47.90 by 2030 in constant 2005 dollars based on reference case economic assumptions (Energy Information Administration, 2007).

Key Findings Regarding Cap-and-Trade

All impacts are estimated in 2005 dollars.

- A carbon cap-and-trade program similar to S. 280 focused on the electric industry will have a gradually deepening impact on low-income consumers. In real terms the electric bills of low-income consumers will increase by approximately 9 percent by 2020 and by 20 percent by 2030 compared to a base case with no cap-and-trade program. The average low-income electric bill will rise by $167, from $833 to $1,000 during that time frame.

- The impacts will not be evenly distributed geographically. Those regions more heavily dependent on coal for electric generation will experience greater price increases according to EIA and their low-income households will see a more severe escalation in the price of electricity. For a map showing Census Regions and Divisions please see Appendix B.

- Low-income households in the Midwest and South will be much more severely impacted than those in the Northeast or West. The average annual low-income electric bill will rise by $85 in the Northeast and $97 in the West by 2030. On the other hand, in the Midwest the average increase will be $233 and in the South it will be $220.

- High-impact households, those experiencing increases in the top 25 percent relative to all low-income households, will experience increases in excess of $235 by 2030 compared to the average of $166 for all low-income households.

- Among these high-impact households a disproportionate number will come from the West South Central, East South Central, East North Central and West North Central Census Divisions. Please see Fig. ES.1 for further details.

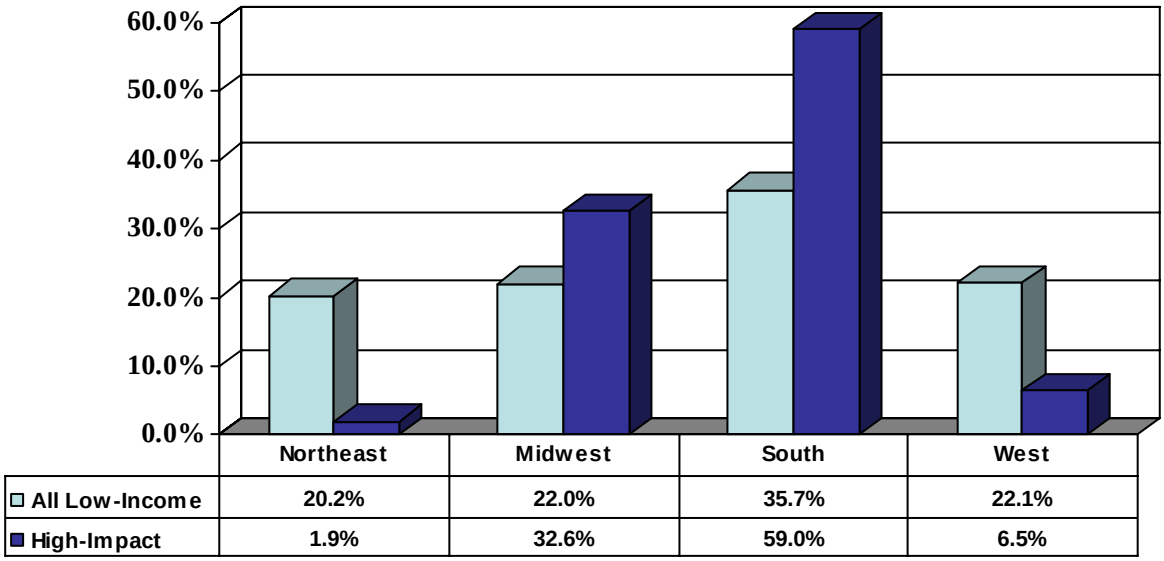


Fig. ES.1. Location of all low-income households and high-impact low-income households (percent by region).

- Many of the high-impact households, 43 percent, use electricity to heat their homes. Those heating with electricity in the East South Central Census Division are projected to experience an increase of $339 per annum and many will experience bill increases in excess of $400.

- Eighty-one percent of the high-impact households live in either mobile homes or single-family detached homes. For the low-income population in general only 54 percent lived in these two types of homes.

- High-impact households have higher electricity consumption, higher total energy consumption, and higher energy usage per square foot of living space when compared to the averages for all low-income households.

Conclusions of Cap-and-Trade Analysis

- This preliminary analysis of one cap-and-trade carbon policy indicates that there will be a substantial impact of such a policy on low-income energy budgets. This impact will begin at a relatively small level in the years immediately ahead and increase over the following decades as the level of carbon dioxide emitted in the U.S. is increasingly constrained.

- Residential energy expenditures are only part of the regressive impact of a cap-and-trade policy on low-income households because higher energy costs to producers of other goods and services are likely to be passed to their customers. Direct energy expenses will, nonetheless, be a significant proportion of the impact of a major carbon pricing policy on low-income households, as the figures above demonstrate.

- These direct energy expenditure impacts are likely to vary substantially by region, housing type, and other factors. General income redistribution mechanisms such as withholding tax adjustments or the Earned Income Tax Credit may be major vehicles to help deal with the general

consumption impacts of the policy but they are not well suited to deal with the energy-specific variations noted in this report.

- Appropriately funded low-income energy assistance has a significant role to play in dealing with these impact disparities among and within the different regions of the country because the benefits can be varied to target high-impact households.

- The energy usage profile of high-impact low-income households, living disproportionately in detached single family homes and consuming more electricity and more energy in general than other low-income households, indicates that they stand to benefit substantially from energy efficiency investments. For example, it is currently estimated that DOE Weatherization can reduce low-income energy expenditures by an average of $403 per year which would more than off-set the impact of cap-and-trade on many high-impact households.

- The gradual introduction of the cap-and-trade carbon restrictions and accompanying price impacts creates a window of opportunity to employ energy efficiency to cushion the future impacts. During the decade immediately ahead residential building envelope retrofits and appliance replacement, targeted at those homes occupied by those in the high-impact segment of the low-income population, can help reduce the need for future energy assistance while also reducing the carbon footprint of low-income communities.

1. INTRODUCTION

The Department of Energy's Energy Information Administration (EIA) recently released its Short Term Energy Outlook for residential energy prices for the winter of 2007–2008 (EIA, 2007). The forecast indicates increases in costs for all low-income consumers in the year ahead, particularly for those using fuel oil to heat their homes. In the following analysis, the Oak Ridge National Laboratory has integrated the EIA price projections with the Residential Energy Consumption Survey (RECS) for 2001 in order to project the impact of these price increases on the nation's low-income households by primary heating fuel type, nationally and by Census Region. The report provides an update of bill estimates provided in a previous study, "The Impact of Forecasted Energy Price Increases on Low-Income Consumers" (Eisenberg, 2005).

In addition to providing expenditure forecasts for the year immediately ahead this analysis uses a similar methodology to give policy makers some insight into one of the major policy debates that will impact low-income energy expenditures well into the middle decades of this century and beyond. There is now considerable discussion of employing a cap-and-trade mechanism to first limit and then reduce U.S. emissions of carbon into the atmosphere in order to combat the long-range threat of human-induced climate change. The Energy Information Administration has provided an analysis of projected energy prices in the years 2020 and 2030 for one such cap-and-trade carbon reduction proposal that, when integrated with the RECS 2001 database, provides estimates of how low-income households will be impacted over the long term by carbon reduction legislation.

This document employs these three sets of data from EIA (short-term residential price projections, long term residential price projections associated with a key cap-and-trade proposal, and RECS) together with the projection methodology developed by ORNL to help shed light on two significant issues for policy makers. First, what can we expect for low-income households in the year ahead in light of current price escalations? Second, how can we begin to understand the implications of federal policy on limiting greenhouse gas emissions for low-income households and potential approaches to remediation as the nation comes to grips with the profound issues of climate change and global warming.

2. FY 2008—THE YEAR AHEAD

The Department of Energy now forecasts that there will be increases in the price of household energy for all major energy sources in the current fiscal year. In an effort to understand the distributive effect of these price increases on low-income consumers who are eligible for the Department of Energy's Weatherization Assistance Program, the Oak Ridge National Laboratory has developed projections of the probable impact of these price increases on energy bills nationally, by region, and by fuel type. These projections were created by integrating the EIA's price forecasts and NOAA weather projections for the coming year into a data base derived from the EIA Residential Energy Consumption Survey for 2001. This data base, with records for over 4,800 households, provides the most accurate available national picture of energy usage and expenditures for the nation's households by fuel type, income, region, and other energy-related criteria. For purposes of this analysis, low-income households are defined as those at or below the greater of 150 percent of the federal Poverty Level or 60 percent of state median income, the federal maximum eligibility standard for LIHEAP and Weatherization. This population was comprised of approximately 33.8 million households in 2001.

The projections contained in this report may prove useful for those trying to gauge the impact of the recent energy price escalation on low-income consumers at the federal and regional level. Great caution should be exercised in trying to translate these increases to individual states or localities, let alone to individual consumers. National or regional price increases for wholesale natural gas, propane, home heating oil, and electricity often flow down to end consumers at very different rates depending on state regulations, local market conditions, and the purchasing strategies of individual local gas and electric distribution companies. Average price increases projected by EIA for a given fuel for one of the four Census Regions or nine Census Divisions are useful for understanding the broad policy impacts of national price trends but they may not reflect significant variations from state to state and even from utility to utility within a state.

Furthermore, the price forecast by EIA is produced by a predictive model that does not attempt to capture the potential impact of price speculation in the event of real or perceived supply shortfalls as the winter progresses. For example, recent price volatility apparently caused by the border conflict between Turkey and Iraq is not captured in the oil price projections. Nor do they make any attempt to take into account the impact of price volatility and speculation in natural gas futures and spot markets. These estimates should never-the-less provide a reasonable basis for understanding the national and regional impacts of the increase in energy prices on the nation's low-income consumers.

2.1 NATIONAL FINDINGS

The price increases estimated for natural gas and home heating oil are part of a persistent escalation in the prices of fossil fuels over the past fifteen years that has outstripped the increase in purchasing power of low-income households, as shown in Fig. 2.1. During the interval 1992 through 2006, the price of residential natural gas rose by 133 percent and that of home heating oil by more than 173 percent. During the same period, incomes of those in the lowest fifth of all U.S. households increased by only 56 percent, a bit more than the consumer price index increase of 44 percent. Simply put, low-income resources have not kept pace with energy price inflation for low-income consumers.

It is also important to note that the price increases for residential energy have been particularly sharp over the 2001–2008 interval. During that period natural gas prices rose 70 Percent, propane prices

rose 100 percent, and electricity prices rose 25 percent. Home heating oil prices rose at an even faster rate, 143 percent.

The impact of these rising energy costs across time can be measured for individual households in the form of rising energy burdens, defined as the ratio of residential energy expenses divided by household income. From 2001 through 2005, the most recent year for which data is available, the

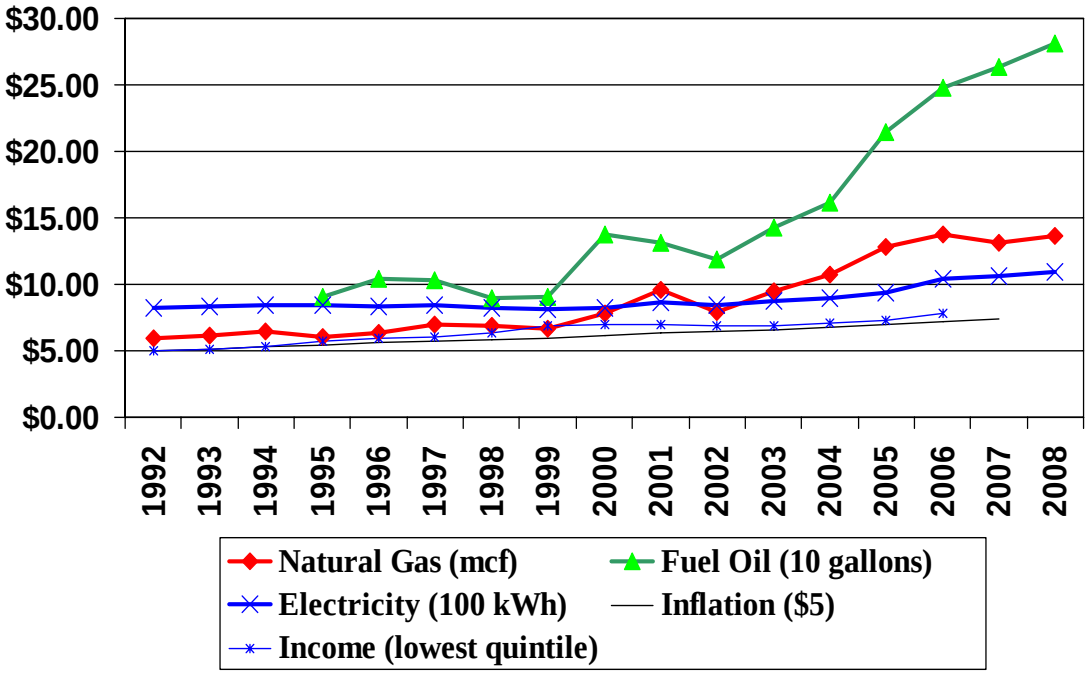


Fig. 2.1. Rate of increase in residential energy prices by fuel type (since 1992 nominal dollars). *Source:* DOE/EIA Short Term Energy Outlook, October 2007, Bureau of Labor Statistics, Bureau of the Census.

average residential energy burden for low-income households rose from 12.6 percent to 14.6 percent of income. For non-low-income households the average burden was 3.1 percent of income in 2001 and remained essentially unchanged at 3.2 percent of income in 2005 (Administration for Children and Families, 2007).

The apparent trends in energy prices and household income, as shown in Fig. 2.1, indicate that low-income energy burdens since 2005 are likely to have continued their upward climb.

The EIA price forecast foresees a price of $13.62 per thousand cubic feet (mcf) for residential natural gas in 2008 compared to $13.10 in 2007, an increase of 4 percent. The price of home heating oil is forecasted to rise an additional 13 percent to $2.81 per gallon through the coming year. The price of propane is expected to increase 3 percent to $2.20 per gallon in 2008 (EIA, 2007).

2.2 AGGREGATE EXPENDITURES

1. The total cost of residential energy for low-income consumers will increase by $3.1 billion during the year ahead compared to last year, from $58.0 billion to $61.1 billion, assuming the NOAA-predicted weather conditions which are slightly warmer than normal.

2. Approximately half of this increase is projected to occur among the nation's low-income natural gas consumers whose total energy bill will rise by an estimated $1.5 billion. The majority of low-income consumers heat their homes with natural gas.

3. The year-to-year increase for natural gas consumers is paralleled by significant increases for propane and home heating oil users, estimated at $332 million and $664 million respectively.

4. The cost of residential energy to home heating oil consumers has been rising steadily since 2001 and is now expected to be $2.9 billion higher than it was in that year in nominal dollars, an increase of 78 percent. Though a relatively small proportion of all low-income households, heating oil users are heavily concentrated in the Northeast. It is important to note that in recent weeks the price of crude oil has far exceeded the projections employed by EIA in making its winter fuel price estimates. Crude oil is now (December 2007) selling for over $95 per barrel compared to estimates in the $74 range employed by EIA in their October forecast. Should these prices be sustained over the medium term the price increases for home heating oil could be 30–40 cents per gallon higher than the 17-cent-per-gallon increase estimated by EIA in their October report.

5. Low-income consumers who heat with electricity will experience an increase of $482 million next year and $3.8 billion over the same 2001–2008 time period. Please see Table 2.1 for further details on aggregate expenditures by low-income households.

Table 2.1. Aggregate low-income residential energy expenditures by primary heating fuel

Nominal $ (millions)

Year	Natural gas	Propane	Fuel oil	Electricity	Total[a]
2001	$24,324	$2,905	$3,671	$10,384	$42,298
2006	$32,464	$3,806	$5,557	$12,838	$56,043
2007	$32,768	$4,192	$5,873	$13,679	$57,975
2008	$34,253	$4,524	$6,537	$14,161	$61,060

[a]Individual fuels do not sum to total due to absence of minor fuels.

The statistics below estimating average household energy expenditures are presented in two forms. Residential energy expenditures describe all of a household's home energy spending including heating, cooling, hot water, refrigeration, lighting, and appliances. Heating and cooling expenditures, a subset of total residential energy expenditures, deals only with those two components of residential energy usage. These costs are the primary focus of the LIHEAP program. Electricity is the source of cooling energy for almost all low-income households that have air conditioning, so heating and cooling costs for low-income households are differentiated in the statistics below by the primary heating fuel that they employ.

2.3 AVERAGE HOUSEHOLD TOTAL RESIDENTIAL ENERGY EXPENDITURES

1. The expected mean national residential energy expenditure for households heating with natural gas will rise to $1,915, an increase of $83 from last year and $555 since 2001. The mean expenditure will exceed that for the year of the Hurricanes Katrina and Rita disruptions by $100.

2. The average annual residential energy bill for those heating with propane will rise to $2,545, an increase of $187 from last year and $911 since 2001.
3. The average bill for heating oil consumers is projected at $2,895, up $294 from last year and $1,269 since 2001.

4. The average bill for low-income consumers heating with electricity is projected at $1,381, up $47 from last year and $368 since 2001.

For further details on average residential energy expenditures please see Table 2.2.

Table 2.2. Mean low-income residential energy expenditures per household by primary heating fuel

(Nominal dollars)

Year	Natural gas	Propane	Fuel oil	Electricity	All
2001	$1,360	$1,634	$1,626	$1,013	$1,270
2006	$1,815	$2,141	$2,461	$1,252	$1,682
2007	$1,832	$2,358	$2,601	$1,334	$1,742
2008	$1,915	$2,545	$2,895	$1,381	$1,834

2.4 AVERAGE HOUSEHOLD HEATING AND COOLING COSTS

1. Heating and cooling costs for households that heat with natural gas, excluding the cost of cooking, hot water, appliances, and lighting, are projected at $847 in FY 2008, an increase of 7 percent this year compared to last year and 70 percent higher then in 2001.

2. For those heating with propane, heating and cooling costs in the year ahead are estimated at $1,211, an increase of 14 percent compared to last year and 100 percent higher then in 2001.

3. The cost of heating and cooling for fuel oil users will rise 20 percent compared to last year to $1,405 and will be 143 percent higher then in 2001.

4. Those that heat with electricity will see a 5 percent annual increase in their heating and cooling expenditures during the coming year and a cumulative increase of 108 percent since 2001.

2.5 REGIONAL FINDINGS

1. The impact of these price increases on low-income households will vary considerably by region. The most severe energy price inflation is occurring for those heating with home heating oil, who live predominantly in the Northeast. More than 26 percent of low-income households in the Northeast have fuel oil as their primary heat source compared to 6 percent nationwide. Please see Figure 2.2 for the distribution of low-income households by primary heating fuel by Region.

2. Over 70 percent of low-income households in the Midwest Region have natural gas as their primary heat source compared to 53 percent nationwide. The high costs for natural gas that occurred in the aftermath of hurricane-caused supply disruptions in 2005-2006 continue in this region.

3. A very high proportion of low-income households in the South, 48 percent, use electricity as their primary heating fuel. The combination of rising electricity and natural gas prices have produced

average energy bills for low-income households in the region that are very close to the national average.

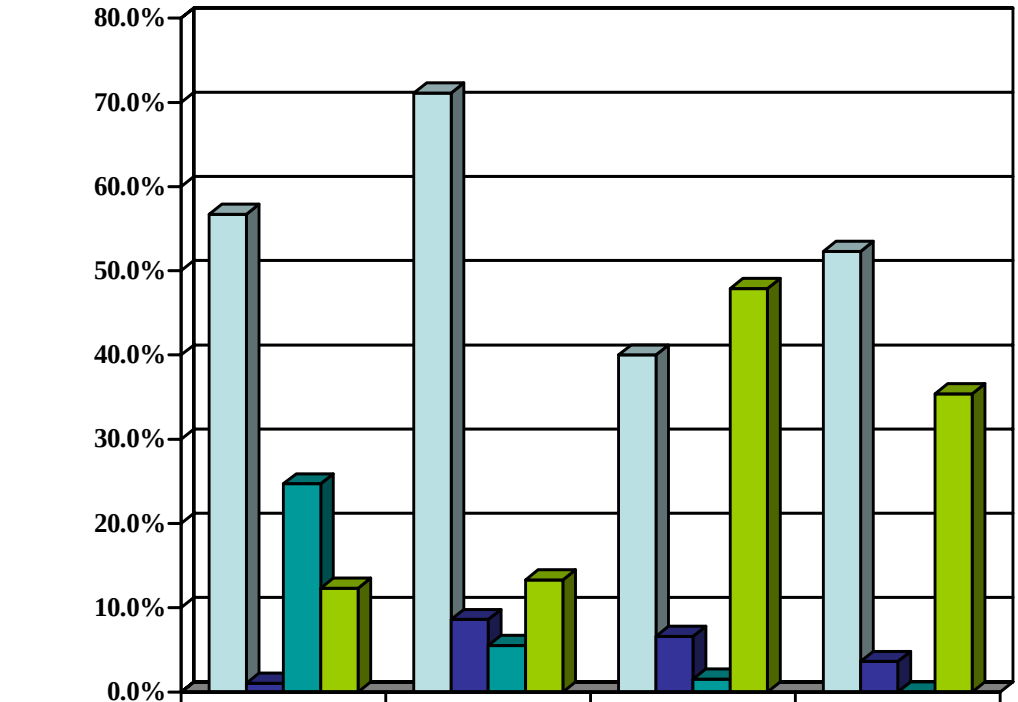
2.6 REGIONAL RESIDENTIAL ENERGY EXPENDITURES

1. Low-income households in the Northeast that heat with fuel oil will face an average residential energy expenditure for all purposes of $2,902 in the year ahead given the predicted prices and weather conditions while those heating with natural gas in the region will face an average expenditure of $2,157. This represents an increase of 11 percent in the case of fuel oil and 5 percent in the case of natural gas compared to last year.

2. Households in the Northeast that heat with electricity, a relatively small proportion, are expected to have an average expenditure of $1,582 for all residential energy expenditures, an increase of 5 percent compared to last year.

3. In the Midwest low-income consumers of all three primary carbon-based heating fuels—natural gas, propane, and fuel oil—will face average residential energy bills for all purposes exceeding $2,000 this coming year.

4. Those that heat with propane in the Midwest, like fuel oil users in the Northeast, will be particularly hard hit and face an average bill for residential energy expenditures of $2,864. This is an increase of 9 percent compared to last year.



	Northeast	Midwest	South	West
Natural Gas	56.7%	71.1%	40.0%	52.3%
Propane	1.0%	8.6%	6.6%	3.6%
Fuel Oil	24.7%	5.5%	1.5%	0.0%
Electricity	12.3%	13.3%	47.9%	35.4%

Fig. 2.2. Primary heating fuel for low-income households (percent by region).

4. The impact of rising prices will not be confined to the coldest parts of the country. In the South Region low-income natural gas consumers will experience an average residential energy expenditure of $2,005. Though average natural gas usage, measured in Btus, is somewhat lower in the South than in the Midwest, the price of natural gas and electricity is higher in the South. This causes total expenditures to be comparable.

5. Those who heat with electricity in the South will have an average residential energy expenditure of $1,619 while propane users will be spending an average of $2,334. These represent annual increases of 3 percent and 6 percent respectively.

6. In the West Region those heating with propane will have an average bill of $1,978, up 13 percent from last year.

7. Those in the West with natural gas as their primary heating fuel will pay $1,383, for total residential energy, an increase of 5 percent from last year.

8. Households heating with electricity in the West will see an average residential energy bill of $918, up 4 percent from last year.

2.7 REGIONAL HEATING AND COOLING COSTS

1. Low-income households heating with home heating oil in the Northeast will face average heating and cooling expenditures in the year ahead of $1,356, approximately 19 percent higher than last year.

2. Heating and cooling costs for those in the Northeast that heat with natural gas will average $1,075 compared to $998 last year, an increase of 8 percent.

3. In the Midwest the heating and cooling costs for those who heat with natural gas will rise to $1,018 and for propane it will jump to $1,449. These estimates contain annual increases of 8 percent and 16 percent respectively when compared to last year.

4. The cost of heating and cooling for those who heat with fuel oil in the Midwest will rise to $1,442 from $1,176 last year, an increase of 23 percent.

5. The cost of heating and cooling for those who heat with natural gas in the South Region will rise to $834, and for those who heat with propane, heating and cooling costs will rise to $1,034. In the case of natural gas this is an increase of 6 percent compared to last year and in the case of propane the increase is 10 percent.

6. Heating and cooling costs for those who heat with propane will rise to $851 in the West Region, a jump of 10 percent.

For annual expenditure projections by region and fuel please see Appendix C.

It is important to keep in mind that the statistics reported in this analysis are averages for low-income households by primary heating fuel type, nationally and by region. These averages mask considerable variation within these large blocks of consumers. On the one hand, while the average energy expenditures for those heating with natural gas are projected to be $1,915 in the year ahead the median expenditure is expected to be somewhat lower, at $1,773.

The median represents the midpoint in the distribution of expected residential energy bills, with half the households facing higher bills and half the households expected to pay less then this figure. The standard deviation for the national distribution, a measure of the variance in the sample, is $1,073, which means that a substantial number of low-income households will face bills that are well above the median, and indeed well above the mean value described above, as shown in Fig. 2.3.

Households in the top quartile, those with projected expenditures in excess of $2,400, are projected to spend an average of $3,282 during the current fiscal year for residential energy. These are households that live primarily in detached single-family and mobile homes, that live outside the West Census Region, and that use much more energy than the low-income average. Annual MBtu consumption for these households averaged 153.4 MBtu compared to 88.7 MBtu for all low-income households in 2001 (EIA, 2001). Consumption per square foot of living space was also higher, averaging 87.6 Btu per square foot compared to 67.3 Btu per square foot for all low-income households.

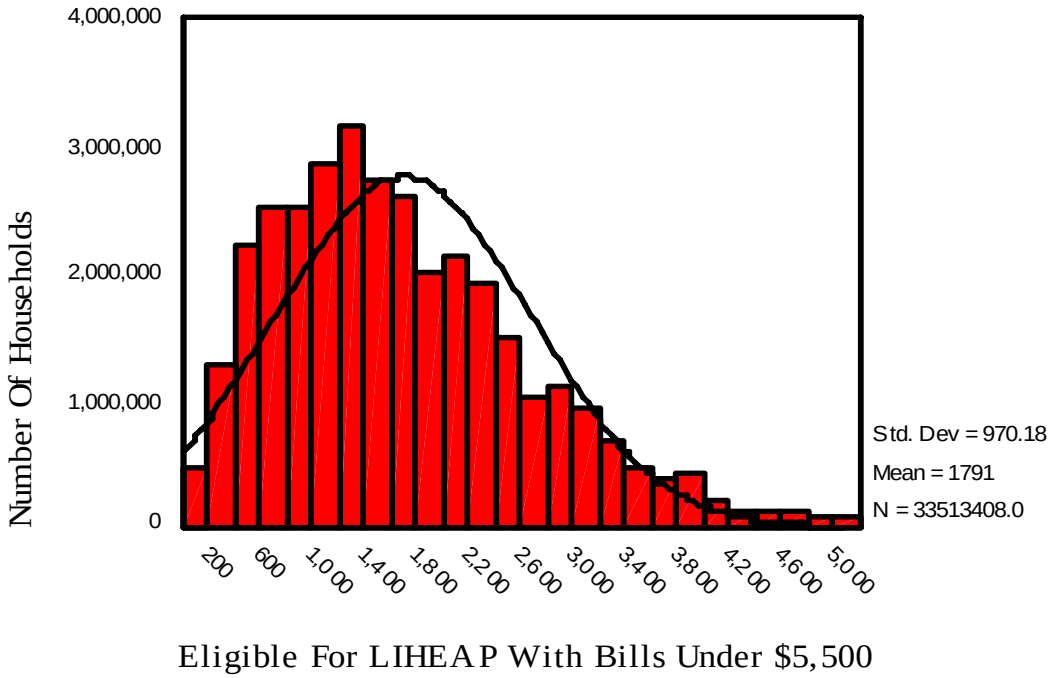


Fig. 2.3. Distribution of low-income energy bills estimated for FY 2008. For purposes of graphic design, households at the extreme of low-income sample were excluded.

2.8 CONCLUSIONS

The combination of long-term trends in residential energy prices with expected near-normal weather conditions are likely to cause continued high residential energy expenditures for low-income households this year. The trend in recent years is for the cost of residential energy to low-income consumers to increase at a pace far exceeding the rate of general inflation or of increases in household income. This trend can be seen for all major fuel sources and all regions of the country. Many households will face higher energy burdens in the year ahead and will lack the discretionary income to adjust to the rising costs of home energy.

The aggregate cost of residential energy for low-income households is projected to rise by $3.1 billion during the year ahead and, by the end of 2008, will have increased by nearly $18.9 billion since 2001, an increase of more than 45 percent. These costs far exceed the rate of increase in income for low-income households.

It is also important to keep in mind that a significant minority of the low-income population will experience energy bills that are higher than the averages described above would suggest. Within the low-income population there will be numerous households that will face residential energy bills in excess of $3,000 during the coming year. For these households' residential energy costs may well cause loss of service for inability to pay, burdensome and growing utility arrearages, threats to health from hypothermia and hyperthermia, and painful choices among home heating, food, or medicine.

3. THE IMPACT OF CARBON CONTROL: A FIRST LOOK

In July of 2007 The Department of Energy's Energy Information Administration (EIA) released its impact analysis of "The Climate Stewardship And Innovation Act of 2007," known as S. 280. This legislation, cosponsored by Senators Joseph Lieberman and John McCain, was designed to significantly cut U.S. greenhouse gas emissions over time through a 'cap-and-trade' system that would gradually but extensively reduce such emissions over many decades using a mechanism that is briefly described below. This legislation is one of several proposals that have emerged in recent years to come to grips with this nation's role in causing human-induced global climate change.*

An analysis of this proposal produced by EIA used the National Energy Modeling System (NEMS) to generate price projections for electricity under the proposed cap-and-trade system. Oak Ridge National Laboratory integrated those price projections into a data base derived from the EIA Residential Energy Consumption Survey for 2001 in order to produce a preliminary impact assessment of these types of policies on low-income consumers. ORNL has developed these projections in order to give policy makers a sense of the potential magnitude of the impact of carbon control on low-income consumers' direct residential energy expenditures over time as well as a sense of how those impacts may vary from region to region and among groups within the low-income population. For purposes of this analysis, low-income households are defined as those at or below the greater of 150 percent of the federal Poverty Level or 60 percent of state median income, which ever is higher, the federal maximum eligibility standard for LIHEAP and Weatherization. This population was comprised of approximately 33.8 million households in 2001.

Previous analysis of green house gas reduction policies by the Congressional Budget Office and others has demonstrated that the cost of reducing carbon emissions will tend to be regressive, impacting lower-income consumers more severely on a percentage-of-income basis than it would upper or middle income households (CBO, 2003). A recent study for the Brookings Institution estimated the potential impact of a $15-per-ton carbon tax on those in the lowest 10 percent of income as a 3.4 percent drop in income and for the next decile up a drop of 3.1 percent. This compares to approximately 1.5 percent for the middle deciles and .8 percent of income for those among the highest 10 percent of earners (Metcalf, 2007). An analysis by the Center on Budget and Policy Priorities estimates that households in the poorest fifth of all U.S. households will experience an increase of $750-$950 for all goods and services as the result of a cap-and-trade program that drops carbon emissions 15 percent below projected levels (CBPP, 2007).

The new EIA data, integrated with the Residential Energy Consumption Survey for 2001, helps identify the potential impacts on household electric bills as well as how this impact might vary by primary fuel source and region. The focus on electric bills is due to the fact that a unique feature of S. 280 is that it tends to shield small natural gas consumers from the impacts of the cap. The analysis may prove useful in understanding the needs and remedies for the distributive impacts of such policies and how varied these impacts may be based on patterns of location and energy usage. The estimates do not attempt to differentiate among alternative legislative proposals nor do they provide an estimate of aggregate impacts on the low-income population across time. Since the price impacts are estimated decades ahead, in 2020 and 2030, the aggregate estimates will require projections of population growth, poverty rates, housing, appliance, income, and energy profiles far into the future

*These include the recommendations of the National Commission on Energy Policy incorporated into draft legislation by Senator Bingaman, S. 309 introduced by Senator Sanders, S. 317 by Senator Feinstein, S. 485 by Senator Kerry, S. 2191 Senators Lieberman and Warner, H.R. 620 by Representative Olver, and H.R. 1590 by Representative Waxman.

and are beyond the scope of the present work. These estimates project what the household impact of the policy might be for consumers with current fuel use and consumption profiles.

3.1 CAP-AND-TRADE

The United States is a major driver of the world economy and also a major emitter of greenhouse gases such as carbon dioxide (CO^2) through its extensive use of fossil fuels such as coal, petroleum, and natural gas. Many U.S. policy makers now believe that in order to slow and eventually stop the impact of these gases on the world's climate that the United States must slow and then greatly reduce its own use of these carbon-based fuels. Among the proposals that have been made to achieve this objective is the use of a "cap-and-trade" system that would set a limit or cap on greenhouse gas emissions, measured in tons of CO^2 equivalent emitted each year, and gradually reduce that limit over time. Producers or users of fossil fuels would be required to hold permits to enable them to emit CO^2, each permit entitling the holder to emit a ton of CO^2. The number of these permits, sometimes called 'allowances', would be reduced over time, consistent with the cap. Permit holders would be free to buy and sell permits in an open market. As the cap decreases the number of permits would also decrease thereby increasing their price and that of carbon-based energy that they enable.

The impact of such a system would begin small but would become significant over time depending on many factors such as the price of alternative energy sources, the introduction of new cost-effective sustainable energy technologies, the rate of economic growth, and the potential to off-set carbon emissions through energy efficiency or carbon sequestration. Under S. 280 the carbon emissions cap would be set at the 2004 level for the period 2012–2019, at the 1990 level for the period 2020 to 2029, at 78 percent of the 1990 level for the period 2030 to 2049 and at 40 percent of that level thereafter. EIA has estimated that the cost of an allowance will rise to $22.20 by 2020 and $47.90 by 2030 in constant 2005 dollars based on reference case economic assumptions (EIA, 2007).

This study does not explicitly estimate the impact on low-income households of a carbon tax, which is one of the major policy alternatives to a cap-and-trade program. Though there can be profound differences between a cap-and-trade program and a carbon tax in terms of administration, impact on energy markets, and impact on emissions, both kinds of vehicles will raise the cost of residential energy produced from carbon-based fuels. For purposes of understanding the direction of low-income energy expenditures and the regional, housing, and fuel-use variations that would occur with a carbon tax that is comparably effective to S. 280 in reducing emissions, the reader can assume that the impact on low-income electric expenditures will also be roughly comparable to those presented below for the cap-and-trade program.

There are many alternative design choices for a cap-and-trade greenhouse gas reduction program that can have a significant impact on the scope, scale, and impact of the program. A full description of these is well beyond the reach of this study but a mention of several will illustrate the potential complexities and significance of the choices made.

1. How *high a cost are we willing to pay*? A cap-and-trade program, like a carbon tax, will use price as the major mechanism to reduce carbon consumption and increase the economic feasibility of using non-carbon based fuels that might not otherwise be considered cost effective. The higher energy prices caused by the cap would also create incentives for research, development, and deployment of new energy technologies. There is little disagreement that the price will have to be substantial in order to have a major impact on carbon emissions and the higher the price, the greater the impact on the economy in general and low income consumers in particular. There is general scientific agreement that carbon dioxide already in the atmosphere will remain there for generations and that only a major cut back, at least on the scale of S. 280, will be required to slow and eventually stop their further

accumulation. How high a price will today's consumers be willing to pay for a benefit that may not occur for several generations down the road?

2. *Who will need a permit*? Some proposals call for energy producers and importers to hold the permits in order to sell their fossil fuels. Others would place the requirement lower down the energy consumption chain at the emissions source itself such as at power generation and industrial plants. The higher up the chain the greater the administrative simplicity of the system while the lower down towards the end consumer the closer to those whose choices will be affected by the higher prices. Choosing to place the burden on major industrial and utility users of fossil fuels enables the program to minimize the impact on small consumers like those heating with natural gas but also can concentrate the impact on certain energy sources like electricity.

3. *How will permits be allocated*? The basic choice here is whether permits will be allocated to current users of fossil fuels or sold to those same users. Over time the impact in both cases is to raise the cost to those who use carbon-intensive energy but the initial impact on these users is much reduced if they are allocated permits. This would tend to reduce the immediate impact on electricity prices in places that use a lot of coal for generation and have not deregulated their power systems. On the other hand, if permits are sold this raises revenue that can be recirculated to consumers, develop and deploy alternative energy and energy efficiency resources, or reduce the impact of price hikes on low-income households. Most proposals for cap-and-trade have recognized the regressive nature of the policy and the need to return funding to low and middle income consumers although there is no consensus on the mechanisms that should be used for doing so.

3.2 KEY FINDINGS

All impacts are estimated in 2005 dollars.

- A carbon cap-and-trade program similar to S. 280 focused on the electric industry will have a gradually deepening impact on low-income consumers. In real terms the electric bills of low-income consumers will increase by approximately 9 percent by 2020 and by 20 percent by 2030 relative to what it would have been without the program. The average low-income electric bill will rise by $167 from $833 to $1,000 during that time frame.

- There will not be significant variation in the impact by primary heating fuel, as shown in Table 3.1. Electric bills vary significantly among households using different heating fuels but the dollar increases caused by cap-and-trade are, on average, comparable.

Table 3.1. Mean low-income residential electricity expenditures per household with and without a cap-and-trade in 2030 by primary household heating fuel ($2005)

Year	Natural gas	Propane	Fuel oil	Electricity	All
Baseline	$705	$1,050	$885	$1,018	$833
Cap-and-trade	$848	$1,310	$1,028	$1,219	$1,000

- The impacts will not be evenly distributed geographically. Those regions more heavily dependent on coal for electric generation will experience greater price increases according to EIA and their low-income households will see a more severe escalation in the price of electricity.
- Low-income households in the Midwest and South will be much more severely impacted than those in the Northeast or West. The average annual low-income electric bill will rise by $85 in the

Northeast and $97 in the West by 2030. On the other hand, in the Midwest the average increase will be $233 and the South it will be $220.

- On a sub-regional basis the disparity in average annual impacts is even more severe. For example, on the Pacific Coast and in New England the increase will be, respectively, $54 and $69 per annum. In the West North Central Census Division, the average increase will be $284 by 2030, a jump of 33 percent. Similarly in the East South Central Division, the increase will be 25 percent, or approximately $274. Please see Appendix B for complete map of the states by Census Region and Division.

- In addition to geography other factors contribute to the disparities in the impact of cap-and-trade on low-income consumers within Regions. These may include such elements as a household's primary heating fuel, number and age of appliances, and its electric energy usage habits. High-impact households, those experiencing increases in the top 25 percent relative to all low-income households, will experience increases in excess of $235 by 2030 compared to the average of $166 for all low-income households. See Fig. 3.1 for a graphical depiction of the distribution of low-income bill increases in both bar graph and curve form.

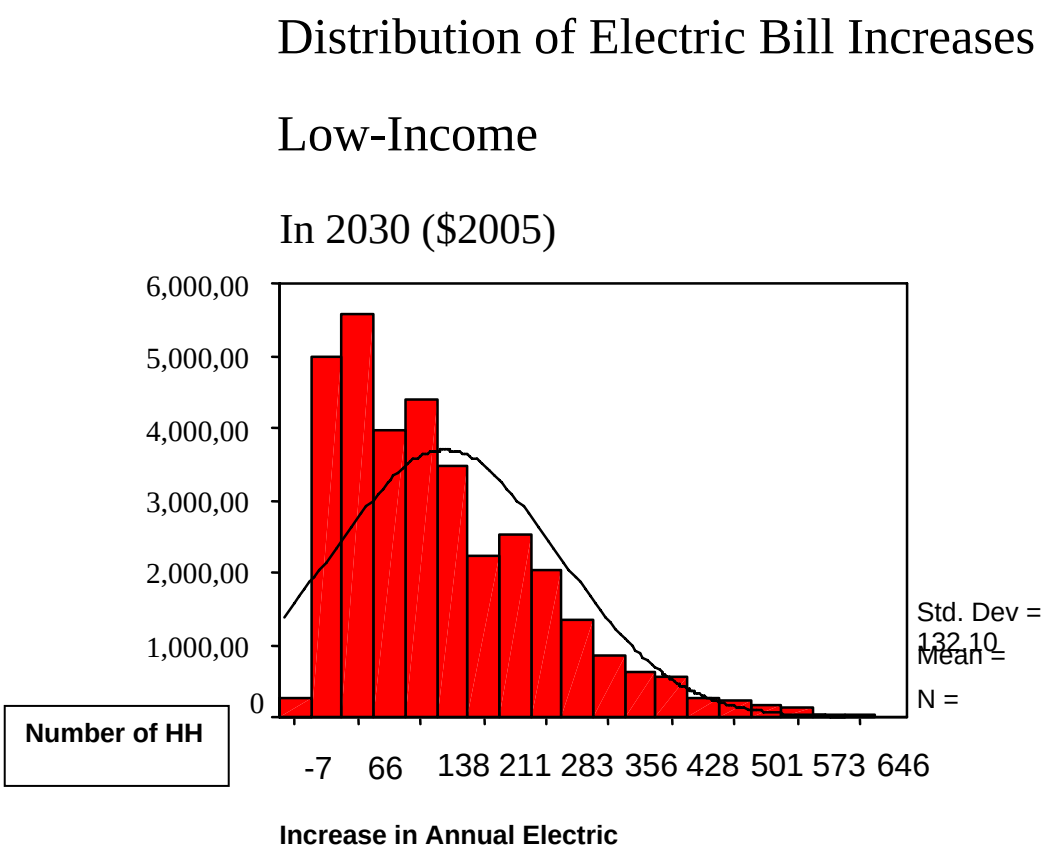


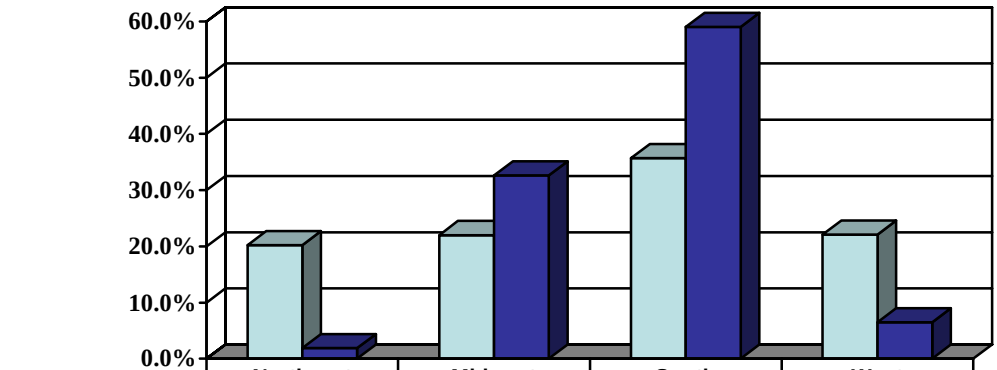
Fig. 3.1. Distribution of electric bill increases for low-income households in 2030 ($2005).

- Among these high-impact households a disproportionate number will come from the West South Central Census Division and the East North Central Division, in addition to the Divisions previously highlighted.

- Many of the high-impact households, 43 percent, use electricity to heat their homes. Those heating with electricity in the East South Central Census Division are projected to experience an average increase of $339 per annum and many will experience bill increases in excess of $400. In contrast, low-income households in the Pacific Division heating with natural gas would find their energy costs increasing by an average of $52 per year. Regional concentrations of low-income households and high-impact low-income households are shown in Fig. 3.2.

- High-impact households have higher electricity consumption, higher total energy consumption, and higher energy usage per square foot of living space when compared to the averages for all low-income households. Average kWh electricity consumption for high-impact households is 16,179 per annum compared to 8,971 for all low-income households. Average total MBtu of energy consumption for these households is 116.3 per annum compared to 86.6 for all low-income households.

LOCATION OF ALL LOW-INCOME HOUSEHOLDS AND HIGH -IMPACT LOW-INCOME HOUSEHOLDS
Percent By Region



	Northeast	Midwest	South	West
All Low-Income	20.2%	22.0%	35.7%	22.1%
High-Impact	1.9%	32.6%	59.0%	6.5%

Fig. 3.2. Location of all low-income households and high-impact low-income households (percent by region). *Sources*: Residential Energy Consumption Survey, 2001 and EIA Analysis of S. 280.

- The age of key appliances such as water heaters, refrigerators, and air conditioners does not vary significantly among low-income households in general and those in the high-impact category. There is, however, considerable variation in the type of homes the two groups live in. Eighty-one percent of the high-impact households live in either mobile homes or single-family detached homes. For the low-income population in general only 54 percent live in these two types of homes.

3.3 CONCLUSIONS

- This preliminary analysis of one cap-and-trade carbon policy indicates that there will be a substantial impact of such a policy on low-income energy expenditures. This impact will begin at a relatively small level in the years immediately ahead and increase over the following decades as the level of carbon dioxide emitted in the United States is increasingly constrained.

- The breadth of the impact of a substantial cap-and-trade policy, comparable to the reductions proposed in S. 280 and similar proposals, will vary substantially with the program design. The proposal evaluated in this analysis imposes its carbon emissions requirements at the level of large emitters such as power plants and the impact on low-income energy bills is therefore largely concentrated in the electric sector. Other proposals seek to impose the allowance requirements at the producer level and would be more likely to have a high impact on those using natural gas or fuel oil as their primary heat source. In this regard the general design matters.

- Residential energy expenditures are only part of the regressive impact of a cap-and-trade policy on low-income households because higher energy costs to producers of other essential goods and services are likely to be passed to their customers. Direct energy expenses will, nonetheless, be a significant proportion of the impact of a large-scale carbon pricing policy on low-income households, as the figures above demonstrate.

- These direct energy expenditure impacts are likely to vary substantially by region, fuel type, housing type and condition, and numerous other factors. General income redistribution mechanisms such as withholding tax adjustments or the Earned Income Tax Credit may be a major mechanism to help deal with the general consumption impacts of the policy but they are not well suited to deal with the energy-specific variations explored in this report. This is because those mechanisms are not designed to take these highly varied energy-related benefit requirements into account nor to deliver energy efficiency services.

- Appropriately funded low-income energy assistance has a significant role to play in dealing with these impact disparities among and within the different regions of the country because the benefits can be varied to target high-impact households.

- The energy usage profile of high-impact low-income households, living disproportionately in detached single family homes and consuming more electricity and more energy in general than other low-income households, indicates that they stand to benefit substantially from energy efficiency investments.

- The gradual introduction of the cap-and-trade carbon restrictions and accompanying price impacts creates a window of opportunity to employ energy efficiency to cushion the future impacts. During the decade immediately ahead residential building envelope retrofits and appliance replacement, targeted at those homes occupied by the high-impact segment of the low-income population, can help reduce the need for future energy assistance while also reducing the carbon footprint of low-income communities.

- Further analysis of carbon reduction policies with projections of future housing, appliance, and energy profiles, as well as various projections of the size, demographics, and economic well being of the low-income population will help better assess remedial requirements for these policies as well as better target energy assistance and energy efficiency efforts.

APPENDIX A. METHODOLOGY

The method used to estimate the impact of projected price increases for residential energy on low-income households is based on the integration of two products from the Department of Energy's Energy Information Administration- the Residential Energy Consumption Survey (RECS) for 2001 and the Short Term Energy Outlook (STEO) for October, 2007. The former is the most recent EIA survey of U.S. households in an occasional series dating back to 1978 that provides detailed data on housing and energy characteristics, demographics, and energy consumption and expenditures verified through billing data. There are records on 4822 individual households in the data base. The STEO provides EIA's monthly estimate of energy prices in the 18-month period immediately ahead.

The RECS public use files identify the location of each household by Census Region, of which there are four, and by Census Division, of which there are nine. Heating and cooling degree days are provided for each household for 2001 based on the population-weighted data for each Census Division and the poverty status of each household is also provided. The survey provides actual fuel bills for each household and uses statistical techniques to allocate the usage and expenditures among major usage categories such as heating, cooling, hot water heating, refrigeration, etc. Long range climate normals for heating and cooling degree days for each of the Census divisions were calculated using statistics provided by the National Climatic Data Center of the National Oceanic and Atmospheric Administration, National Environmental Satellite, Data and Information Service. These data were employed to calculate an adjustment factor for each division so that RECS data on heating and cooling expenditures for 2001 could be adjusted to reflect actual weather conditions for the most recent two heating and cooling seasons and NOAA projections were used for the year ahead.

Price adjustment factors were similarly calculated using quarterly price projections by division for natural gas and electricity and by region for propane and heating oil as provided by the STEO for October, 2007. The quarterly prices were weighted by consumption for each quarter to calculate an annual price adjustment factor for the historical record for 2006 and 2007 and for the price projections for 2008. The baseline energy prices used to calculate multipliers were derived from the historical STEO database. This is a change from the method used in the previous report which used the RECS expenditures as the baseline. The revised methodology provides a more conservative and internally consistent approach to the estimation problem.

The estimate of an individual household's expenditure for a given year n was then calculated using the following formula in SPSS:

(((Dolngsph * hddfact) + Dolngwth + Dolngapl) * pmngd) + (((Dollpsph * hddfact)
+ Dollpwth + Dollpapl)*pmlp r) + (((Dolkrsph*hddfact+Dolkrwth+Doldrapl)*pmfo r)
+ (((Dolfosph*hddfact)+ Dolfowth + Dolfoapl)*pmfo r) + (((Dolelsph * hddfact)
+ (Dolelcol* cddfact)+dolelapl+ dolelrfg + dolelwth)* pmel d)

where

'Dol' signifies the expenditure for 2001,
'ng' represents natural gas
'lp' represents propane
'kr' represents kerosene
'fo' represents fuel oil
'el' represents electricity
'hddfact' is the heating degree day adjustment factor for normalization

‘cddfact’ is the cooling degree day adjustment factor for normalization
‘sph’ is space heating
‘wth’ is water heating
‘apl’ is appliances
‘col’ is cooling,
‘rfg’ is refrigerator
‘pm’ is price multiplier year ‘n’
‘r’ is Census region
‘d’ is Census division.

Regional estimates were then made using the sort functions of SPSS to select households by region and qualification of eligibility for LIHEAP and the ‘Explore’ statistical function to derive means, medians, and standard deviations by primary heating fuel type for total expenditures as well as heating and cooling expenditures for each year. Statistics were generated on a weather-normalized and actual basis for 2001, 2006, 2007, and on a projected basis for 2008.

The projections for the impact of the cap-and-trade were developed using regional and division electric price data for 2020 and 2030 as provided in the EIA analysis of S. 280, the so called Lieberman-McCain bill. Those data were provided in 2005 constant dollars. The prices for 2008 were adjusted to 2005 value in order to make the baseline projections consistent for all projections. In each year electric bills were projected using the electricity-only components of the formula presented above and two EIA scenarios- the baseline mid-range projection absent cap-and-trade as provided by the National Energy Modeling System and the base-case analysis of the prices for the same year as provided in the analysis of S. 280.

APPENDIX B. MAP OF CENSUS DIVISIONS AND REGIONS

www.eia.doe.gov

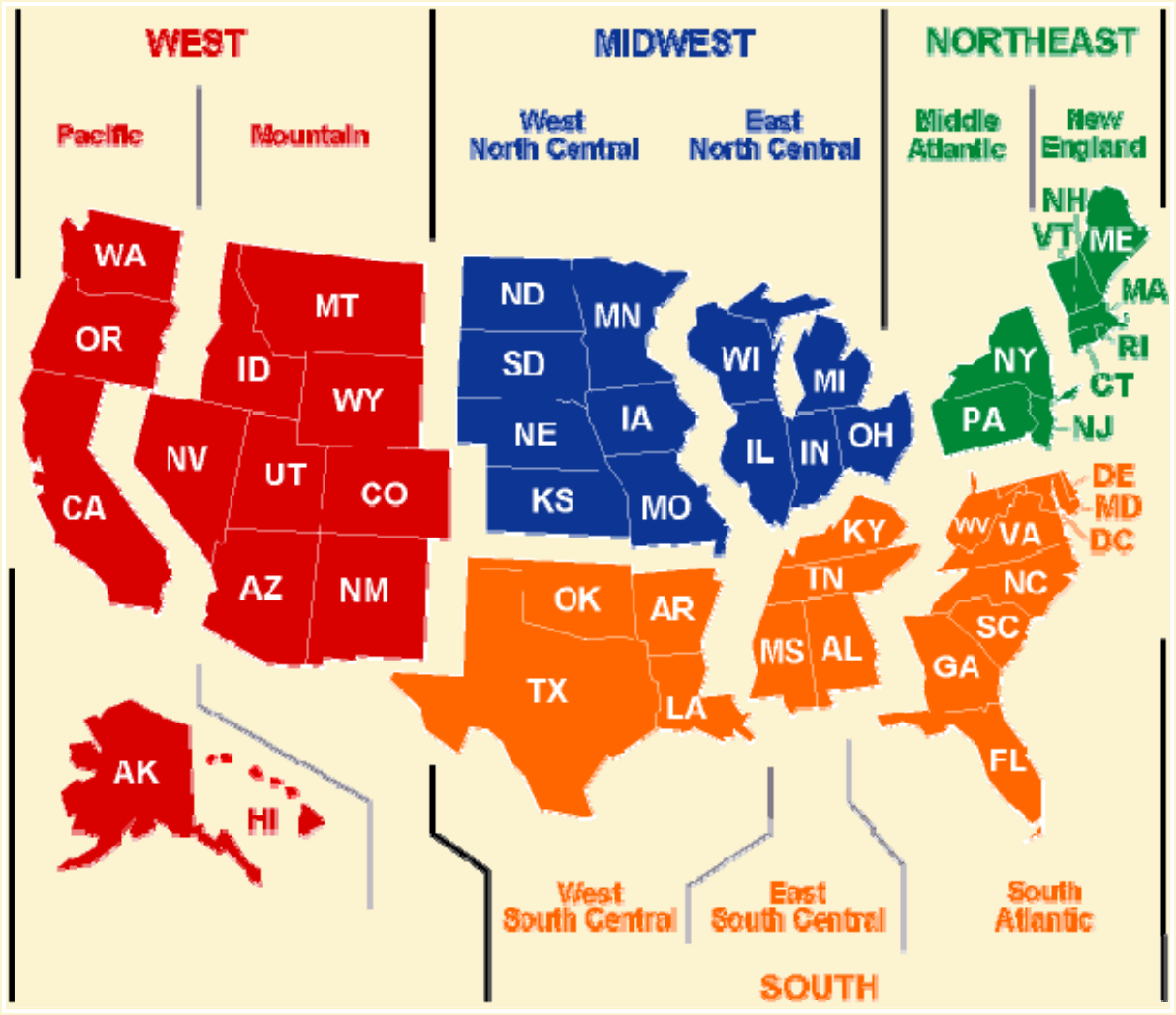
Energy Information Administration

Home > Regional Energy Profiles > U.S. Census Map

Regional Energy Profiles

U.S. CENSUS REGIONS AND DIVISIONS

Release date: June 14, 2000



APPENDIX C. REGIONAL RESULTS OF THE SHORT-TERM EXPENDITURE PROJECTIONS FOR 2008

Table C.1. Mean low-income residential energy expenditures per household by primary heating fuel in the Northeast

(Nominal dollars)

Year	Natural gas	Propane	Fuel oil	Electricity	All
2001	$1,495	$1,267	$1,607	$1,160	$1,453
2006	$2,064	$1,709	$2,462	$1,406	$2,044
2007	$2,052	$1,850	$2,609	$1,511	$2,094
2008	$2,157	$2,102	$2,902	$1,582	$2,245

Table C.2. Mean low-income residential energy expenditures per household by primary heating fuel in the Midwest

(Nominal dollars)

Year	Natural gas	Propane	Fuel oil	Electricity	All
2001	$1,455	$1,860	$1,469	$831	$1,406
2006	$1,925	$2,419	$2,174	$941	$1,846
2007	$1,950	$2,623	$2,230	$1,023	$1,896
2008	$2,049	$2,864	$2,516	$1,052	$2,008

Table C.3. Mean low-income residential energy expenditures per household by primary heating fuel in the South

(Nominal dollars)

Year	Natural gas	Propane	Fuel oil	Electricity	All
2001	$1,384	$1,483	$2,202	$1,159	$1,286
2006	$1,908	$1,953	$3,152	$1,472	$1,706
2007	$1,921	$2,200	$3,427	$1,568	$1,784
2008	$2,005	$2,334	$3,760	$1,619	$1,860

Table C.4. Mean low-income residential energy expenditures per household by primary heating fuel in the West

(Nominal dollars)

Year	Natural gas	Propane	Fuel oil	Electricity	All
2001	$1,066	$1,640	N.A.	$715	$943
2006	$1,304	$2,149	N.A.	$839	$1,682
2007	$1,345	$2,334	N.A.	$884	$1,147
2008	$1,383	$2,529	N.A.	$918	$1,244

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