

Energy Poverty in Arizona

Final Report

Prepared for NLIEC

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Executive Summary

Since its founding, the National Low Income Energy Consortium (NLIEC) has furthered its mission of reducing home energy poverty through information development and dissemination, partnership building, training and technical assistance, and the promotion of effective solutions to energy hardships, using its annual conferences as the hub. However, more recently, NLIEC has also produced information that enhances knowledge and casts public attention upon the low-income residential energy issues and hardships facing the particular region in which the annual conference is held.

In 2005, NLIEC asked APPRISE, a nonprofit policy research firm in Princeton New Jersey, to conduct an analysis of energy poverty throughout Arizona, in the Phoenix Metropolitan Area, and in specific Phoenix-area neighborhoods. A preliminary report was released and presented at the 19th Annual National Low Income Energy Conference held from June 13 to June 16 in Phoenix. This document represents the final "Energy Poverty In Arizona" report.

Report Goals

We developed this report with the following goals:

- Assess the energy needs of low-income households in Arizona and furnish state and area-specific statistics to Arizona decision makers and program managers.
- Provide all interested parties with information regarding publicly available data, how the data can be used to produce valuable information, and where to find the data.

This report presents some examples of the broad array of information that can be developed related to the energy needs of low-income households using publicly available data sources. Moreover, the analyses presented here provide constructive information about the needs and characteristics of low-income households in the United States, Arizona, the Phoenix Metropolitan Area, and the Phoenix-area neighborhoods of Guadalupe and Westwood.

State-Level Findings

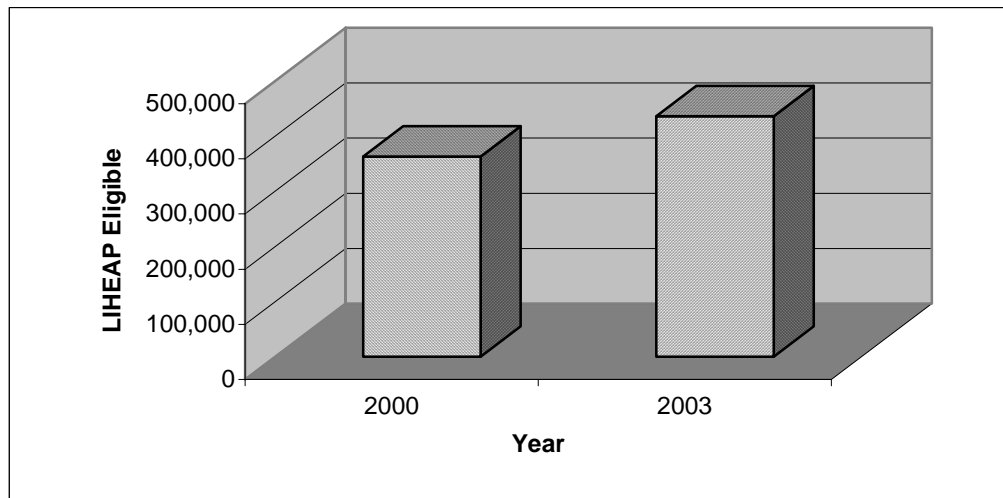
Key findings from the state-level analysis of Arizona data are presented below:

- The number of households eligible¹ for the Low Income Home Energy Assistance Program (LIHEAP) in Arizona grew substantially between 2000 and 2003.
- Low-income households pay a large share of their income for residential energy costs.
- Current funding for LIHEAP and other energy assistance programs in Arizona is not sufficient to meet the substantial energy needs of Arizona's growing low-income population.

¹ Throughout this report, LIHEAP-eligible households refers to LIHEAP income-eligible households.

As shown in Figure ES-1, the state-level findings demonstrate that the number of LIHEAP-eligible households in Arizona (those with income at or below 150 percent of the Federal Poverty Level) rose by 73,000 households – from 362,800 in 2000 to 436,000 in 2003.

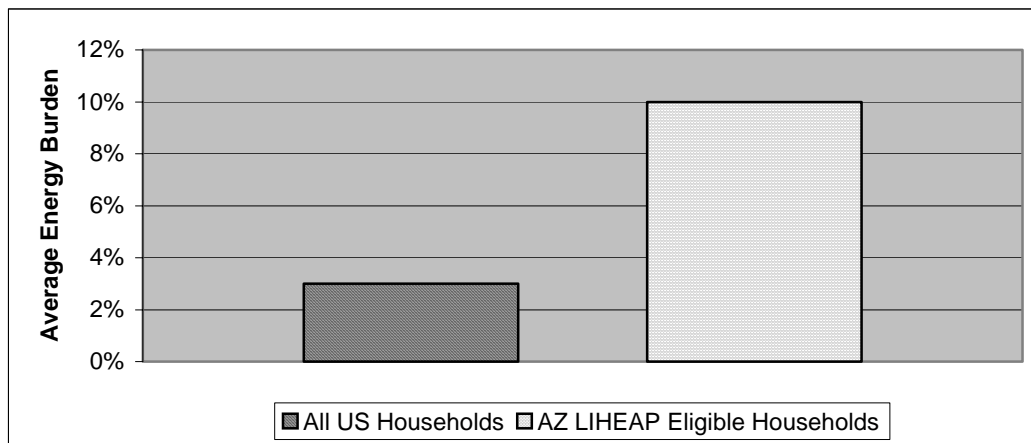
Figure ES-1
Growth in LIHEAP-Eligible Households, 2000 to 2003



Source: 2000 Decennial Census PUMS 5 Percent Sample.
Source: Three-Year Average of the CPS ASEC 2002-2004.

Arizona LIHEAP-eligible households spend, on average, 10 percent of their income on residential energy, which is significantly higher than the 3 percent median energy burden for all United States households.

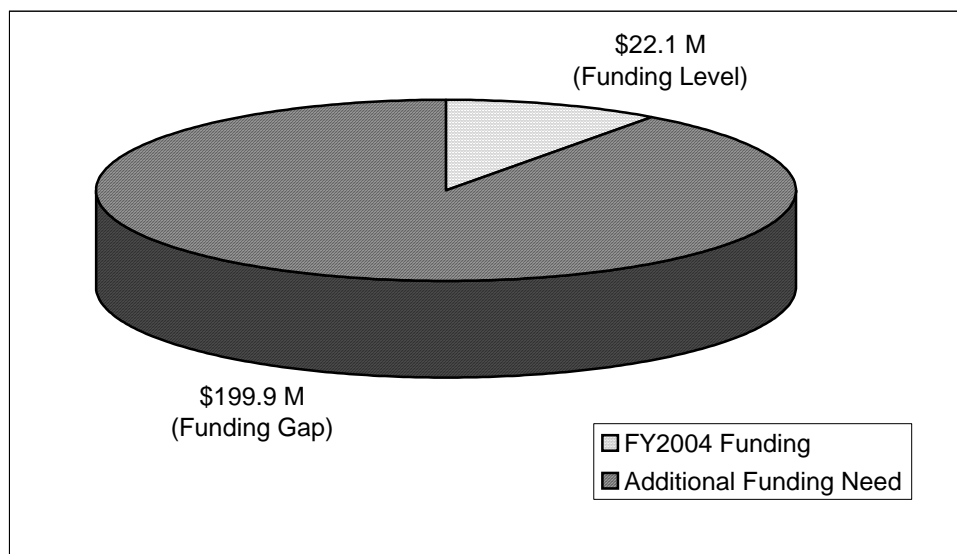
Figure ES-2
Average Energy Burden for All U.S. Households and Arizona LIHEAP-Eligible Households, 2000



Source: United States. Administration for Children and Families, Office of Community Services, Division of Energy Assistance. "Table A-2c." LIHEAP Home Energy Notebook For Fiscal Year 2003; Washington, DC: U.S. Department of Health and Human Services, March 2005. Page 27.
Source: 2000 Decennial Census PUMS 5 Percent Sample.

In addition, the financial commitment to reduce energy bills to 5 percent of income for low-income Arizona households would require over \$222 million in energy assistance funding each year. However, in FY 2004, Arizona residents received just over \$22 million in energy assistance benefits from various sources. LIHEAP provided \$5.7 million in benefits to 18,600 households and an additional \$16.4 million was spent for supplemental energy assistance and energy efficiency programs for low-income Arizona households.²

Figure ES-3
Total Energy Assistance Funding and Additional Energy Assistance Funding Needed to Reduce Energy Burden for All Arizona Households to 5 Percent of Income



Source: "2004 State-by-State Supplements to Energy Assistance and Energy Efficiency." LIHEAP Clearinghouse.

Source: 2000 Decennial Census PUMS 5 Percent Sample.

APPRISE developed these state-level statistics for Arizona using the Census 2000 Public Use Microdata (PUMS) Five Percent Sample and the 2002-2004 Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC).

City-Level Findings

Key findings from the city-level analysis of the Phoenix Metropolitan Area data are presented below:

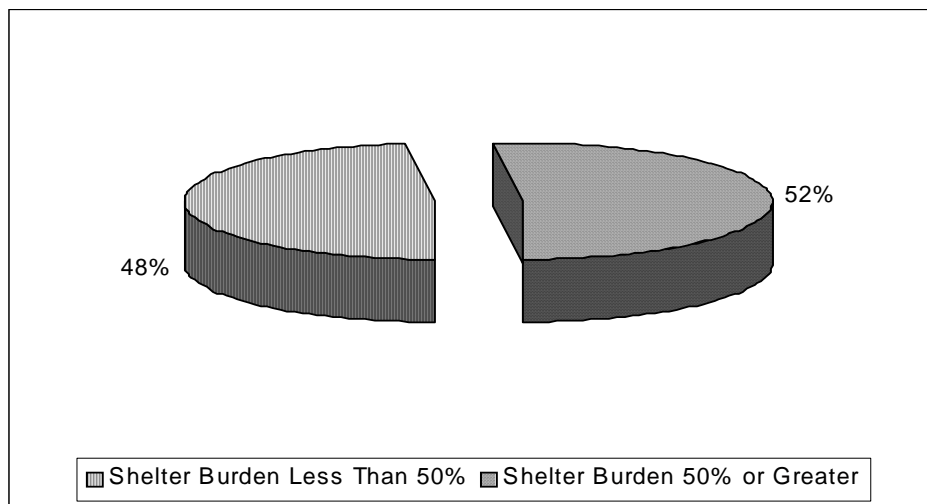
- Low-income households in the Phoenix Metropolitan Area spend a large portion of their annual income on housing costs, including energy costs.

² <http://www.liheap.ncat.org/Supplements/2004/supplement04.htm> (Source Date: May 17, 2005; Download Date: June 9, 2005)

- High shelter burden (i.e. housing costs of at least 50 percent of income) is highly correlated with high energy burden for low-income households in Phoenix. High energy bills contribute significantly to the problem of housing affordability for these households.

Our city-level analysis revealed that the energy burden for LIHEAP-eligible households in the Phoenix Metropolitan Area is similar to that of LIHEAP-eligible households throughout Arizona. American Housing Survey (AHS) data provided valuable information on the relationship between energy poverty and housing. Using AHS, we learned that 52 percent of LIHEAP-eligible households in Phoenix spend more than 50 percent of their income on housing, including utilities.

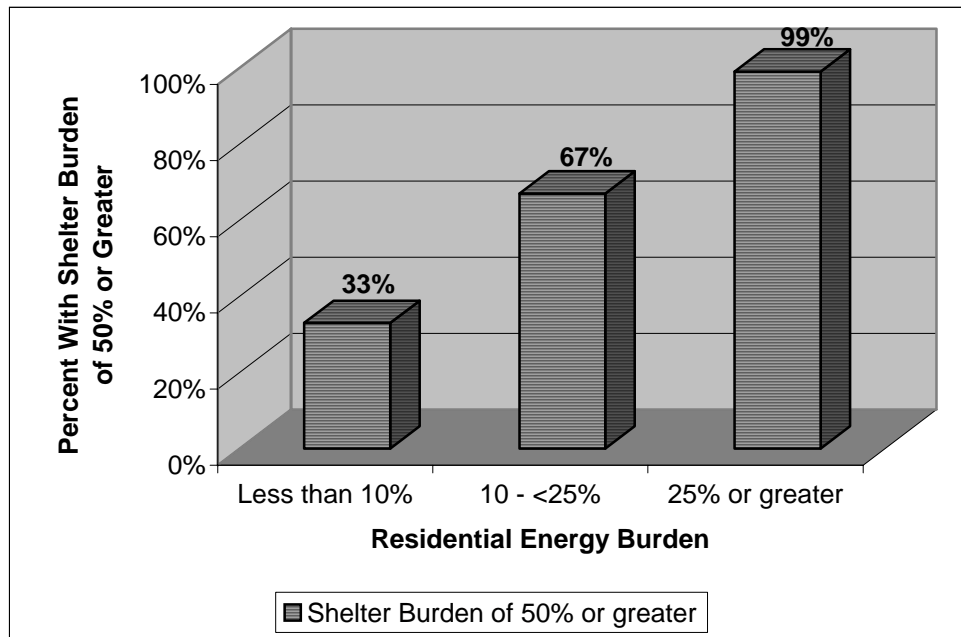
Figure ES-4
Shelter Burden for Low-Income Households in Phoenix, 2002



Source: 2002 American Housing Survey, Phoenix Metropolitan Area Sample.

Moreover, the statistics demonstrated that energy burden is positively correlated with shelter burden (i.e., percent of income spent on housing and energy costs). Nearly all households with an energy burden of 25 percent of income or greater also had a severe shelter burden of 50 percent or greater, compared to one third of households with an energy burden less than 10 percent. This finding serves as a reminder that high energy costs can make housing unaffordable for low-income households.

Figure ES-5
Percent of LIHEAP-Eligible Households in Phoenix with Shelter Burden Greater Than 50%, 2002



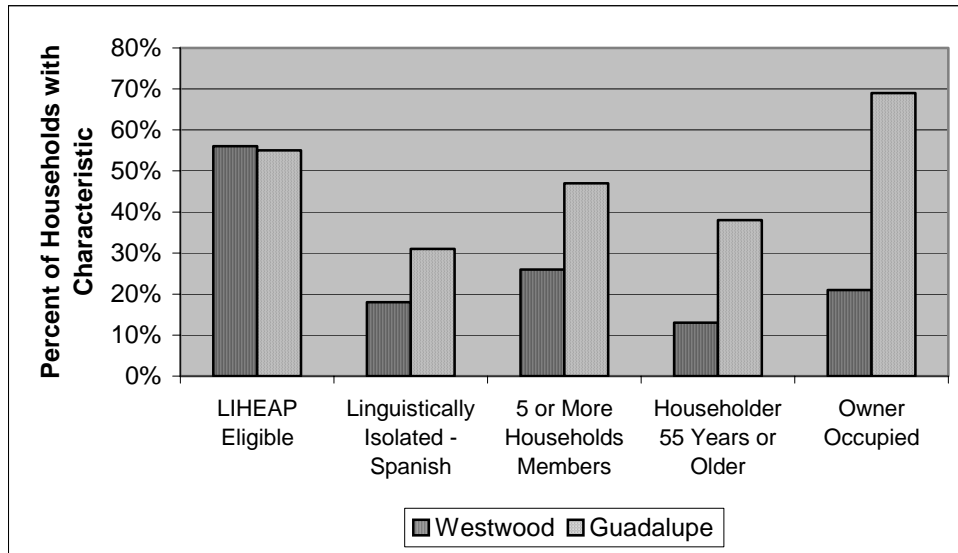
Source: 2002 American Housing Survey, Phoenix Metropolitan Area Sample.

APPRISE developed these statistics for the Phoenix Metropolitan Area using the 2002 AHS Phoenix Metropolitan Area Sample.

Neighborhood-Level Findings

At the local level, we found that two neighborhoods with very similar poverty and LIHEAP eligibility rates, within ten miles of each other, can have significantly different demographic and housing characteristics. Approximately 55 percent of both the Guadalupe and Westwood communities are LIHEAP-eligible. Large multi-generational single-family homeowner households dominate the neighborhood of Guadalupe and 32 percent of Guadalupe households self-report that no adult household members speak English “very well.” In contrast, Westwood is comprised of mostly renter households of more typical family size, with significantly less language isolation, and who reside in multiple-unit (i.e., five or more units) structures. Despite the superficial neighborhood similarities in geography and LIHEAP eligibility, the differences in characteristics support the need for different program design and outreach efforts to achieve program success.

Figure ES-6
Differences in Household Characteristics for Households in Guadalupe and Westwood



Source: 2000 Decennial Census Summary File 3.

APPRISE developed statistics for the Phoenix-area neighborhoods of Guadalupe and Westwood using the Census 2000 Summary File 3 (SF3).

Conclusion

Policymakers and program managers can use information developed from existing data sources for program design, operations, and evaluation at the national, state, city, and neighborhood levels. The analyses presented in this report are illustrations of how these data can be used to develop findings that can inform effective decision making. While the data furnished and analyzed in this report were developed with Arizona policymakers and program administrators in mind, the existing and publicly available data sources described can provide valuable information for decision makers, advocates, stakeholders, and scholars in any state.

I. Introduction

Policymakers and program managers need information about the energy needs of low-income households to make effective decisions related to energy assistance program design, operations, and evaluation. Decisions need to be made at the national, state, and local levels; therefore, information needs to be developed for each of those levels as well. In this report, APPRISE uses existing data sources to develop information on the energy needs of low-income households for decision makers in Arizona. The findings in this report provide valuable information about the needs and characteristics of low-income households in the United States, Arizona, the Phoenix Metropolitan Area, and the Phoenix-area neighborhoods of Guadalupe and Westwood.

The statistics and figures presented in this report represent examples of the broad array of information that can be obtained from existing data sources. The analyses presented in this report are illustrations of how these data can be used to develop findings that can inform effective decision making. While the data furnished and analyzed in this report were developed with Arizona policymakers and program administrators in mind, the existing and publicly available data sources described can provide valuable information for decision makers, advocates, stakeholders, and scholars in any state. The information presented in this report includes:

- **National-level Data:** Decision makers can use national-level data to understand the similarities and differences between energy needs of households in their area and those of households throughout the United States.
- **State-level Data:** State program managers can use state-level data to make informed decisions regarding the design of their statewide program.
- **Local-level Data:** Local organizations that provide services in a city or neighborhood can use local-level data to improve integration of energy assistance programs with other programs designed to assist low-income households.

Data and Methodology

Each state selects its own LIHEAP income eligibility standard. For this profile, low-income households have been identified using the current Arizona LIHEAP income eligibility standard of 150 percent of the HHS poverty guidelines³, which was \$27,600 for a four-person household in 2003.⁴ APPRISE used the HHS poverty guideline threshold values that

³ The U.S. Department of Health and Human Services (HHS) poverty guidelines, or percentage multiples of them (such as 125 percent, 150 percent, or 185 percent), are used as an eligibility criterion by a number of federal programs, including the Low Income Home Energy Assistance Program. The poverty guidelines are sometimes loosely referred to as the “federal poverty level” (FPL). HHS suggests that the phrase, “federal poverty level”, is ambiguous and should be avoided. Retrieved 24 May 2005 from <<http://aspe.hhs.gov/poverty/05poverty.shtml>>.

⁴ United States. Assistant Secretary for Planning and Evaluation, Department of Health and Human Services. "Prior HHS Poverty Guidelines and Federal Register References." Source: Federal Register, Vol. 68, No. 26, February 7, 2003, pp. 6456-6458. Retrieved 24 May 2005 from <<http://aspe.hhs.gov/poverty/figures-fed-reg.shtml>>.

correspond to the survey year when analyzing data for this report. Throughout the document, the terms low-income and LIHEAP-eligible⁵ are used interchangeably.

APPRISE used data from various sources to generate the information provided in this report:

- National-level Data: APPRISE used information from the Division of Energy Assistance in the U.S. Department of Health and Human Services, the U.S. Energy Information Administration, and the U.S. Census Bureau's Current Population Survey.
- Regional-level Data: APPRISE developed statistics for the West Census Region using the 2003 National Energy Assistance Survey of LIHEAP Recipients.
- State-level Data: APPRISE developed statistics for the state of Arizona using the Census 2000 Public Use Microdata (PUMS) Five Percent Sample and the 2002-2004 Current Population Survey Annual Social and Economic Supplement (ASEC).⁶
- Local-level Data: APPRISE developed statistics for the Phoenix Metropolitan Area using the 2002 American Housing Survey (AHS) Phoenix Metropolitan Area Sample⁷ and for the neighborhoods of Guadalupe and Westwood using the Census 2000 Summary File 3 (SF3).

Background

Several federal agencies generate publicly available data and publish statistical reports on a regular basis. These data and statistics can provide useful contextual information at a national level on energy poverty. For example, several sources of information demonstrate that the poverty rate and energy prices are increasing in the United States.

- The poverty rate increased from 11.3% in 2000⁸ to 12.5% in 2003.⁹
- Electricity prices have increased from 8.24 cents per kilowatt-hour (kWh) in 2000 to 8.94 cents in 2004.¹⁰

⁵ Throughout this report, LIHEAP income-eligible households are referred to as LIHEAP-eligible households.

⁶ While the CPS ASEC file can be used to make state-level estimates, the statistical variances for Arizona are too large for the data to be useful for analysis. Using averages from three consecutive years of CPS ASEC data reduces the variances of the estimates and improves confidence in the data. To estimate the FY 2003 number of LIHEAP-eligible households in the Arizona population, averages derived from the 2002, 2003, and 2004 CPS ASEC were used.

⁷ The AHS has metropolitan area data, but does not furnish state-level data.

⁸ United States. Census Bureau. "Table A. People and Families in Poverty by Selected Characteristics: 1999 and 2000." Source: Current Population Survey, March 2001. Retrieved 24 May 2005 from <<http://www.census.gov/hhes/poverty/poverty00/tablea.pdf>>.

⁹ United States. Census Bureau. "Table 3. People and Families in Poverty by Selected Characteristics: 2002 and 2003." Source: Current Population Survey, 2004 Annual Social and Economic Supplements. Retrieved 24 May 2005 from <<http://www.census.gov/hhes/poverty/poverty03/table3.pdf>>.

- Natural gas prices have increased from \$7.76 per thousand cubic feet (Mcf) in 2000 to \$10.74 in 2004.¹¹

Each year, the Division of Energy Assistance in the U.S. Department of Health and Human Services releases the *LIHEAP Home Energy Notebook*, which contains information about the energy needs of low-income households. The following statistics are selected key findings from the FY 2003 report:

- The total residential energy bill for low-income households has increased from \$25.1 billion in 2001 to \$28.3 billion in 2003.¹² The total residential energy bill increase results from both the growth in the number of low-income households and the rise in average home energy bills.
- Energy burden is defined as the percent of income spent on energy. Energy burden is a statistic that is often used to assess the difficulties that households have in paying their energy bills. In 2003, the median residential energy burden was 2.6 percent for non low-income households and 8.0 percent for low-income households.¹³
- Energy gap is defined as the dollar amount needed to reduce a customer's energy burden to an amount equal to a specified energy burden percentage. Energy gap is a statistic that is often used to assess the financial commitment necessary to address energy poverty. In 2003, the total dollar amount needed to ensure that no American low-income household spends more than 15 percent of income on residential energy was \$4.9 billion. The total dollar amount required to reduce residential energy bills for low-income households to 25 percent of income was \$2.7 billion.¹⁴

¹⁰ United States. Energy Information Administration, Office of Energy Markets and End Use. "Table 9.9 Average Retail Prices of Electricity." *Monthly Energy Review*. Washington, DC: U.S. Department of Energy, April 2005.

¹¹ United States. Energy Information Administration, Office of Energy Markets and End Use. "Table 9.11 Natural Gas Prices." *Monthly Energy Review*. Washington, DC: U.S. Department of Energy, April 2005.

¹² United States. Administration for Children and Families, Office of Community Services, Division of Energy Assistance. "Figure 3-13. Aggregated Residential Energy Expenditures by End Use for Households with Incomes at or below 150 percent of the poverty income guidelines, 1979 to FY 2003." *LIHEAP Home Energy Notebook For Fiscal Year 2003*; Washington, DC: U.S. Department of Health and Human Services, March 2005. Page 22. Low-income is defined in this statistic, as income at or below 150 percent of the U.S. Department of Health and Human Services federal poverty income guidelines (or HHS Poverty Guidelines).

¹³ United States. Administration for Children and Families, Office of Community Services, Division of Energy Assistance. "Table A-2c. Residential Energy: Average Annual Expenditures, by Amount (Dollars) and Median Individual (Percent of Income), for All, Non Low Income, Low Income, and LIHEAP Recipient Households, by Census Region and Main Heating Fuel." *LIHEAP Home Energy Notebook For Fiscal Year 2003*; Washington, DC: U.S. Department of Health and Human Services, March 2005. Page 54. Low-income is defined in this statistic as income at or below the LIHEAP maximum in section 2506(b)(2)(B) of Public Law 97-35. This version of income varies by state, but is a close approximation at the national level to 150 percent of the HHS Poverty Guidelines.

¹⁴ United States. Administration for Children and Families, Office of Community Services, Division of Energy Assistance. "Figure 3-12. Total Dollar Need for LIHEAP Funding for Low Income Households Spending Over 15 Percent and 25 Percent of Income on Residential Energy, 1979 to FY 2003." *LIHEAP Home Energy Notebook For Fiscal Year 2003*; Washington, DC: U.S. Department of Health and Human Services, March 2005. Page 21. Low-income defined here as income at or below 150 percent of the HHS Poverty Guidelines.

Organization of the Report

This report explores the energy needs of low-income households in Arizona with two primary goals:

1. To furnish state and area-specific statistics to Arizona decision makers and program managers.
2. To provide all interested parties with information regarding types of publicly available data, how the data can be used to produce valuable information, and where the data can be found.

The remainder of the report is structured as follows:

- **Section II: Energy Needs of Low-Income Households in Arizona.** In this section, we examine the impact that poverty and energy prices have on LIHEAP-eligible households in Arizona. We measure the energy gap (i.e., energy-related financial need) of these households and the energy assistance funding in Arizona directed to reducing the energy gap. In addition, we assess the effect that unaffordable energy bills and energy poverty have on household well-being. We conclude the section with a review of the demographic characteristics of LIHEAP-eligible households in Arizona.
- **Section III: Energy Needs of Low-Income Households in Phoenix.** In this section, we examine the relationships among energy needs, home energy appliances, housing affordability, and housing adequacy for LIHEAP-eligible households in the Phoenix Metropolitan Area.
- **Section IV: Energy Needs of Low-Income Households in Two Phoenix-Area Communities.** In this section, we examine two Phoenix-area neighborhoods where more than half of the households are eligible for LIHEAP. The two neighborhoods, Guadalupe and Westwood, are only nine miles apart. Despite their proximity, the data reveal very significant differences in demographic and housing characteristics between these communities. We provide examples of how a review of these characteristics can suggest the need to implement very different types of program designs and outreach efforts for neighborhoods that might appear similar based on income and location.
- **Section V: Conclusion.** In this section, we summarize key findings from the state and area-specific statistics presented in this report. In addition, we offer some final observations designed to encourage readers to take advantage of publicly available data.
- **Appendices:** In the appendices, we describe the data sources used in this report. The description includes information regarding the population represented by the data,

the types of information (e.g., key variables) available from the data, and the sources of the data.

- Appendix A: 2000 Decennial Census Data.
- Appendix B: Current Population Survey.
- Appendix C: American Housing Survey.

APPRISE prepared this report at the request of NLIEC. Any errors or omissions in this report are the responsibility of APPRISE. Furthermore, the statements, findings, conclusions, and recommendations are solely those of analysts from APPRISE and do not necessarily reflect the views of NLIEC.

II. Energy Needs of Low-Income Households in Arizona

In this section, we examine the impact that poverty and energy prices have on LIHEAP-eligible households in Arizona. We measure the energy gap (i.e., energy-related financial need) of these households and the energy assistance funding in Arizona directed to reducing the energy gap. In addition, we assess the effect that unaffordable energy bills and energy poverty have on household well-being. We conclude the section with a review of the demographic characteristics of LIHEAP-eligible households in Arizona.

For this section, APPRISE developed statistics for the state of Arizona using the Census 2000 Public Use Microdata (PUMS) Five Percent Sample and the 2002-2004 Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC). Data from both the PUMS and ASEC are available at the state level. The Census is conducted every ten years. The Census PUMS data provide very useful household-level data on demographic characteristics, housing characteristics, household energy use, and household energy spending. The CPS ASEC is conducted annually. The CPS ASEC data provide more current information on demographic and housing characteristics. More information regarding the Decennial Census data and the Current Population Survey data can be found in Appendix A and Appendix B, respectively. The remainder of this section presents statistics from and analysis of these data. In addition, we suggest ways that the findings can be utilized.

Measuring the Impact of Poverty and Energy Prices

Arizona is a growing state with an increasing population of low-income households. As shown in Table 1, the number of households in Arizona that are income-eligible for LIHEAP increased by 73,000 households in just three years, from 362,800 in 2000 to 436,000 in 2003.

Table 1
Arizona LIHEAP-Eligible Households (2000 and 2003)

	Number of Households	Percent of all Arizona Households
LIHEAP-Eligible Households, 2000	362,800 ¹	19.1%
LIHEAP-Eligible Households, 2003	436,000 ²	21.4%

¹ Source: 2000 Decennial Census PUMS 5 Percent Sample.

² Source: Three-Year Average of the CPS ASEC 2002-2004.

Table 2 displays the changes in natural gas and electricity prices in Arizona from 1999 to 2001. Natural gas prices rose 16 percent from \$8.99 per million BTU in 1999 to \$10.45 per million BTU in 2001. Electricity prices remained stable between 1999 and 2001.

Table 2
Arizona Historical Energy Prices (1999-2001)

Year	Natural Gas	Electricity
1999	8.99	25.01
2000	9.33	24.73
2001	10.45	24.32

Source: United States. Energy Information Administration. "Table 2." The State Energy Data 2001 Price and Expenditure Data tables. Retrieved 24 May 2005 from http://www.eia.doe.gov/emeu/states/sep_prices/total/pdf/pr_az.pdf. Prices in Nominal Dollars per Million BTU.

In Arizona, energy expenditures, particularly related to cooling for the elderly, disabled, and young children, are not a luxury but a necessity, due to extreme summer high temperatures that average over 100 degrees Fahrenheit during the months of June, July, and August. High energy prices and the need for energy have a direct impact on the amount of money that low-income households spend on energy. Table 3 shows that 26 percent of LIHEAP-eligible households reported that they spent more than \$1,500 on residential energy in 1999.

Table 3
Energy Expenditures for Arizona LIHEAP-Eligible Households (1999)

	Percent of Households
No Separate Energy Bill	10%
Less than \$500	12%
\$500 - \$999	27%
\$1,000 - \$1,499	25%
\$1,500 - \$1,999	13%
Over \$2,000	13%
All LIHEAP-Eligible Households	100%

Source: 2000 Decennial Census PUMS 5 Percent Sample.

Table 4 shows that 44 percent of LIHEAP-eligible households in Arizona had an energy burden of 10 percent or greater (i.e., spent 10 percent or more of their income on total residential energy). Moreover, 17 percent of LIHEAP-eligible households had an energy burden of 25 percent or greater. By comparison, the median residential energy burden for all U.S. households was three percent.¹⁵

¹⁵ United States. Administration for Children and Families, Office of Community Services, Division of Energy Assistance. "Table A-2c. Residential Energy: Average Annual Expenditures, by Amount (Dollars) and Median Individual (Percent of Income), for All, Non Low Income, Low Income, and LIHEAP Recipient Households, by Census Region and Main Heating Fuel." LIHEAP Home Energy Notebook For Fiscal Year 2003: Washington, DC: U.S. Department of Health and Human Services, March 2005. Page 54.

Table 4
Energy Burden for Arizona LIHEAP-Eligible Households (1999)

	Percent of Households
No Separate Energy Bill	10%
Less than 5%	17%
5 - <10%	28%
10 - <15%	16%
15 - <20%	7%
20 - <25%	4%
25% or greater	17%
All LIHEAP-Eligible Households	100%

Source: 2000 Decennial Census PUMS 5 Percent Sample.

The energy assistance needs of low-income Arizona households are growing faster than the State's capacity to provide energy assistance. In FY 2004, LIHEAP provided \$5.7 million in home energy assistance to nearly 18,600 low-income households in Arizona.¹⁶ However, as shown in Table 5, the LIHEAP recipient households represent only 4 percent of the LIHEAP income-eligible households in Arizona.¹⁷

Table 5
Arizona LIHEAP-Eligible and Recipient Households

	Number of Households
LIHEAP-Eligible, FY 2003	436,000 ¹
LIHEAP Recipient, FY 2004	18,600 ²

¹ Source: Three-Year Average of the CPS ASEC 2002-2004.

² Source: LIHEAP Household Reports, FY 2004.

Measuring the Financial Need

Decision makers can estimate the severity of the energy needs of low-income Arizona households by considering the energy gap, that is, the funding level needed to ensure that no low-income household spends more than a certain percentage of income on energy expenses. Although there is no standard measure of energy affordability, Table 6 displays the funding needed to reduce the energy burden of low-income Arizona households in 1999 to 5 percent, 10 percent, and 25 percent.

¹⁶ The number of FY 2004 LIHEAP recipients was obtained from Arizona's FY 2004 LIHEAP Household Reports. The amount of FY 2004 benefits provided was obtained from Arizona's FY 2004 LIHEAP Grantee Survey for FY 2004.

¹⁷ For the purposes of this report, LIHEAP-eligible households in Arizona are defined as those with income at or below the state LIHEAP standard of 150 percent of the Federal Poverty Guideline.

- **5 Percent Energy Burden:** There were approximately 266,700 LIHEAP-eligible households with energy burdens greater than 5 percent. It would require over \$222 million in assistance to reduce their energy bills to 5 percent of household income.
- **10 Percent Energy Burden:** There were approximately 166,000 LIHEAP-eligible households with energy burdens greater than 10 percent. It would require over \$128 million in assistance to reduce their energy bills to 10 percent of household income.
- **25 Percent Energy Burden:** There were approximately 68,500 LIHEAP-eligible households with energy burdens greater than 25 percent. It would require \$57 million in assistance to reduce their energy bills to 25 percent of household income.

Table 6
Energy Gap for Arizona LIHEAP-Eligible Households (1999)

	Number of Households	Energy Gap
Households with Energy Burdens Greater Than 5%	266,700	\$222,100,000
Households with Energy Burdens Greater Than 10%	166,000	\$128,400,000
Households with Energy Burdens Greater Than 25%	68,500	\$57,000,000

Source: 2000 Decennial Census PUMS 5 Percent Sample.

However, the number of low-income households in Arizona has grown since 1999. To get a more accurate picture of the current need, we updated the energy gap estimates from 1999 to 2003 using the three-year average of the 2002 through 2004 CPS ASEC. Table 7 shows the projected energy gap for Arizona households for 2003.

This projection assumes that the energy burden distribution of low-income households in Arizona remained stable from 1999 to 2003. The actual energy gap may be lower than this projection, if low-income households with lower energy burdens increased at a greater rate than households with higher energy burdens. However, given the rise in energy prices from 1999 to 2003, the energy gap may be higher than this projection. If the energy burden distribution of low-income households in Arizona remained stable from 1999 to 2003, the following energy gaps would be experienced:

- **5 Percent Energy Burden:** There would be approximately 321,200 LIHEAP-eligible households with energy burdens greater than 5 percent. It would require over \$267 million in assistance to reduce their energy bills to 5 percent of household income.
- **10 Percent Energy Burden:** There would be nearly 200,000 LIHEAP-eligible households with energy burdens greater than 10 percent. It would require over \$154 million in assistance to reduce their energy bills to 10 percent of household income.

- **25 Percent Energy Burden:** There would be approximately 82,500 LIHEAP-eligible households with energy burdens greater than 25 percent. It would require over \$68 million in assistance to reduce their energy bills to 25 percent of household income.

Table 7
Energy Gap for Arizona LIHEAP-Eligible Households (2003, Projected)

	Number of Households	Energy Gap
Households with Energy Burdens Greater Than 5%	321,200	\$267,500,000
Households with Energy Burdens Greater Than 10%	199,900	\$154,600,000
Households with Energy Burdens Greater Than 25%	82,500	\$68,700,000

Source: Projected using 2000 Decennial Census PUMS 5 Percent Sample and Three-Year Average of the CPS ASEC 2002-2004.

Energy Assistance Funding

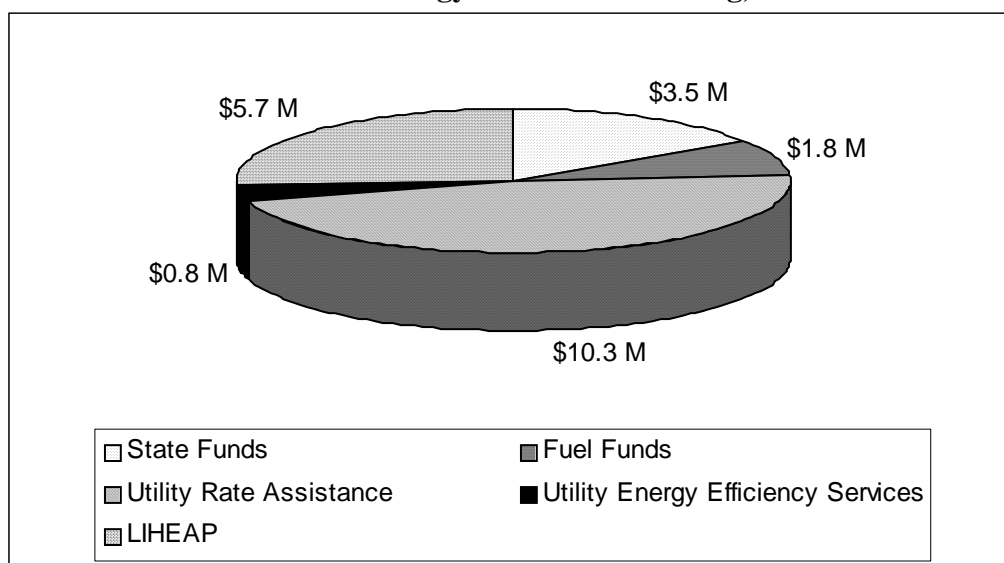
Low-income households in Arizona receive assistance with their energy bills from various sources, including LIHEAP, state funds, fuel funds, utility rate assistance, and utility energy efficiency services. While this assistance is not accounted for in a household's income, it can be vital in helping to make ends meet in a low-income household and may help mitigate the adverse effects on household well-being for some low-income households.

In FY 2004, LIHEAP provided \$5.7 million in benefits to 18,600 households. Arizona also expended \$16.4 million in additional resources to supplement LIHEAP and low-income energy efficiency programs.¹⁸ The majority of this supplemental funding, \$10.3 million, or 63 percent of the total supplemental funding, was in the form of utility rate discounts for low-income households. An additional \$3.5 million came from state funds, and \$1.8 million came from fuel funds. Utilities offered an additional \$0.8 million in energy efficiency and weatherization services.

In total, Arizona households received over \$22 million in energy assistance benefits in FY 2004. LIHEAP benefits represent about one quarter of the energy assistance benefits that are provided each year in Arizona. However, as shown in Table 7, the dollars needed to ensure that no LIHEAP-eligible Arizona household spends more than 25 percent of household income on residential energy is over \$68 million.

¹⁸ <http://www.liheap.ncat.org/Supplements/2004/supplement04.htm> (Source Date: May 17, 2005; Download Date: June 9, 2005)

Figure 1
Total Arizona Energy Assistance Funding, FY 2004



Source: "2004 State-by-State Supplements to Energy Assistance and Energy Efficiency." LIHEAP Clearinghouse.

Effects of Energy Poverty on Household Well-Being

In the previous section, which describes the energy needs of low-income households, the data showed a combination of increasing poverty and rising energy prices for Arizona households. For low-income households, the impact of unaffordable energy bills is experienced not just in the pocketbook. Energy poverty has a domino effect, as low-income households are forced to make difficult and sometimes unhealthy choices to make ends meet.

The following tables describe the effects of energy poverty on household well-being. The statistics presented were developed using data from the 2003 National Energy Assistance Survey (NEAS) conducted by APPRISE for the National Energy Assistance Directors Association (NEADA).¹⁹ The NEAS documented the choices made by LIHEAP-recipient households when faced with unaffordable home energy bills. The information presented in this report is comprised of responses from LIHEAP recipients representing the West Census Region.²⁰

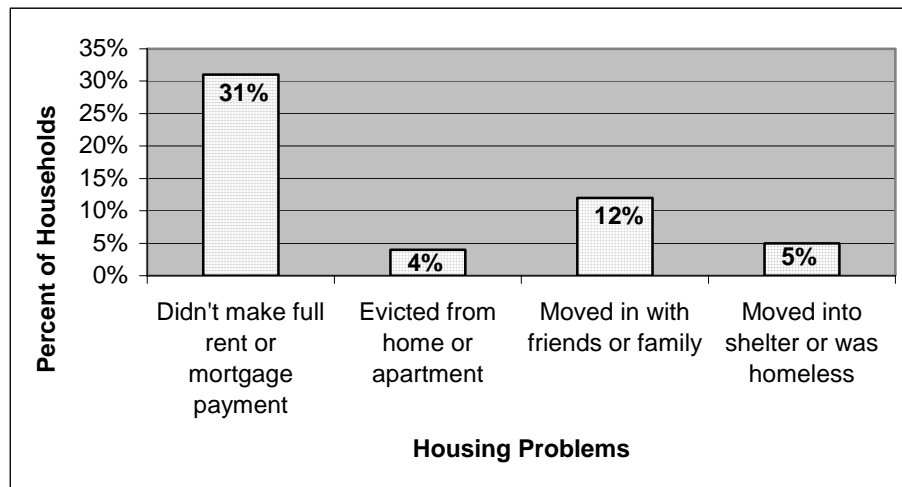
Respondents were asked whether they encountered specific housing problems over the past five years due in part to their total residential energy expenses. Figure 2 shows that 31 percent of respondents reported that they did not make a full rent or mortgage payment, 4

¹⁹ National Energy Assistance Directors Association. "National Energy Assistance Survey Report." Source Date: 17 August 2004. Available online at <http://www.neada.org/comm/surveys/NEADA_Survey_2004.pdf>.

²⁰ Arizona was not a participating state in the 2003 NEAS. State-level responses are available for 20 states including California, New Mexico, Colorado, Montana, and Washington. LIHEAP recipients from those five states comprise the West Census Region respondents.

percent said they were evicted from their home or apartment, 12 percent reported that they moved in with friends or family, and 5 percent were homeless at some point.

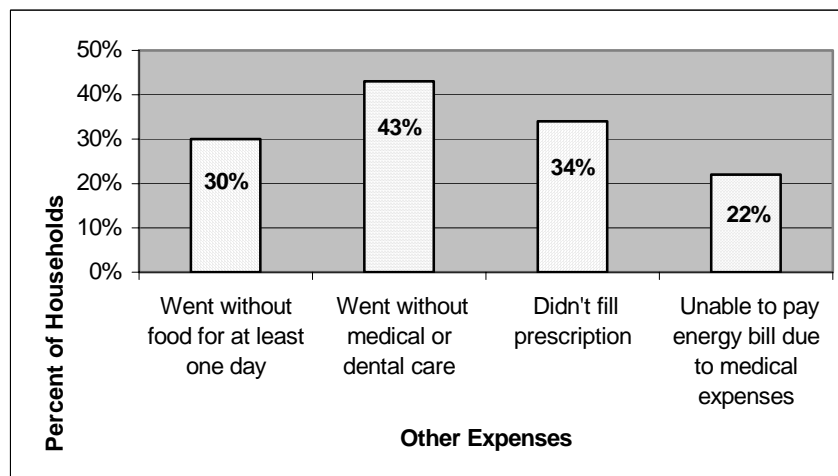
Figure 2
Experiences with Housing Problems
Due to Energy Bills in Past Five Years



Source: 2003 National Energy Assistance Survey

Respondents were asked whether they went without food, medical care, or medicine in the past five years due in part to their total residential energy expenses. Figure 3 shows that 30 percent of LIHEAP recipients reported that they went without food for at least one day, 43 percent said they went without medical care, 34 percent said they didn't fill a prescription or took less than the full dose of a prescribed medicine, and 22 percent said they were unable to pay their energy bill due to medical expenses.

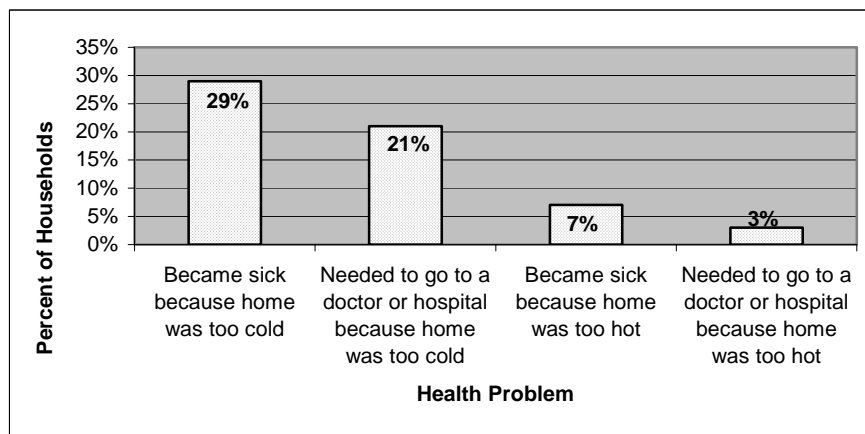
Figure 3
Experiences with Other Expenses
Due to Energy Bills in Past Five Years



Source: 2003 National Energy Assistance Survey

Respondents were asked whether they suffered illness in the past five years because their homes were too hot or too cold. Figure 4 shows that 29 percent of LIHEAP recipients reported that someone in their household became sick because their home was too cold, and 21 percent reported that someone in the household needed to go to the doctor or hospital due to an illness. Seven percent of LIHEAP recipients reported that someone in their household became sick because their home was too hot, and 3 percent reported that an illness resulted in a doctor or hospital visit.

Figure 4
Health Problems Due to Energy Bills in Past Five Years



Source: 2003 National Energy Assistance Survey

Arizona is a state with both cold weather mountain regions to the North and hot weather valley regions in the South. If state-level survey data had been available for Arizona, one could assert that the number of respondents who reported that they became sick because their home was too hot (as well as those who needed to go to a doctor or hospital because the home was too hot) would be greater. Evidence supporting the claim that heat-related illness is a significant issue in Arizona can be found in the reported 30 heat-related deaths that occurred in the Phoenix area between July 16 and July 29, 2005.²¹

Characterizing Low-Income Households in Arizona

Data on demographic characteristics can provide useful information for making effective targeting and outreach decisions. These data are particularly important when funding is limited and services need to be aimed at the most vulnerable populations where assistance might have the greatest impact.

The LIHEAP statute identifies vulnerable and high energy burden households as having the highest home energy needs. The statute defines a vulnerable household as a household with at least one resident who is a young child, an individual with disabilities, or a frail older

²¹ Associated Press. "Regional Briefing." *Arizona Daily Star Online*. Source Date: 29 July 2005. Retrieved on 5 August 2005 from <<http://www.dailystar.com/dailystar/news/86313.php>>.

individual. LIHEAP has explicit national performance goals for FY 2003 that include increasing the percentage of LIHEAP-recipient households with at least one member age 60 years or older or age 5 years or younger.²²

The tables in this subsection describe the characteristics of LIHEAP-eligible households. The majority of LIHEAP-eligible households in Arizona have at least one vulnerable member. These households are vulnerable with respect to poverty, rising energy prices, and high energy burdens. Vulnerable individuals, in particular the elderly population, are also at great health risk due the extreme summer heat in Arizona. Table 8 shows that 73 percent of all LIHEAP-eligible households in 2003 reported at least one household member who is an elderly (i.e., age 60 years or older) individual, a disabled individual, or a young (i.e., age five years or younger) child. The information reveals that targeting assistance benefits will be a challenge for Arizona decision makers, because most low-income Arizona households have vulnerable household members and the State has funding capacity to serve only a fraction of these households.

Table 8
Arizona LIHEAP-Eligible Households with Any Vulnerable Group Members (2003)

	Number of Households	Percent of Households
Household With Vulnerable Member(s)	316,500	73%
Household with No Vulnerable Members	119,500	27%
All LIHEAP-Eligible Households	436,000	100%

Source: Three-Year Average of the CPS ASEC 2002-2004.

Table 9 describes the number of LIHEAP-eligible households that reported one or more household members particularly vulnerable to unaffordable energy bills. Thirty-five percent of households reported at least one household member who was elderly, 15 percent reported at least one household member who was nonelderly and disabled, and 27 percent reported at least one household member who was a young child.

²² United States. Administration for Children and Families, Office of Community Services, Division of Energy Assistance. "Figure 3-12." LIHEAP Home Energy Notebook For Fiscal Year 2003: Washington, DC: U.S. Department of Health and Human Services, March 2005. Page ix.

Table 9
Arizona LIHEAP-Eligible Households with Vulnerable Group Members (2003)

	Number of Households	Percent of Households
Household With Elderly (Age 60 or older)	154,100	35%
Household With Non-elderly Disabled	64,375	15%
Household With Young Child (Age 5 or under)	117,200	27%

Source: Three-Year Average of the CPS ASEC 2002-2004.

Table 10 presents the number of LIHEAP-eligible households that reported income from public assistance (e.g., Temporary Assistance for Needy Families), Supplemental Security Income, or Social Security. Six percent reported public assistance benefits, another six percent received supplemental security income, 30 percent received social security, and 58 percent reported no benefits from these programs.

Table 10
Income Program Participation of Arizona LIHEAP-Eligible Households (2003)

	Number of Households	Percent of Households
Public Assistance	24,600	6%
Supplemental Security Income	26,400	6%
Social Security	132,400	30%
No Income Program Participation	252,600	58%
All LIHEAP-Eligible Households	436,000	100%

Source: Three-Year Average of the CPS ASEC 2002-2004.

As shown in Table 11, 21 percent of all LIHEAP-eligible households reported that the household was a single-parent household.

Table 11
Single-Parent Arizona LIHEAP-Eligible Households (2003)

	Number of Households	Percent of Households
Single-Parent Household	90,300	21%
Not Single Parent Household	345,700	79%
All LIHEAP-Eligible Households	436,000	100%

Source: Three-Year Average of the CPS ASEC 2002-2004.

Table 12 shows that 15 percent of all LIHEAP-eligible households reported that the primary language spoken in their household is Spanish and that none of the household members

speaking English “very well.” Given this data, it is incumbent on program managers to design programs to accommodate the language needs of their population.

Table 12
Linguistically Isolated Arizona LIHEAP-Eligible Households (2000)

	Number of Households	Percent of Households
Spanish Isolation	54,800	15%
Not Isolated	308,000	85%
All LIHEAP-Eligible Households	436,000	100%

Source: 2000 Decennial Census PUMS 5 Percent Sample.

III. Energy Needs of Low-Income Households in Phoenix

In addition to information related to energy needs and demographic characteristics of low-income households, policymakers and program managers at the local level might have information needs related to other factors that are associated with energy (e.g., housing) for the purposes of devising complementary direct assistance programs. These decision makers can use statistical information on the relationship between energy needs and housing adequacy to develop policies and procedures to more effectively operate energy assistance programs that complement housing programs. In this section, we examine the relationships between energy needs, home energy appliances, housing affordability, and housing adequacy for LIHEAP-eligible households in the Phoenix Metropolitan Area.

For this section, APPRISE developed statistics for the Phoenix Metropolitan Area using the 2002 American Housing Survey (AHS) Phoenix Metropolitan Area Sample. Data from the AHS are available for metropolitan areas, but the data are not provided at the state level. The AHS is conducted nationally every four years and in metropolitan areas nationwide on a rotating basis. The AHS provides valuable household-level data on demographic characteristics, housing characteristics, housing costs, housing adequacy, home energy appliances, household energy use, and household energy spending. More information regarding the AHS data can be found in Appendix C. The remainder of this section presents statistics from and analysis of these data. In addition, we suggest ways that the findings can be utilized.

Poverty and Energy Need In Phoenix

As shown in Table 13, approximately 203,800 households in Phoenix, or 17.5 percent of all Phoenix households, are eligible for LIHEAP.

Table 13
Phoenix LIHEAP-Eligible Households (2002)

	Number of Households	Percent of all Phoenix Households
LIHEAP-Eligible Households, 2002	203,800	17.5%

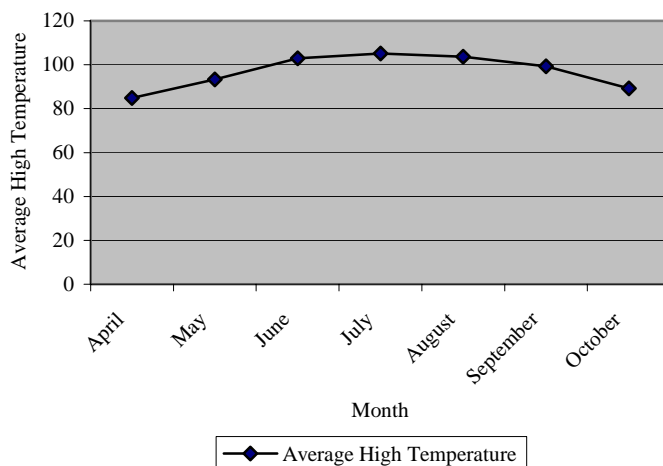
Source: 2002 American Housing Survey, Phoenix Metropolitan Area Sample.

In Phoenix, the extreme summer temperature creates a substantial need for cooling energy, particularly in households with an elderly person, disabled person, or young child. These households come to rely on air conditioners not as a luxury, but as an essential appliance for health-related use.

Households with elderly or disabled members, or children are at great risk for heat-related illnesses during the extreme Arizona summer. Figure 5 displays the average high temperature during the warm weather months in Arizona. The average high temperature

during the months between April and October is above 90 degrees Fahrenheit with temperatures above 100 degrees for most of June, July, and August.

Figure 5
Historical Weather Data (April – October), In Degrees Fahrenheit²³



With steady summer high temperatures above 100 degrees, 119 deaths were caused by exposure to excessive natural heat in Arizona in 2002.²⁴ Table 14 displays the number of LIHEAP-eligible households in Phoenix with and without air conditioning units.²⁵ 23,400 (or 12 percent of 203,800) LIHEAP-eligible households in Phoenix do not have air conditioning units.

Table 14
Phoenix LIHEAP-Eligible Households with Air Conditioning Units (2002)

	Number of Households	Percent of Households
Household With Air Conditioning Unit(s)	180,400	88%
Household with no Air Conditioning Unit	23,400	12%
All LIHEAP-Eligible Households	203,800	100%

Source: 2002 American Housing Survey, Phoenix Metropolitan Area Sample.

²³ Source: Western Regional Climate Center. "Period of Record Monthly Climate Summary, Phoenix, Arizona, Period of Record 7/1/1948 – 12/31/1998." Retrieved 24 May 2005 from <<http://www.wrcc.dri.edu/cgi-bin/cliRECTm.pl?azphoc>>.

²⁴ Arizona Department of Health Services, Bureau of Public Health Statistics, Health Status and Vital Statistics Section. Deaths From Exposure to Excessive Natural Heat Occurring in Arizona, 1992 -2002: Page 2.

²⁵ Evaporative coolers are not included in the American Housing Survey definition of air conditioning units and the survey does not provide data about the use of evaporative coolers.

Table 15 presents energy burden statistics for the Phoenix Metropolitan Area. In Phoenix, 37 percent of LIHEAP-eligible households had an energy burden of 10 percent or greater. Moreover, 18 percent of LIHEAP-eligible households had an energy burden of 25 percent or greater. As evidenced by Table 4, the energy burden distribution for LIHEAP-eligible households in Phoenix is very similar to the distribution for LIHEAP-eligible households throughout Arizona.

Table 15
Energy Burden for Phoenix LIHEAP-Eligible Households (2002)

	Number of Households	Percent of Households
No Separate Energy Bill	21,400	11%
Less than 5%	50,700	25%
5 - <10%	54,300	27%
10 - <15%	18,900	9%
15 - <20%	12,600	6%
20 - <25%	8,600	4%
25% or greater	37,300	18%
All LIHEAP-Eligible Households	203,800	100%

Source: 2002 American Housing Survey, Phoenix Metropolitan Area Sample.

Energy, Housing Affordability, and Housing Adequacy

Policymakers and researchers often focus on shelter burden when considering the plight of low-income households. Shelter burden is defined as the percent of income spent on housing costs (including residential energy costs). According to the United States Department of Housing and Urban Development (HUD), the generally accepted definition of affordable housing is “housing for which the occupant is paying no more than 30 percent of his or her income for gross housing costs, including utilities;²⁶ families who pay more than 30 percent of their income for housing are considered cost burdened and may have difficulty affording necessities such as food, clothing, transportation and medical care.”²⁷

Some researchers have defined severe shelter burden more narrowly as a household that spends 50 percent or more of their income on shelter costs.²⁸ Table 16 presents shelter

²⁶ United States. Community Planning and Development, Housing and Urban Development. "Glossary of CPD Terms - A. Source Date: 6 December 2002. Retrieved on 1 June 2005 from <<http://www.hud.gov/offices/cpd/library/glossary/a/index.cfm>>.

²⁷ United States. Community Planning and Development, Housing and Urban Development. "Affordable Housing." Source Date: May 27, 2005. Retrieved on 1 June 2005 from <<http://www.hud.gov/offices/cpd/affordablehousing/index.cfm>>.

²⁸ See Cushing N. Dolbeare. 2001. "Housing Affordability: Challenge and Context." *Cityscape: A Journal of Policy Development and Research*, (5)2:111-130. Washington, DC: United States Office of Policy Development Research, Department of Housing and Urban Development.

burden and energy burden for LIHEAP-eligible households in Phoenix. Nearly all LIHEAP-eligible households with an energy burden of 25 percent or greater have a severe shelter burden (i.e., spend 50 percent or more of their income on housing costs). Table 16 shows that as energy burden increases so does the likelihood of having a severe shelter burden. These findings suggest that energy burden has a substantial impact on housing costs.

Table 16
Shelter Burden and Energy Burden for Phoenix LIHEAP-Eligible Households (2002)

Energy Burden	Shelter Burden					
	Less than 50%		50% or greater		All LIHEAP-Eligible Households	
	Number	Percent	Number	Percent	Number	Percent
Less than 10%	84,700	67%	41,700	33%	126,400	100%
10 - <25%	13,600	34%	26,600	67%	40,200	100%
25% or greater	200	1%	37,100	99%	37,300	100%

Source: 2002 American Housing Survey, Phoenix Metropolitan Area Sample.

The housing needs of low-income households are not limited to housing affordability, but extend to housing adequacy and the quality of the housing stock. Table 17 shows the housing adequacy for LIHEAP-eligible households in Phoenix. Three percent of LIHEAP-eligible households live in severely inadequate housing units²⁹ and nine percent live in moderately inadequate housing units³⁰.

Table 17
Housing Adequacy for Phoenix LIHEAP-Eligible Households (2002)

	Number of Households	Percent of Households
Adequate	178,600	88%
Moderately Inadequate	18,600	9%
Severely Inadequate	6,600	3%
All LIHEAP-Eligible Households	203,800	100%

Source: 2002 American Housing Survey, Phoenix Metropolitan Area Sample.

²⁹ A severely inadequate housing unit is defined by the AHS as any housing unit that does not have complete plumbing facilities, does not have electricity, has severely faulty heating equipment, has inadequate or faulty electrical wiring, or has various water leaks and/or holes or cracks in the walls and floors. Severely inadequate housing units must also lack working light fixtures in common hallways, have broken or missing steps and stair railings in common stairways, and have three or more floors between the unit and the main entrance to the building and lack an elevator.

³⁰ A moderately inadequate housing unit is defined by the AHS as any housing unit that does not have complete kitchen facilities, has faulty toilet(s), uses an unvented room heater as the main heating equipment, has various water leaks and/or holes or cracks in the walls and floors, or at least three of the following conditions exist: lack working light fixtures in common hallways, have broken or missing steps and stair railings in common stairways, and have three or more floors between the unit and the main entrance to the building and lack an elevator.

Low-income households are vulnerable to higher energy costs due to old or substandard housing with inefficient heating systems, low levels of insulation, or gaps in the exterior of the home. Table 18 shows that inadequate housing is not correlated with higher energy burden for low-income households in Phoenix. If there were a correlation between energy burden and housing adequacy, then any weatherization attempts might be hindered by housing repair needs. However, the findings in Phoenix suggest that aggressive usage reduction programs should be successful in lowering high energy bills.

Table 18
Housing Adequacy and Energy Burden for Phoenix LIHEAP-Eligible Households (2002)

Housing Adequacy	Energy Burden					
	Less than 25%		25% or greater		All LIHEAP-Eligible Households	
	Number	Percent	Number	Percent	Number	Percent
Adequate	145,000	81%	33,600	19%	178,600	100%
Moderately Inadequate	14,600	79%	4,000	21%	18,600	100%
Severely Inadequate	6,400	97%	200	3%	6,600	100%

Source: 2002 American Housing Survey, Phoenix Metropolitan Area Sample.

IV. Energy Needs of Low-Income Households in Two Phoenix-Area Communities

In this section, we examine two Phoenix-area neighborhoods where more than half of the households are eligible for LIHEAP. The two neighborhoods, Guadalupe and Westwood, are only nine miles apart. Despite their proximity, the data reveal significant differences in demographic and housing characteristics between these communities. We provide examples of how a review of these characteristics can suggest the need to implement very different types of program designs and outreach efforts for neighborhoods that might appear similar based on income and location.

For this section, APPRISE developed statistics for the Phoenix-area neighborhoods of Guadalupe and Westwood using the Census 2000 Summary File 3 (SF3). Data from the Summary File 3 is available at various local levels including county, census block group, census tract, zip code, and congressional district. The Census is conducted every ten years. The Census SF3 data provides household level data on demographic characteristics and housing characteristics. More information regarding the Decennial Census data can be found in Appendix A. The remainder of this section presents statistics and analysis from these data. In addition, we suggest ways that the findings can be utilized.

Estimating the Population In Need

The availability of local-level poverty estimates is limited and program managers may use estimates of the percent of individuals in poverty as a proxy for the percent of households in poverty. However, these estimates tend to underestimate the number of households in poverty. Additionally, households – not individuals – are eligible for LIHEAP.

Data from the 2000 Decennial Census allow for limited analysis at the local level. While statistics for the characteristics of LIHEAP-eligible households are not available, the number of LIHEAP-eligible households can be estimated. As shown in Table 19, 30 percent of all households in the Guadalupe community have income below the HHS poverty guideline.

Table 19
Households in Poverty for the Guadalupe and Westwood Communities (1999)

	Guadalupe		Westwood	
	Number of Households	Percent of all Households	Number of Households	Percent of all Households
Households Below Federal Poverty Guideline	331	30%	1,041	31%

Source: 2000 Decennial Census Summary File 3.

Figure 6 demonstrates a ratio-adjustment method that can be used to estimate the number of LIHEAP-eligible households using the available data.

Figure 6
Using a Ratio-Adjustment Method to Estimate the Number of LIHEAP-Eligible Households for a Neighborhood

- Step 1:** Obtain estimate of the number of households below the HHS Poverty Guideline for neighborhood (e.g., Guadalupe) from 2000 Census Summary File 3.
- Step 2:** Obtain estimates for the larger geographic area that the neighborhood is in (e.g., Phoenix) of the number of LIHEAP-eligible households and the number of eligible households below the HHS Poverty Guideline from the appropriate data source (i.e. American Housing Survey).
- Step 3:** Find the Below Poverty Ratio by dividing the number of eligible households below the HHS Poverty Guideline by the total number of LIHEAP-eligible households for the larger geographic area.
- Step 4:** To estimate the total number of LIHEAP-eligible households for the neighborhood, divide the estimate of the number of households below the Federal Poverty Guideline for neighborhood by the Below Poverty Ratio for the larger geographic area.

Using the procedure described in Figure 6, the numbers of LIHEAP-eligible households in the Guadalupe and Westwood communities were estimated using 2000 Census Summary File 3 data for each community and 2002 American Housing Survey data for the Phoenix Metropolitan Area. Using these procedures, an estimated 55 percent of households in Guadalupe and 56 percent of households in Westwood were LIHEAP-eligible in 1999.

Table 20
LIHEAP-Eligible Households for the Guadalupe and Westwood Communities (Estimated)

	Guadalupe		Westwood	
	Number of Households	Percent of all Households	Number of Households	Percent of all Households
LIHEAP-Eligible Households, 1999 Estimate Using Ratio Adjustment	610	55%	1,917	56%

Source: 2000 Decennial Census Summary File 3, ratio-adjusted using 2002 American Housing Survey, Phoenix Metropolitan Area Sample.

Characterizing Low-Income Households in Guadalupe and Westwood

The following tables describe and compare the characteristics of all households in the Guadalupe and Westwood communities. Table 21 shows that 31 percent of all households in the Guadalupe community and 18 percent of households in the Westwood community reported that the primary language spoken in their household is Spanish and that none of the household members speak English “very well.” Local level program managers are probably already aware of the language needs of their population based on experience. Nevertheless,

Census data can be used to confirm their experience and quantify for decision makers the need for additional funding for tools such as bilingual program promotional and outreach materials.

Table 21
Linguistically Isolated Households in the Guadalupe and Westwood Communities (2000)

	Guadalupe		Westwood	
	Number of Households	Percent of Households	Number of Households	Percent of Households
Spanish Isolation	343	31%	616	18%
Other Indo-European Language Isolation	0	0%	70	2%
Asian or Pacific Islands Language Isolation	9	1%	0	0%
Other Language Isolation	0	0%	58	2%
Not Isolated	753	68%	2,650	78%
All Households	1,105	100%	3,394	100%

Source: 2000 Decennial Census Summary File 3.

Table 22 shows that nearly half of all households in the Guadalupe community have five or more household members, compared to one-quarter of all households in the Westwood community. The proportion of households with five or more household members in Guadalupe is significantly larger than in the Westwood community (26 percent), the Phoenix Metropolitan Area (20 percent) or Arizona (21 percent). Local program managers need to be aware that increasing the energy efficiency of certain appliances whose level of usage is a function of household size should be most effective for larger households, such as those in Guadalupe. For example, energy saving showerheads and faucet aerators are likely to have a large impact on energy bills and water bills in Guadalupe.

Table 22
Household Size of All Households in the Guadalupe and Westwood Communities (2000)

	Guadalupe		Westwood	
	Number of Households	Percent of Households	Number of Households	Percent of Households
1-Person Household	108	10%	775	22%
2-Person Household	135	12%	638	19%
3-Person Household	158	14%	571	17%
4-Person Household	191	17%	578	17%
5 or More-Person Household	518	47%	886	26%
All Households	1,110	100%	3,448	100%

Source: 2000 Decennial Census Summary File 3.

A concentration of large households may indicate the presence of young and middle-aged parents living with children. However, Table 23 shows that 38 percent of all households in the Guadalupe community have a householder who is age 55 years or older. Coupled with

the concentration of large households, this suggests that there is also a concentration of multi-generational households in the Guadalupe community. These households are likely to have vulnerable members, especially young children and elderly individuals. Program managers can use this information to accommodate the unique energy needs of these households in their communities and to target outreach to such households. Most notably, elderly householders may be less likely to participate in assistance programs, and may require additional outreach measures. In comparison, 13 percent of all Westwood households have a householder who is 55 years or older and, therefore, present different needs for outreach.

Table 23
Age of Householder for All Households in the Guadalupe and Westwood Communities (2000)

	Guadalupe		Westwood	
	Number of Households	Percent of Households	Number of Households	Percent of Households
Householder 55 Years or Older	421	38%	430	13%
Householder 65 Years or Older	199	18%	236	7%

Source: 2000 Decennial Census Summary File 3.

Table 24 shows that 82 percent of households in Guadalupe are single family units, compared to only 28 percent of households in the Westwood community that are single family units. The majority of households in the Westwood community, 58 percent, are in buildings with five or more units. This information can be used by decision makers who design weatherization and usage reduction programs in these communities. The single family homes in the Guadalupe community present different opportunities to reduce energy bills through usage reduction programs and weatherization than the multi-family units in the Westwood community.

Table 24
Units in Structure for All Households in the Guadalupe and Westwood Communities (2000)

	Guadalupe		Westwood	
	Number of Households	Percent of Households	Number of Households	Percent of Households
Single Family	909	82%	982	28%
2-4 Units	61	5%	398	12%
5 or More Units	29	3%	2,016	58%
Mobile Home	111	10%	43	1%
Other	0	0%	9	<1%
All Households	1,110	100%	3,448	100%

Source: 2000 Decennial Census Summary File 3.

Some of the largest obstacles in designing and implementing usage reduction or weatherization programs are creating protocols for landlord contributions to improvements and for obtaining landlord permission during the program design phase, and obtaining landlord contributions and permission during the program implementation. For this reason, rental units present unique challenges for these programs. Almost 80 percent of households in the Westwood community rent their homes, compared to 31 percent of households in Guadalupe. Program managers in Westwood would need to build collaborative relationships with landlords to achieve successful program participation.

Table 25
Home Ownership for All Households in the Guadalupe and Westwood Communities (2000)

	Guadalupe		Westwood	
	Number of Households	Percent of Households	Number of Households	Percent of Households
Own	761	69%	721	21%
Rent	349	31%	2,727	79%
All Households	1,110	100%	3,448	100%

Source: 2000 Decennial Census Summary File 3.

V. Conclusion

This report presents some examples of the broad array of information that can be developed related to the energy needs of low-income households using publicly available data sources. Moreover, the analyses presented here provide constructive information about the needs and characteristics of low-income households in the United States, Arizona, the Phoenix Metropolitan Area, and the Phoenix-area neighborhoods of Guadalupe and Westwood.

The state-level findings demonstrate that the number of LIHEAP-eligible households in Arizona rose from 363,000 in 2000 to 436,000 in 2003. Arizona LIHEAP-eligible households spend, on average, 10 percent of their income on residential energy, which is significantly higher than the 3 percent median energy burden for all United States households. In addition, the financial commitment to reduce energy bills to 5 percent of income for low-income Arizona households would require over \$222 million in energy assistance funding each year.

Our city-level analysis revealed that the energy burden for LIHEAP-eligible households in the Phoenix Metropolitan Area is similar to that of LIHEAP-eligible households throughout Arizona. AHS data provided valuable information on the relationship between energy poverty and housing. Using AHS, we learned that more than half of LIHEAP-eligible households in Phoenix have a severe shelter burden (i.e., spend more than 50 percent of their income on housing, including utilities). Moreover, we found evidence that higher energy burdens can make housing unaffordable for low-income households.

At the local level, we found that two neighborhoods with similar poverty and LIHEAP eligibility rates within ten miles of each other can have significantly different demographic and housing characteristics. Despite the superficial neighborhood similarities, the differences in characteristics support the need for different program designs and outreach efforts in order to achieve program success.

Policymakers and program managers can use information developed from existing data sources for program design, operations, and evaluation at the national, state, city, and neighborhood levels. The analyses presented in this report are illustrations of how these data can be used to develop findings that can inform effective decision making. While the data furnished and analyzed in this report were developed for Arizona policymakers and program managers, the publicly available data sources can provide valuable information for decision makers, advocates, stakeholders, and scholars in any state.

Appendix A: 2000 Decennial Census Data

State-level estimates for Arizona of the number of LIHEAP income-eligible households for FY 2000 were developed using the Census 2000 5 Percent Public Use Microdata (PUMS). The 5 Percent PUMS sample of LIHEAP income-eligible households, using the Arizona state standard, has approximately 19,000 records for Arizona households.

The Census is conducted every 10 years. Data for each of the 50 states and the District of Columbia can be obtained from the Census Bureau's Census 2000 website, at <http://www.census.gov/main/www/cen2000.html>.

The following list presents a sampling of the variables available from the Census 2000 PUMS:

- Annual household income
- Poverty status
- Household size
- Age of householder
- Disability status of householder
- Household language group
- Primary language of householder
- Household linguistic isolation
- Ethnicity of householder
- Hispanic/Latino origin of householder
- Household composition
- Employment status of householder and spouse
- Residence type
- Primary space heating fuel
- Age of housing unit
- Annual energy expenditures
- Energy burden
- Income program participation
- Household vulnerability status
- Presence of elderly household member (age 60 or older)
- Presence of disabled household member
- Presence of young child (age 5 or younger)

Neighborhood-level estimates for the Guadalupe and Westwood communities in the Phoenix Metropolitan Area were developed using the Census 2000 Summary File 3. This data can be obtained and a variety of custom tables can be created at the Census Bureau website, at <http://factfinder.census.gov/>.

Appendix B: Current Population Survey Data

State-level estimates for Arizona of the number of LIHEAP income-eligible households for FY 2003 were developed using the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC). While the CPS ASEC file can be used to make state-level estimates, the statistical variances for Arizona are too large for the data to be useful for analysis. Using averages from three consecutive years of CPS ASEC data reduces the variances of the estimates and improves confidence in the data. To estimate the FY 2003 number of LIHEAP-eligible households in the Arizona population, averages derived from the 2002, 2003, and 2004 CPS ASEC were used. The CPS ASEC sample of LIHEAP income-eligible households for FY 2003, using the Arizona state standard, has approximately 730 records for Arizona households.

The CPS ASEC is conducted annually. A national file can be obtained from the Current Population Survey website at <http://www.bls.census.gov/cps/>.

The following list presents a sampling of the variables available from the CPS ASEC:

- Annual household income
- Poverty status
- Household size
- Age of householder
- Disability status of householder
- Ethnicity of householder
- Hispanic/Latino origin of householder
- Household composition
- Employment status of householder and spouse
- Residence type
- Education level of householder
- Household tenure
- Income program participation
- Household vulnerability status
- Presence of elderly household member (age 60 or older)
- Presence of disabled household member
- Presence of young child (age 5 or younger)

Appendix C: American Housing Survey Data

The Phoenix area sample for the American Housing Survey (AHS) was conducted in 2002. [Note: The AHS has metropolitan area data, but does not furnish state-level data.] Because the AHS housing and energy data are richer than the data available from the CPS and Census, the AHS data were analyzed to provide information on housing and energy problems for the Phoenix Metropolitan Area. The AHS Phoenix Metropolitan Area sample of LIHEAP income-eligible households for FY 2002, using the Arizona state standard, has approximately 650 records for Phoenix households.

The American Housing Survey is conducted nationally every four years and in Metropolitan Areas nationwide on a rotating basis. A national file, as well as metropolitan area files, can be obtained from the HUD User website, at <http://www.huduser.org/datasets/ahs/ahsprev.html>.

The following list presents a sampling of the variables available from the American Housing Survey:

- Annual household income
- Poverty status
- Household size
- Ethnicity of householder
- Hispanic/Latino origin of householder
- United States citizenship status of householder
- Residence type
- Primary space heating fuel
- Annual energy expenditures
- Energy burden
- Monthly housing costs (including energy expenditures)
- Shelter burden
- Housing adequacy
- Presence of elderly household member (age 60 or older)
- Presence of young child (age 5 or younger)
- Presence of central air conditioning unit
- Presence of room air conditioning unit
- Presence of any air conditioning unit
- Household tenure

Table C-1 presents the survey history for the American Housing Survey for all Metropolitan Areas that are currently included in the sample.

Table C-1
Dates of Current AHS Metropolitan Areas: 1974 to 2003

Area	2003	1998- 2002	1995- 1997*	1992- 1994	1988- 1991	1984- 1987	1981- 1983	1980	1977- 1979	1974- 1976
Anaheim_Santa Ana, CA PMSA**	--	02	--	94	90	86	81	--	77	74
Atlanta, GA MSA	--		96	--	91	87	82	--	78	75
Baltimore, MD MSA	--	98	--	--	91	87	83	--	79	76
Birmingham, AL MSA	--	98	--	92	88	84	--	80	--	76
Boston, MA-NH CMSA	--	98	--	93	89	85	91	--	77	74
Buffalo, NY CMSA**	--	02	--	94	88	84	--	--	79	76
Charlotte, NC-SC MSA	--	02	95	--	--	--	--	--	--	--
Chicago, IL PMSA	03	99	95	--	91	87	83	--	79	75
Cincinnati, OH-KY-IN PMSA**	--	98	--	--	90	86	82	--	78	75
Cleveland, OH PMSA**	--		96	92	88	84	--	--	79	76
Columbus, OH MSA	--	02	95	--	91	87	82	--	78	75
Dallas, TX PMSA**	--	02	--	94	89	85	81	--	77	74
Denver, CO MSA	--		95	--	90	86	83	--	79	76
Detroit, MI PMSA	03	99	95	93	89	85	81	--	77	74
Fort Worth-Arlington, TX PMSA	--	02	--	94	89	85	81	--	77	74
Hartford, CT MSA	--		96	--	91	87	83	--	79	75
Houston, TX MSA ⁺	--	98	--	--	91	87	83	--	79	76
Indianapolis, IN MSA**	--		96	92	88	84	--	80	--	76
Kansas City, MO-KS MSA	--	02	95	--	90	86	82	--	78	75
Los Angeles-Long Beach, CA PMSA**	03	99	95	--	89	85	--	80	77	74
Memphis TN-AR-MS MSA	--		96	92	88	84	--	80	77	74
Miami-Ft. Lauderdale, FL CMSA	--	02	95	--	90	86	83	--	79	75
Milwaukee, WI PMSA**	--	02	--	94	88	84	--	--	79	75
Minneapolis-St. Paul, MN-WI MSA	--	98	--	93	89	85	81	--	77	74
New Orleans, LA MSA	--		95	--	90	86	82	--	78	75
New York-Nassau-Suffolk-Orange, NY	03	99	95	--	91	87	83	80	--	76
Norfolk-Virginia Beach-Newport News, VA-	--	98	--	--	--	--	--	--	--	--
Northern NJ PMSAs	03	99	95	--	91	87	--	--	--	--
Oakland, CA PMSA****	--	98	--	--	--	--	--	--	--	--
Oklahoma City, OK MSA	--		96	92	88	84	--	80	--	76
Philadelphia, PA-NJ PMSA**	03	99	95	--	89	95	82	--	78	75
Phoenix, AZ MSA**	--	02	--	94	89	85	81	--	77	74
Pittsburgh, PA MSA	--		95	--	90	86	81	--	77	74
Portland, OR-WA OMSA	--	02	95	--	90	86	83	--	79	75
Providence-Pawtucket-Warwick, RI-WA	--	98	--	92	88	84	--	80	--	76
Riverside-San Bernardino-Ontario, CA	--	02	--	94	90	86	82	--	78	75
Rochester, NY MSA	--	98	--	--	90	86	82	--	78	75
Sacramento, CA PMSA	--		96	--	--	--	83	80	--	76
St. Louis, MO-IL MSA	--		96	--	91	87	83	80	--	76
Salt Lake City, UT MSA	--	98	--	92	88	84	--	80	77	74
San Antonio, TX MSA	--		95	--	90	86	82	--	78	75
San Diego, CA MSA**	--	02	--	94	91	87	82	--	78	75
San Francisco, CA PMSA****	--	98	--	--	--	--	--	--	--	--
San Francisco-Oakland, CA PMSAs	--		--	93	89	85	82	--	78	75
San Jose, CA PMSA	--	98	--	93	88	84	--	--	--	--
Seattle-Everett, WA PMSA	--		96	--	--	--	83	--	79	76
Tampa-St. Petersburg, FL MSA	--	98	--	93	89	85	--	--	--	--
Washington, DC-MD-VA MSA	--	98	--	93	89	85	81	--	77	74

