



United States Government Accountability Office
Washington, DC 20548

August 24, 2012

The Honorable Jeff Bingaman
Chairman
Committee on Energy and Natural Resources
United States Senate

The Honorable Jon Tester
United States Senate

Subject: Home Energy Assistance for Low-Income Occupants of Manufactured Homes

According to the Energy Information Administration (EIA),¹ the nation's approximately 130 million housing units account for about 23 percent of total energy consumption in the United States. Approximately 2 million of these housing units are manufactured homes (i.e., mobile homes) that were built prior to 1976, when new standards for energy efficient construction became effective.² These older manufactured homes are generally considered to have some of the poorest energy efficiency of all housing units. Many of the occupants of these homes qualify for federal assistance to help pay their energy bills through the U.S. Department of Health and Human Services' (HHS) Low Income Home Energy Assistance Program (LIHEAP). LIHEAP helps cover home energy expenditures— key components of which are home heating and, in some cases, cooling expenditures. In 2009, LIHEAP covered about 8.3 million low-income households through payments to homeowners, occupants, landlords, or others. LIHEAP is a federally funded block grant program in which funds are provided to grantees, including states, territories, and tribes and tribal

¹EIA in the U.S. Department of Energy collects, analyzes, and disseminates a wide range of information and data products covering energy production, stocks, demand, imports, exports, and prices. EIA then prepares analyses and special reports on topics of current interest.

²In 1976, as a result of the National Manufactured Home Construction and Safety Standards Act of 1974 (Pub. L. No. 93-383, as amended, 42 U.S.C. § 5401 *et seq.*), the U.S. Department of Housing and Urban Development (HUD) began to issue and enforce standards for the construction, design, performance and installation of manufactured homes to ensure that they were more energy efficient, among other things. Consistent with these standards, for the purposes of this report, we consider manufactured homes to include any home that is constructed, and then transported to a site where it is occupied as a permanent residence. These definitions are consistent with the federal building code administered by HUD and the definitions used by EIA to collect information on housing. These codes and definitions do not consider prefabricated structures that are assembled on site to be manufactured homes.

organizations, based on a number of factors, such as climate and income. Grantees then provide LIHEAP funds to eligible beneficiaries. To be eligible, household income must be below varying thresholds set by the federal government. In fiscal year 2012, Congress appropriated about \$3.5 billion for LIHEAP nationwide.

Questions have been raised about whether improving the energy efficiency of older manufactured homes or replacing them with newer, more energy-efficient models would save the federal government money by reducing LIHEAP costs. A portion of LIHEAP funds can be used to improve the energy efficiency of these homes but, in many cases, because of the ways these homes were built and their sometimes poor condition, improving their energy efficiency cannot be accomplished cost effectively. LIHEAP funds are statutorily prohibited from being used for new construction, which includes replacing existing homes.

You asked us to review available data on energy use by and LIHEAP assistance for occupants of manufactured homes—particularly those built before 1976. Our objectives for this report were to determine (1) the amount occupants of older manufactured homes paid for energy and how it compared with the amount paid by occupants of detached homes, (2) how the amount of LIHEAP assistance occupants of older manufactured homes received and the amount of their energy expenditures this assistance covered compared with such assistance received and expenditures covered for occupants of detached homes, and (3) the proportion of total LIHEAP funding used to assist occupants of older manufactured homes.³

To address these objectives, we analyzed the EIA Residential Energy Consumption Survey (RECS) data for 2005—the most recent year for which data were available.⁴ In addition, the 2005 RECS data were divided into manufactured homes, site-built detached homes, site-built attached homes, and apartments of any size.⁵ HHS signed an interagency agreement with EIA for use of the RECS data to match with state and local LIHEAP

³We also have ongoing work examining how some states or localities have leveraged private, state, local, and other funds to replace older manufactured homes with newer, more energy-efficient models and the extent to which doing so may result in cost savings. We expect to issue a separate report on these findings in early 2013.

⁴EIA administers RECS every 4 years to a nationally representative sample of housing units to collect energy characteristics on the housing unit, usage patterns, and household demographics. RECS seeks information primarily about primary residential housing units—excluding unoccupied housing and secondary housing units such as vacation homes—including questions about housing types and year of construction, as well as questions related to household income. Data on home energy expenditures includes heating and cooling bills from the following energy sources: electricity, natural gas, fuel oil, kerosene, propane, wood, coal, or solar.

⁵EIA defines detached homes as single-family houses as long as they are not divided into more than one housing unit and have an independent outside entrance. A single-family house is contained within walls extending from the basement (or the ground floor, if there is no basement) to the roof. Townhouses, rowhouses, and duplexes are considered single-family attached housing units as long as there is no household living above another one within the walls extending from the basement to the roof to separate the units.

beneficiaries.⁶ We used the resulting matched data to determine the average income, size, energy expenditures, as well as information on LIHEAP payments by housing type and year of construction. Because the sample size in RECS for households that received LIHEAP assistance was relatively small, estimates using these data should be considered a midpoint within a range rather than an exact estimate. To assess the reliability of the 2005 RECS data and the matched HHS data, we compared the data with other EIA documents, electronically tested the data for consistency, and discussed the data with knowledgeable EIA officials; we determined that the data were sufficiently reliable for the purposes of this report.⁷ We surveyed LIHEAP grantees—including all 50 states and the District of Columbia, 152 tribes and tribal organizations, and 5 U.S. territories—to determine the extent to which they collect data on LIHEAP recipients' housing types and years of construction.⁸ We received responses from 141 grantees—about a 68 percent response rate. In addition, we met with officials from HHS and EIA, as well as state officials from Maine and Montana—because these states have conducted pilot programs to replace older manufactured homes with newer, more energy-efficient models. We also interviewed officials from organizations and agencies that conduct research or represent the interests of LIHEAP officials and grantees, including the National Energy Assistance Directors' Association, National Consumer Law Center, NeighborWorks America, Apprise Inc., and the American Gas Association. A more detailed description of our objectives, scope, and methodology is provided in enclosure I.

We conducted this performance audit from November 2011 to August 2012 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

In summary, in 2005, the most recent year for which complete data were available, occupants of older manufactured homes paid over twice as much on average per square foot for energy—\$1.75 per square foot as compared with \$0.87—as was paid by occupants

⁶ According to HHS officials, the purpose of the administrative records matching initiative was to improve the quality of data for LIHEAP recipients, including the validity of the recipient's data, the quality of the information on the types and amount of LIHEAP assistance received, and information on both LIHEAP recipients and LIHEAP eligible nonrecipients.

⁷ For purposes of this report, we refer to these data as 2005 RECS data.

⁸The U.S. territories include American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands.

of detached homes.⁹ Annual energy expenditures for older manufactured homes—about 906 square feet on average—were about \$1,369, compared with detached homes—about 2,919 square feet on average—were about \$2,060. Energy expenditures—both per square foot and annually—varied significantly by region reflecting regional differences in the types and costs of fuels commonly used to heat and cool homes, income levels, and climate, among other things. In 2005, LIHEAP provided more assistance on a per square foot basis—about \$0.33 per square foot—to occupants of older manufactured homes than to those of detached homes—about \$0.20 per square foot. However, this assistance covers slightly less of the annual energy expenditures of occupants of older manufactured homes than occupants of detached homes—15 and 17 percent, respectively. Based on our analysis of EIA’s RECS data, we estimate that about 3 percent of LIHEAP funds—about \$57 million—spent in 2005 were used to assist occupants of older manufactured homes.

Background

A manufactured home is constructed almost entirely in a factory and transported to the site where it will be occupied, in contrast to a site-built home, which is constructed at the site where it will be occupied. Many manufactured homes are rectangular, wood-framed, aluminum-sided, single-story structures—commonly known as "mobile homes" or "house trailers"—built on a metal frame that can be placed on wheels or on the back of a commercial-grade truck and transported to sites where they are generally permanently installed. Camping or travel trailers—typically smaller structures that can be pulled by car or small truck—are another type of manufactured home but are generally designed to be temporary dwellings rather than permanent residences.

To implement the National Manufactured Housing Construction and Safety Standards Act of 1974, the Department of Housing and Urban Development (HUD) began to issue and enforce standards for the construction, design, performance, and installation of manufactured homes to ensure their quality, durability, affordability, and safety. HUD may enforce these standards directly, or they may be enforced at the state level. These standards preempt state and local laws that are not identical to the federal standards and apply to all manufactured homes produced after June 15, 1976.

Prior to 1976, there were few provisions for ensuring the safety or quality of manufactured homes. Many of these older homes were built with little or no insulation, thin walls and

⁹Due to significant size differences between older manufactured homes and detached homes, we calculated energy expenditures on a per square foot basis for purposes of comparison.

roofs, uninsulated heating and cooling systems, and inefficient louvered windows (known as jalousie windows). Further, over time many of these older manufactured homes have deteriorated to the point that their windows and doors no longer seal tightly to protect the interior from the weather. According to the Maine Housing Authority, which conducted a study in 2007 of pre-1976 manufactured homes, many of these older manufactured homes have depreciated to the point where they have no market value. In addition, housing and weatherization experts have stated that some pre-1976 manufactured homes may be unsuitable for weatherization (i.e., making long-term energy efficiency improvements). For example, these homes typically have roofs made of thin metal sheets seamed together and walls built with 2-inch by 2-inch studs; therefore, neither the ceilings nor the walls can accommodate insulation.¹⁰ In addition, most of these older manufactured homes are beyond the scope of federal and state weatherization programs;¹¹ that is, officials responsible for implementing these programs have generally determined that such homes are too deteriorated to warrant weatherization or are unsafe for weatherization crews to work on. Approximately 80 percent of older manufactured homes are in the South and West U.S. Census Regions as are approximately 84 percent of newer manufactured homes.¹² Figure 1 presents an example of a manufactured home that was built prior to 1976,

¹⁰Standards for homes built after 1976 require 2-inch by 6-inch wall studs.

¹¹DOE's Weatherization Assistance Program was created in 1976 under Title IV of the Energy Conservation and Production Act. By making long-term energy efficiency improvements, such as installing insulation, sealing leaks, and modernizing heating and air conditioning equipment, the weatherization program aims to, among other things, increase the energy efficiency of homes owned or occupied by low-income persons, reduce their total residential energy expenditures, improve their health and safety, and reduce the burden of energy prices. DOE makes weatherization program funds available through formula-based grants to agencies in the 50 states, the District of Columbia, U.S. territories, and American Indian tribes and tribal organizations.

¹² The U.S. Census Bureau divides the United States into four regions. Each region includes several states: Northeast Region (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania); Midwest Region (Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas); South Region (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, and Mississippi, Arkansas, Louisiana, Oklahoma, and Texas); and West Region (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii).

Figure 1: Pre-1976 Manufactured Home



Pre-1976 manufactured homes tend to have:

- thin walls with little or no insulation,
- inefficient louvered windows, and
- little or no market value.

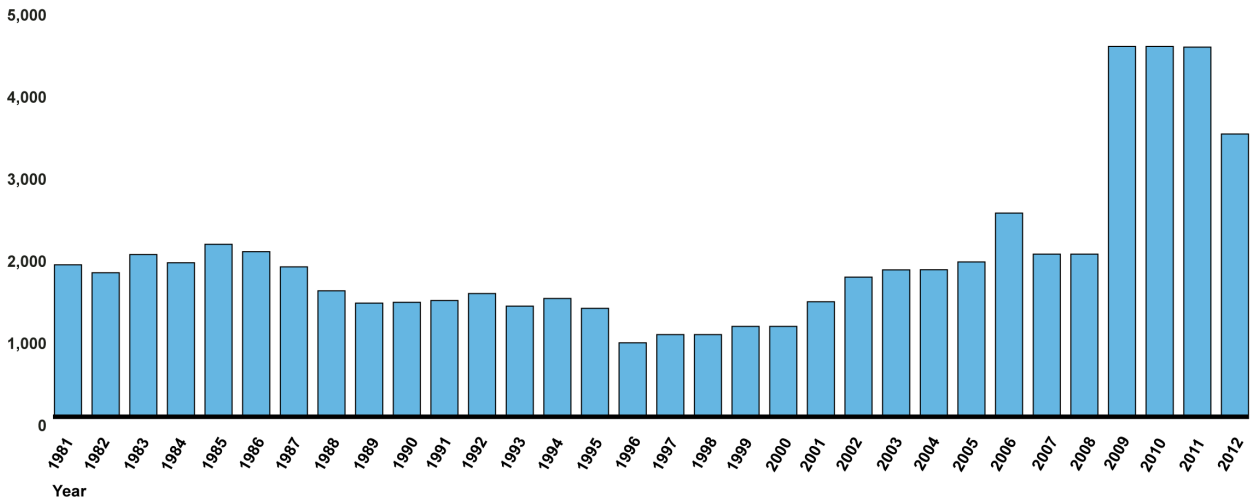
Source: Maine Housing Authority.

Title XXVI of the Omnibus Budget Reconciliation Act of 1981 established LIHEAP to help low-income households—particularly those with the lowest incomes that pay a high proportion of household income on home energy expenditures—pay their home heating and cooling costs.¹³ LIHEAP is a federal block grant program that provides funding grants to states and other entities that, in turn, provide the funds to eligible households. States, territories, and tribes and tribal organizations that wish to assist low-income households in meeting home energy expenditures may apply for a LIHEAP block grant. These grantees then provide payments on behalf of the eligible households directly to homeowners, occupants, landlords or others. Grantees provide LIHEAP assistance to eligible beneficiaries up to the maximum eligible payment for that beneficiary as determined by the grantee. Grant funds are distributed in this manner until the grantees' annual funding has been entirely expended or the fiscal year has ended. LIHEAP funding, adjusted for inflation, was highest from 1981-1986 and from 2009-2011, witnessing a decline in real terms in the years in between (see fig. 2). For 2012, LIHEAP allocated to state grantees funding that ranged from about \$6.1 million, for Hawaii, to about \$375.5 million, for New York. For 2012, LIHEAP allocated to U.S. territory grantees funding that ranged from about \$58.7 thousand, for the Northern Mariana Islands, to about \$4.2 million, for Puerto Rico and for all tribes and tribal organizations funding of about \$38.4 million. Enclosure II includes detailed LIHEAP funding by state, territory, and tribes or tribal organizations for 2012.

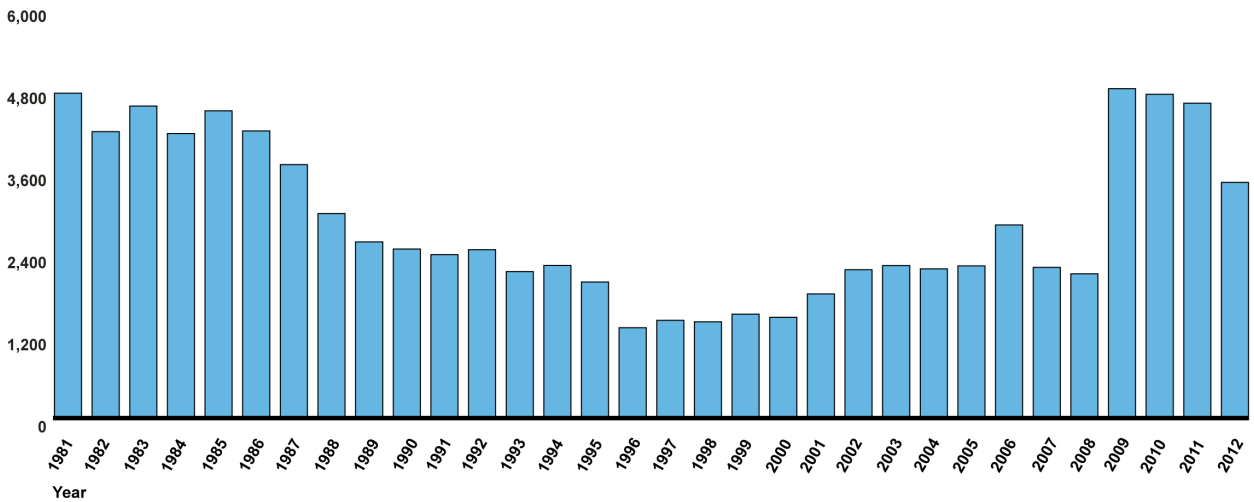
¹³Pub. L. No. 97-35, 95 Stat. 357 (1981).

Figure 2: LIHEAP Funding History

LIHEAP funding (dollars in millions)



LIHEAP funding (dollars in millions, adjusted to 2012 dollars)



Source: GAO analysis of HHS data.

LIHEAP statutes establish overall LIHEAP guidelines, within which each grantee operates its own program. For example, HHS guidelines specify that a LIHEAP-eligible household’s income generally must not exceed the greater of 150 percent of the poverty level or 60 percent of the state’s median income. These guidelines also stipulate that LIHEAP grantees may not set their maximum income threshold for applicants below 110 percent of the poverty level, but they may give priority to those households with the highest home energy expenditures or needs in relation to income. LIHEAP grantees may set additional criteria for allocating LIHEAP funding to recipients. For example, they may give priority to households with vulnerable occupants, which HHS defines as those who are at least 60 years old, disabled, or 5 years old or younger.

LIHEAP does not require grantees to match federal funds, but some grantees choose to supplement funds. Grantees also have the flexibility to use up to 15 percent of their LIHEAP funds—or up to 25 percent under certain circumstances—for state weatherization programs that provide funds to improve home energy efficiency, typically by upgrading insulation and heating and cooling equipment.¹⁴ However, both LIHEAP and the weatherization funds are precluded from being used for new construction, which would also preclude replacing existing homes with newer, more efficient models.

Occupants of Older Manufactured Homes Paid More Than Twice as Much per Square Foot for Energy than Occupants of Detached Homes in 2005

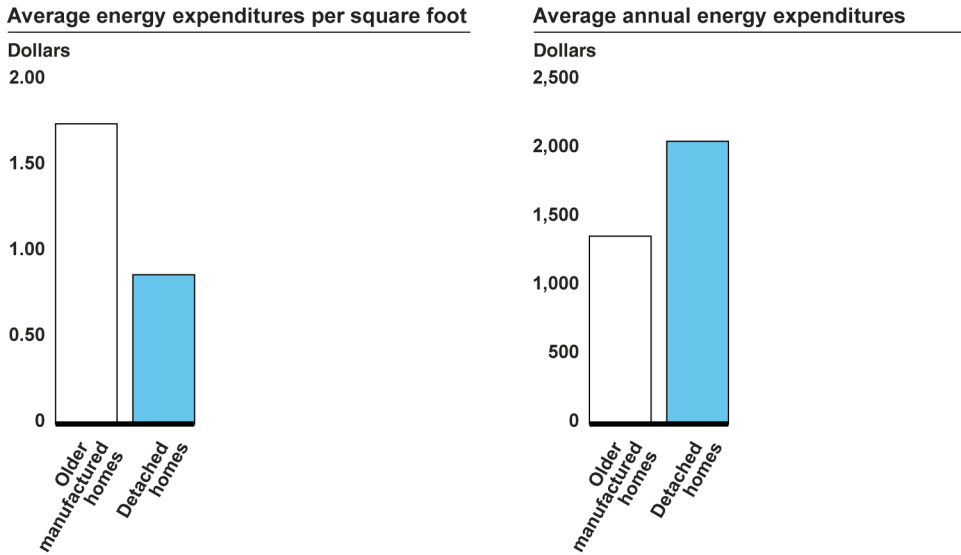
In 2005, the most recent year for which complete data were available, occupants of older manufactured homes paid, on average, more than twice as much for energy per square foot than did occupants of detached homes.¹⁵ Specifically, according to our analysis of EIA's 2005 RECS data, annual energy expenditures for older manufactured homes averaged about \$1.75 per square foot compared to \$0.87 for detached homes. However, because manufactured homes tend to be smaller than detached homes, these differences do not necessarily translate to higher annual energy expenditures. Based on the 2005 RECS data, we estimated that annual energy expenditures for an older manufactured home were \$1,369 per year, with energy expenditures ranging from \$353 to \$4,659. The average size of these homes was about 906 square feet. In contrast, average annual energy expenditures for detached homes were about \$2,060 per year, with energy expenditures ranging from \$57 to \$10,346.¹⁶ The average size of these homes was about 2,919 square feet. Figure 3 compares the average energy expenditures per square foot and annually for older manufactured and detached homes. Additional information on energy expenditures and home size by housing type—including apartments and attached homes—as well as by year of construction can be found in tables 4 and 5 in enclosure III.

¹⁴HHS evaluates states' requests to use up to 25 percent of LIHEAP funds for weatherization programs.

¹⁵Due to significant size differences between older manufactured homes and detached homes, we calculated energy expenditures on a per square foot basis for purposes of comparison.

¹⁶These averages were separately derived from the 2005 RECS database. There is a direct relationship between energy expenditures and household square footage. As such, the ratio of these averages (average energy expenditures divided by average square footage) will not equal the average of their ratio (average of the ratio of energy expenditures to square footage).

Figure 3: Average Energy Expenditures per Square Foot and Annually for Older Manufactured Homes and Detached Homes, 2005



Source: GAO analysis of EIA's RECS data.

We also analyzed energy expenditures for occupants of all housing types by the nine U.S. Census divisions and found that the average energy expenditures per square foot ranged from about \$0.92 in the East North Central Division (Ohio, Indiana, Illinois, Michigan, and Wisconsin) to about \$1.45 in the New England Division (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut).¹⁷ Average annual energy expenditures ranged from \$1,421 in the Pacific Division (Washington, Oregon, California, Alaska, and Hawaii) to \$2,428 in the New England Division (see table 1). These differences in energy expenditures reflect a number of factors including regional differences in the type and costs of fuels commonly used to heat and cool homes, income levels, and climate.

¹⁷EIA calculates energy expenditures per square foot using a different method than we used in our analysis. However, EIA acknowledged that both methods are valid, and our method is appropriate for our analysis.

Table 1: Average Energy Expenditures and Home Size for Occupants of All Housing Types by U. S. Census Division, 2005

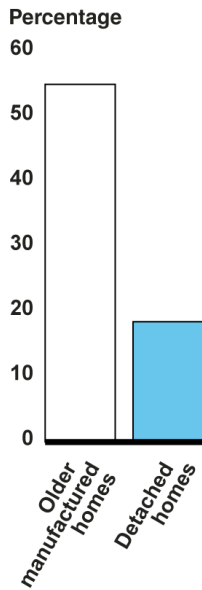
U.S. Census division	Average energy expenditures per square foot (in dollars)	Average annual energy expenditures (in dollars)	Average home size (in square feet)
New England	\$1.45	\$2,428	2,529
Middle Atlantic	1.44	2,279	2,376
East North Central	0.92	1,808	2,628
West North Central	0.93	1,735	2,424
South Atlantic	0.99	1,704	2,370
East South Central	0.98	1,674	2,254
West South Central	1.17	1,903	2,184
Mountain	1.01	1,644	2,149
Pacific	\$0.95	\$1,421	1,878

Source: GAO analysis of EIA’s RECS data.

Note: The U.S. Census Bureau divides the United States into nine divisions. Each division includes several states: New England Division (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut); Middle Atlantic Division (New York, New Jersey, and Pennsylvania); East North Central Division (Ohio, Indiana, Illinois, Michigan, and Wisconsin); West North Central Division (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas); South Atlantic Division (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida); East South Central Division (Kentucky, Tennessee, Alabama, and Mississippi); West South Central Division (Arkansas, Louisiana, Oklahoma, and Texas); Mountain Division (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada); Pacific Division (Washington, Oregon, California, Alaska, and Hawaii). U. S. Census divisions differ from the four U. S. Census regions.

In addition, we analyzed RECS data to determine how many occupants have incomes below 150 percent of states’ varying poverty levels—one of the thresholds for qualifying for LIHEAP assistance—by housing type. We found that, in 2005, about 55.0 percent of occupants living in older manufactured homes had incomes that met this threshold, and about 18.5 percent of occupants living in detached homes met it (see fig. 4). Additional information on occupants whose incomes were below this threshold by housing type and year of construction can be found in table 7 in enclosure III.

Figure 4: Percentage of Occupants with Incomes below 150 Percent of the Poverty Level by Housing Type, 2005



Source: GAO analysis of EIA's RECS data.

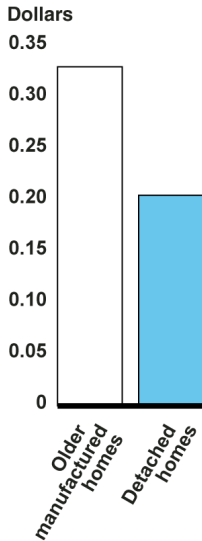
LIHEAP Provided More Assistance per Square Foot to Occupants of Older Manufactured Homes Than to Occupants of Detached Homes in 2005

In 2005, LIHEAP provided more assistance per square foot to occupants of older manufactured homes than to occupants of detached homes, but this assistance covered slightly less of the annual energy expenditures for occupants of older manufactured homes as compared with occupants of detached homes. However, LIHEAP assistance provided less annual support for occupants living in older manufactured homes than for those living in detached homes, in part, because these manufactured homes are smaller. Specifically, occupants of older manufactured homes received about \$0.33 per square foot in LIHEAP assistance, or about \$214 per year, covering about 15 percent of their annual energy expenditures. In contrast, occupants of detached homes received about \$0.20 per square foot in LIHEAP assistance, or about \$345 per year, which covered about 17 percent of their annual energy expenditures.¹⁸ The range of LIHEAP assistance for older manufactured homes was \$0.10 to \$1.55 per square foot, or \$60 to \$776 annually. The range of LIHEAP assistance for detached homes was \$0.01 to \$1.43 per square foot, or \$14 to \$975 annually.

¹⁸Average LIHEAP payments per square foot were derived by dividing each individual household's LIHEAP payment by its square footage then averaging the result. This will yield a different result from dividing the average LIHEAP payment for all households by the average total square footage because LIHEAP payments and square footage are related to each other.

Figure 5 shows average LIHEAP assistance per square foot by type of home. Additional information about energy expenditures and LIHEAP assistance by housing type and year of construction, including information on housing size, can be found in table 8 in enclosure III.

Figure 5: Average LIHEAP Assistance per Square Foot, 2005



Source: GAO analysis of EIA's RECS data.

LIHEAP assistance also varied across U.S. Census divisions in 2005. For instance, LIHEAP assistance per square foot ranged from about \$0.16 in the Middle Atlantic Division (New York, New Jersey, and Pennsylvania) to \$0.42 in the New England Division, or \$262 and \$476 total LIHEAP assistance per year, respectively (see table 2). Such variations can result from a number of different factors including climate, the ways various states implement their block grant programs, and differences in the types and costs of fuel used to heat and cool homes.

Table 2: Average LIHEAP Assistance for Occupants of All Housing Types by U.S. Census Division, 2005

U.S. Census division	Average LIHEAP assistance as a percentage of total energy expenditures	Average LIHEAP assistance per square foot (in dollars)	Average annual LIHEAP assistance (in dollars)
New England	25.26	\$0.42	\$476
Middle Atlantic	15.19	0.16	262
East North Central	18.62	0.22	296
West North Central	21.48	0.24	285
South Atlantic	^a	0.21	250
East South Central	16.84	0.17	192
West South Central	^a	^a	526
Mountain	^a	0.21	285
Pacific	29.72	\$0.35	\$231

Source: GAO analysis of EIA’s RECS data.

Note: The U.S. Census Bureau divides the United States into nine divisions. Each division includes several states: New England Division (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut); Middle Atlantic Division (New York, New Jersey, and Pennsylvania); East North Central Division (Ohio, Indiana, Illinois, Michigan, and Wisconsin); West North Central Division (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas); South Atlantic Division (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida); East South Central Division (Kentucky, Tennessee, Alabama, and Mississippi); West South Central Division (Arkansas, Louisiana, Oklahoma, and Texas); Mountain Division (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada); Pacific Division (Washington, Oregon, California, Alaska, and Hawaii). U. S. Census divisions differ from the four U. S. Census regions.

^aCalculated value is not reliable because either (1) the relative standard error was less than 2, or (2) the number of observations used to calculate the mean estimate was less than 10.

About 3 Percent of LIHEAP Funds in 2005 Were Used to Assist Occupants of Older Manufactured Homes

We estimate that about 3 percent of LIHEAP funds—about \$55 million—in 2005 were used to assist occupants of older manufactured homes, even though older manufactured homes represented about 1.7 percent of the primary, occupied housing units in the United States.¹⁹ The data and methodology used by EIA in RECS limit our ability to definitively determine certain aspects of the LIHEAP assistance occupants of older manufactured homes received.²⁰ However, it appears that occupants of older manufactured homes were more likely to receive LIHEAP assistance than occupants of detached homes, since they received

¹⁹We developed this estimate using 2005 RECS data because HHS and LIHEAP grantees do not routinely collect data that would allow us to determine the percentage of LIHEAP funding annually used to help occupants of older manufactured homes. We derived the \$55 million by multiplying the portion of LIHEAP funds spent in 2005 to assist occupants of older manufactured homes— about 3 percent—by the \$1.88 billion in total distributed LIHEAP funds in fiscal year 2005.

²⁰The sample size for households that received LIHEAP assistance was too small to provide reliable estimates to project to some subcategories such as housing types and year of construction. For more details, see enclosure I.

a disproportionate share of the assistance relative to the share of the universe of housing stock, even though they generally received smaller payments.

Because LIHEAP is a federal block grant program focused on assisting low-income households, HHS collects data from LIHEAP grantees on the number of households receiving assistance, their income, and the number of their households with vulnerable occupants;²¹ however, it does not require grantees to collect information on LIHEAP recipients' housing type or year of construction. As a result, we surveyed grantees (i.e., 50 states and the District of Columbia, 152 tribes and tribal organizations, and 5 U.S. territories) to identify how many collected information on housing type and year of construction from LIHEAP recipients. Of the 141 grantees that responded to our survey of state and tribal grantees, we found that 7 grantees collect this information. In the absence of detailed information from HHS or LIHEAP grantees, we developed an estimate of the percentage of LIHEAP funding provided to occupants of older manufactured homes based on an analysis that HHS undertook that matched 2005 RECS data with LIHEAP recipient rolls. For the 2009 RECS survey—expected to be released later this year—EIA has worked with HHS to incorporate questions related to improving the data available regarding low-income housing units.

Agency Comments

We provided a draft of this report for review and comment to HHS. HHS provided technical and clarifying comments, which we incorporated as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Health and Human Services, the Secretary of Energy, and other interested parties. In addition, this report is available at no charge on the GAO website at <http://www.gao.gov>.

²¹HHS defines vulnerable occupants as an occupant who is 60 year old or older, disabled, or 5 years old or younger. LIHEAP requires states to report these data on these occupants annually.

If you or your staff members have any questions about this report, please contact me at (202) 512-3841 or ruscof@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in enclosure IV.

A handwritten signature in black ink that reads "Frank Rusco". The signature is written in a cursive style with a long horizontal stroke extending to the right.

Frank Rusco
Director, Natural Resources and Environment

Enclosures

Enclosure I: Objectives, Scope, and Methodology

This report examines energy expenditures and Low Income Home Energy Assistance Program (LIHEAP) assistance for occupants of manufactured homes—particularly those built before 1976—and detached homes. Our objectives for this report were to determine (1) the amount occupants of older manufactured homes paid for energy and how it compared with the amount paid by occupants of detached homes, (2) how the amount of LIHEAP assistance occupants of older manufactured homes received and the amount of their energy expenditures this assistance covered compared with such assistance received and expenditures covered for occupants of detached homes, and (3) the proportion of total LIHEAP funding used to assist occupants of older manufactured homes.²²

In conducting our work, we reviewed relevant laws including Title XXVI of the Omnibus Budget Reconciliation Act of 1981 and the National Manufactured Home Construction and Safety Standards Act of 1974. We also reviewed Health and Human Services' (HHS) reports to Congress and LIHEAP Home Energy Notebooks.²³ We met with officials from HHS, the Department of Energy's Energy Information Administration (EIA),²⁴ and the LIHEAP Clearinghouse—an aggregator of LIHEAP data. We also met with state officials from the states of Maine and Montana because these states have conducted pilot programs to replace pre-1976 manufactured homes with newer, more energy-efficient models. In addition, we interviewed officials from organizations and agencies that conduct research or represent the interests of LIHEAP officials and grantees including the National Energy Assistance Directors' Association, National Consumer Law Center, NeighborWorks America, Apprise Inc., and the American Gas Association.

²²We also are doing ongoing work examining how some states or localities have leveraged private, state, local, and other funds to replace older manufactured homes with newer, more energy-efficient models and the extent to which doing so may result in cost savings. We expect to issue a separate report on these findings in early 2013.

²³HHS publishes the LIHEAP Home Energy Notebook, as a supplement to their report to Congress. This publication provides LIHEAP grantees and other interested parties the most recent data on home energy usage, consumption, and expenditures for all, low income, non-low income, and LIHEAP recipient households.

²⁴EIA collects, analyzes, and disseminates a wide range of information and data products covering energy production, stocks, demand, imports, exports, and price; and prepares analyses and special reports on topics of current interest.

To determine how much occupants of older manufactured homes pay for energy and the proportion of LIHEAP funding used to assist occupants of older manufactured homes, we analyzed data from EIA's Residential Energy Consumption Survey (RECS) from 2005, which was the most recent year for which complete data were available.²⁵ RECS is conducted periodically from a random sample of primary, occupied housing units in the United States. The "Household Survey" phase of the 2005 RECS was conducted in late 2005. EIA supplemented its 2005 RECS data with data from a separate RECS "Energy Supplier Survey," conducted in 2006, which collected energy expenditure data from responding households. The RECS data on the year homes were built are available in 10-year increments; therefore, we relied on RECS data from 1979 and before as a proxy for pre-1976 housing in our analysis of older manufactured homes. Because manufactured homes built from 1977 through 1979 were subject to higher energy efficiency standards than were pre-1976 manufactured homes, the inclusion of data on homes built in these 3 years likely creates a downward bias in our estimates of energy expenditures of pre-1976 manufactured homes. However, because the stock of pre-1976 manufactured homes is large relative to the inclusion of homes built in these 3 years, this bias is likely small. In addition, the 2005 RECS data were divided into manufactured homes, site-built detached single-family homes (detached homes), site-built attached single-family homes (attached homes), and apartments of any size.²⁶

For the 2005 RECS, EIA interviewed a sample of occupants of homes in the United States and asked respondents questions about housing unit types, year of construction, and household income, among other things. These occupants were selected using a nationwide random sample. HHS signed an interagency agreement with EIA for use of the RECS data to match with state and local LIHEAP beneficiaries. According to HHS officials, the purpose of the administrative records matching initiative was to improve the quality of data for LIHEAP recipients, including

- validity of the recipient's data,
- quality of the information on the types and amount of LIHEAP assistance received, and
- information on both LIHEAP recipients and LIHEAP eligible nonrecipients.

²⁵EIA administers RECS to a nationally representative sample of housing units to collect energy characteristics on the housing unit, usage patterns, and household demographics. RECS includes questions about housing unit types and year of construction, as well as questions related to household income.

²⁶Detached homes are considered single-family houses as long as they are not divided into more than one housing unit and have an independent outside entrance. A single-family house is contained within walls extending from the basement (or the ground floor, if there is no basement) to the roof. Townhouses, rowhouses, and duplexes are considered single-family attached housing units, as long as there is no household living above another one within the walls extending from the basement to the roof to separate the units.

We used the resulting matched data to determine the average income, size, and energy expenditures, as well as information on LIHEAP payments by housing type and year of construction. The 2005 RECS uses a complex sampling design which, after applying weights to the observations, allowed us to project to all households. However, the sample size for households that received LIHEAP assistance was 434—a relatively small sample size, particularly when these data are divided into categories such as housing types and year of construction. Although the sample sizes were too small to provide reliable results for us to project to a few subcategories, the data for LIHEAP recipients of manufactured homes built in 1979 and before were reliable; but due to their small sizes, we have primarily drawn broad aggregative conclusions about this subcategory. Because of the relatively small sample size, in cases where we examine characteristics of LIHEAP recipients, our estimates may have a higher standard error and should therefore be considered a midpoint within a range rather than an exact estimate of the actual value. In general, we present only those estimates for all housing classifications that meet EIA’s criteria for reporting an estimate using the 2005 RECS data. Specifically, these criteria are: (1) that the mean of each variable divided by its standard error is at least 2 and (2) the number of observations used to calculate the mean estimate should be at least 10. We used these criteria to determine the reliability of our calculations. To assess the reliability of the 2005 RECS data and the matched HHS data, we compared the data with other EIA documents, electronically tested the data for consistency, and discussed the data with knowledgeable EIA officials. Overall, we determined that these data were sufficiently reliable for the purposes of this report.

To determine the proportion of LIHEAP funding used to assist occupants of older manufactured homes, we used the matched HHS data. Since the results were very broad aggregative estimates, we also surveyed LIHEAP grantees—including all 50 states and the District of Columbia, 152 tribes and tribal organizations, and 5 U.S. territories—to determine the extent to which they collect data on LIHEAP recipients’ housing types and years of construction.²⁷ To ensure the reliability and validity of the questions, we pretested the survey with two state officials. We received responses from 141 grantees including 49 states, the District of Columbia, 86 tribes and tribal organizations, and all 5 U.S. territories,²⁸—about a

²⁷The U.S. territories include American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands.

²⁸Louisiana declined to respond to our survey, citing resource constraints.

68 percent response rate. However, HHS and LIHEAP grantees did not routinely collect data that would allow us to determine the percentage of LIHEAP funding annually used to help occupants of older manufactured homes; therefore, we derived our estimate by multiplying the portion of LIHEAP funds spent in 2005 to assist occupants of older manufactured homes— about 3 percent—by the \$1.88 billion in total distributed LIHEAP funds in fiscal year 2005.

We conducted this performance audit from November 2011 to August 2012 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Enclosure II: LIHEAP Funding Allocations by State, Territory, and Tribe and Tribal Organization, 2012

States	Total LIHEAP allocations (in dollars)^a
Alabama	\$47,081,144
Alaska	10,641,099
Arizona	21,904,148
Arkansas	28,537,364
California	153,259,035
Colorado	47,308,286
Connecticut	79,531,964
Delaware	11,956,809
District of Columbia	10,687,141
Florida	78,019,715
Georgia	61,702,366
Hawaii	6,107,011
Idaho	19,577,889
Illinois	185,683,819
Indiana	79,998,845
Iowa	54,812,821
Kansas	32,118,334
Kentucky	46,423,070
Louisiana	43,421,576
Maine	38,520,365
Maryland	69,790,309
Massachusetts	132,678,036
Michigan	172,428,540
Minnesota	116,838,721
Mississippi	31,530,677
Missouri	68,231,128
Montana	19,915,857
Nebraska	30,207,576
Nevada	11,202,561
New Hampshire	26,055,007
New Jersey	136,745,901
New Mexico	15,715,158
New York	375,509,667
North Carolina	81,534,565
North Dakota	20,554,636
Ohio	165,463,488
Oklahoma	32,787,515
Oregon	36,012,085
Pennsylvania	209,548,185
Rhode Island	23,175,439
South Carolina	36,269,889
South Dakota	17,507,368
Tennessee	55,405,327
Texas	129,832,056
Utah	24,100,402

Vermont	19,529,156
Virginia	80,436,332
Washington	57,967,554
West Virginia	29,699,517
Wisconsin	105,171,626
Wyoming	9,501,674
Total LIHEAP funding allocations to states	\$3,398,638,753
Total LIHEAP funding allocations to tribes and tribal organizations	\$38,428,998
Territories	
American Samoa	\$77,107
Guam	169,052
Northern Marianas	58,717
Puerto Rico	4,196,331
Virgin Islands	159,857
Total LIHEAP funding allocations to U.S. territories	\$4,661,064
Total LIHEAP funding	\$3,471,672,115

Source: LIHEAP Clearinghouse.

^a This total does not include rescission that was retained by HHS for training and technical assistance, as well as various grants distributed during the year.

Enclosure III: Energy Expenditures and LIHEAP Assistance for Manufactured, Detached, Attached and Apartment Homes

This enclosure provides information on energy expenditures and LIHEAP assistance to supplement the data represented in figures and tables in the report.²⁹ Table 3 provides energy expenditures and home size for occupants of all types of housing, including homes whose occupants who did not receive LIHEAP assistance. Tables 4 and 5 provide energy expenditures by housing types, year of construction, and size. Table 6 provides LIHEAP assistance by housing types and year of construction. Table 7 provides the percentage of occupants with incomes below 150 percent of the poverty level by housing types and year of construction. Table 8 provides LIHEAP recipients' energy expenditures and amounts of LIHEAP assistance for occupants of manufactured, detached, attached, and apartment homes, as well as home size. Table 9 provides energy expenditures and LIHEAP assistance by rural and nonrural areas. Table 10 provides average LIHEAP assistance for recipients for various income ranges.

Table 3: Average Energy Expenditures and Home Size for Occupants of All Types of Housing, 2005

Occupants	Average energy expenditures per square foot	Average annual energy expenditures	Average home size (in square feet)
That received LIHEAP assistance	\$1.43	\$1,756	1,671
That did not receive LIHEAP assistance	\$1.06	\$1,812	2,324

Source: GAO analysis of EIA's RECS data.

²⁹According to EIA, energy expenditures consist of money spent for the energy used in, or delivered to, a housing unit during a given period of time. For the RECS tables and analyses, all expenditure statistics are presented on an annual basis. The total dollar amount includes state and local taxes but excludes merchandise, repairs, or special service charges. Electricity and natural gas expenditures are for the amount of those energy sources consumed. Fuel oil, kerosene, and liquefied petroleum gas expenditures are for the amount of fuel purchased, which may differ from the amount of fuel consumed. For households that do not pay their fuel supplier directly, the expenditures for fuels are estimated.

Table 4: Average Energy Expenditures and Home Size for All Occupants of Manufactured, Detached, Attached, Apartments and All Homes by Year of Construction, 2005

Types of homes and year of construction		Average energy expenditures per square foot (in dollars)	Average annual energy expenditures (in dollars)	Average home size (in square feet)
Manufactured homes	Built 1979 and before	\$1.75	\$1,369	906
	Built after 1979	1.54	1,583	1,158
Detached homes	Built 1979 and before	0.92	1,996	2,631
	Built after 1979	0.79	2,161	3,372
Attached homes	Built 1979 and before	1.11	1,690	1,978
	Built after 1979	0.84	1,482	2,182
Apartments	Built 1979 and before	1.71	1,339	929
	Built after 1979	1.27	1,053	943
All homes	Built 1979 and before	1.14	1,802	2,133
	Built after 1979	\$0.97	\$1,822	2,562

Source: GAO analysis of EIA's RECS data.

Table 5: Average Energy Expenditures and Home Size for Occupants of Manufactured, Detached, Attached, Apartments for Homes of Any Age, 2005

Types of homes	Average energy expenditures per square foot (in dollars)	Average annual energy expenditures (in dollars)	Average home size (in square feet)
All types of homes	\$1.07	\$1,810	2,307
Manufactured homes	1.62	1,501	1,062
Detached homes	0.87	2,060	2,919
Attached homes	0.99	1,598	2,069
Apartments	\$1.54	\$1,228	935

Source: GAO analysis of EIA's RECS data.

Table 6: Average LIHEAP Assistance by LIHEAP Recipients' Type of Home and Year of Construction, 2005

	Average LIHEAP assistance (% energy expenditures)	Average LIHEAP assistance per square foot (in dollars)	Average annual LIHEAP assistance (in dollars)
All types of homes	21.89	\$0.26	\$302
Manufactured homes	^a	^a	329
Detached homes	20.50	0.20	345
Attached homes	20.57	0.18	306
Apartments	23.74	0.32	230
All homes built in 1979 or before	20.43	0.24	300
All homes built after 1979	26.03	\$0.30	\$307

Source: GAO analysis of EIA's RECS data.

^aCalculated value is not reliable because either (1) the relative standard error was less than 2, or (2) the number of observations used to calculate the mean estimate was less than 10.

Table 7: Percentage of Occupants with Income below 150 Percent of the Poverty Level by Housing Type and Year of Construction, 2005

Types of homes	Percentage of occupants below poverty threshold
Manufactured homes	
Built in 1979 and before	55.0
Built after 1979	42.0
All	47.0
Detached homes	
Built in 1979 and before	23.5
Built after 1979	10.6
All	18.5
Attached homes	
Built in 1979 and before	38.7
Built after 1979	22.5
All	31.6
Apartments	
Built in 1979 and before	45.5
Built after 1979	39.4
All	39.4

Source: GAO analysis of EIA's RECS data.

Table 8: Average Energy Expenditures, Home Size, and Assistance for LIHEAP Recipients in Manufactured, Detached, Attached, and Apartment Homes, 2005

		Average energy expenditures per square foot (in dollars)	Average annual energy expenditures (in dollars)	Average home size (in square feet)	Average LIHEAP assistance (% energy expenditures)	Average LIHEAP assistance per square foot (in dollars)	Average annual LIHEAP assistance (in dollars)
Manufactured homes	All	\$1.97	\$1,708	946	^a	^a	\$329
	Built in 1979 and before	2.02	1,386	710	19.60	\$0.33	214
Detached homes	All	1.09	2,020	2,311	20.50	0.20	345
Attached homes	All	0.97	1,723	2,046	20.57	0.18	306
Apartments	All	1.96	1,415	818	23.74	0.32	230
All homes	Built in 1979 and before	1.44	1,831	1,757	20.43	0.24	300
	Built after 1979	\$1.39	\$1,541	1,428	26.03	\$0.30	\$307

Source: GAO analysis of EIA's RECS data

^aCalculated value is not reliable because either (1) the relative standard error was less than 2, or (2) the number of observations used to calculate the mean estimate was less than 10.

Table 9: Average Energy Expenditures, Home Size, and Assistance for LIHEAP Recipients in All Housing Types in Rural and Nonrural Areas, 2005

	Average energy expenditures per square foot (in dollars)	Average annual energy expenditures (in dollars)	Average home size (in square feet)	Average LIHEAP assistance (% energy expenditures)	Average LIHEAP assistance per square foot (in dollars)	Average annual LIHEAP assistance (in dollars)
Rural	\$1.07	\$1,761	2,235	20.56	\$0.24	\$288
Non-rural	\$1.07	\$2,005	2,595	^a	^a	\$376

Source: GAO analysis of EIA's RECS data.

Note: The U.S. Census Bureau defines homes as rural if they are located outside of core census block groups or blocks that have a population density of at least 1,000 people per square mile and surrounding census blocks that have an overall density of at least 500 people per square mile. However, 2005 RECS figures on rural and nonrural homes are based on respondents reporting whether they live in a rural or nonrural area on the survey.

^aCalculated value is not reliable because either (1) the mean of each variable divided by its standard error was less than 2, or (2) the number of observations used to calculate the mean estimate was less than 10.

Table 10: Average Annual LIHEAP Assistance by Annual Household Income Ranges, 2005

Annual income ranges	Average annual LIHEAP assistance (in dollars)
Less than \$5,000	\$298
\$5,000 to \$7,499	250
\$7,500 to \$9,999	318
\$10,000 to \$14,999	262
\$15,000 to \$19,999	364
\$20,000 to \$24,999	310
\$25,000 to \$29,999	301
\$30,000 to \$34,999	382
\$35,000 or more	\$314

Source: GAO analysis of EIA's RECS data.

Enclosure IV: GAO Contact and Staff Acknowledgments

GAO Contact

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Staff Acknowledgments

In addition to the individual named above, key contributors to this report were Jon Ludwigson, Assistant Director; Michael Kendix; Alison O'Neill; Kelly Rubin; James W. Turkett; and Jarrod West. Important assistance was also provided by Jonathan Kucskar, Armetha Liles, and Christine San.

(361352)

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