LIHEAP Data Case Study:
Energy Burden Targeting

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Executive Summary

The LIHEAP statute requires grantees to provide the highest level of assistance to households with the highest home energy burden. To accomplish this goal, Minnesota's benefit determination procedures do the following:

- Main Heating Fuel Bill - Whenever possible, the program collects main heating fuel expenditures for the last 12 months for LIHEAP applicants from their heating fuel vendor.
- Home Heating Bill – The program then estimates the share of the bill used for heating based on factors developed from the Residential Energy Consumption Survey (RECS).
- Percent of Heating Bill Paid – The program then pays a share of the heating bill based on income, with the lowest income households getting the highest share of the heating bill paid.

The outcome of the procedure is that high burden households (i.e., those with higher energy bills and lower incomes) receive higher LIHEAP benefits (see Figure 1) and have a larger share of their energy bills paid (see Figure 2).

Figure ES1: Average Annual Total LIHEAP Benefits for All and High Burden Households
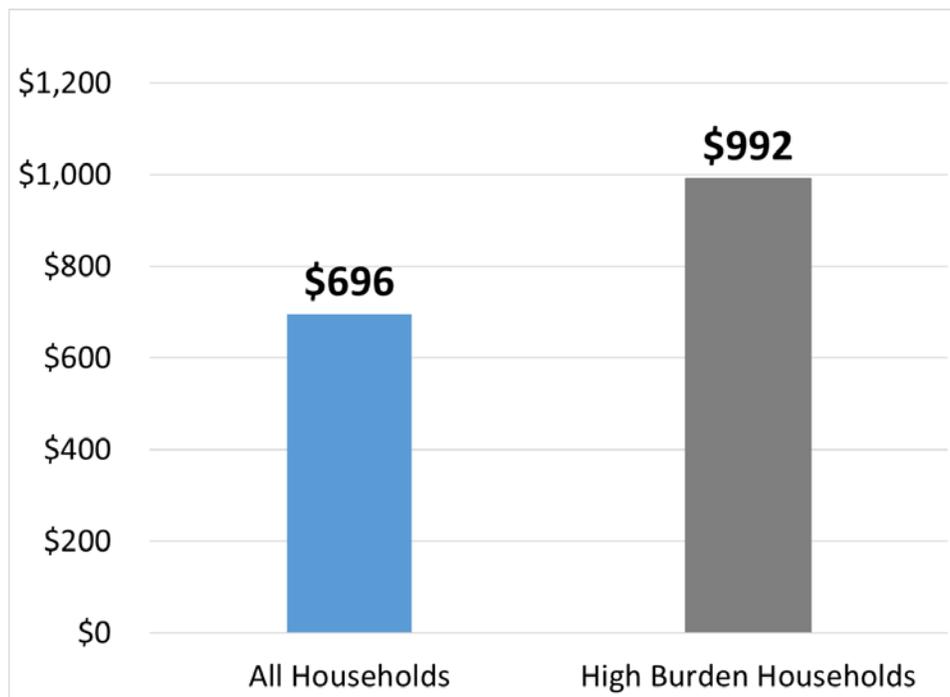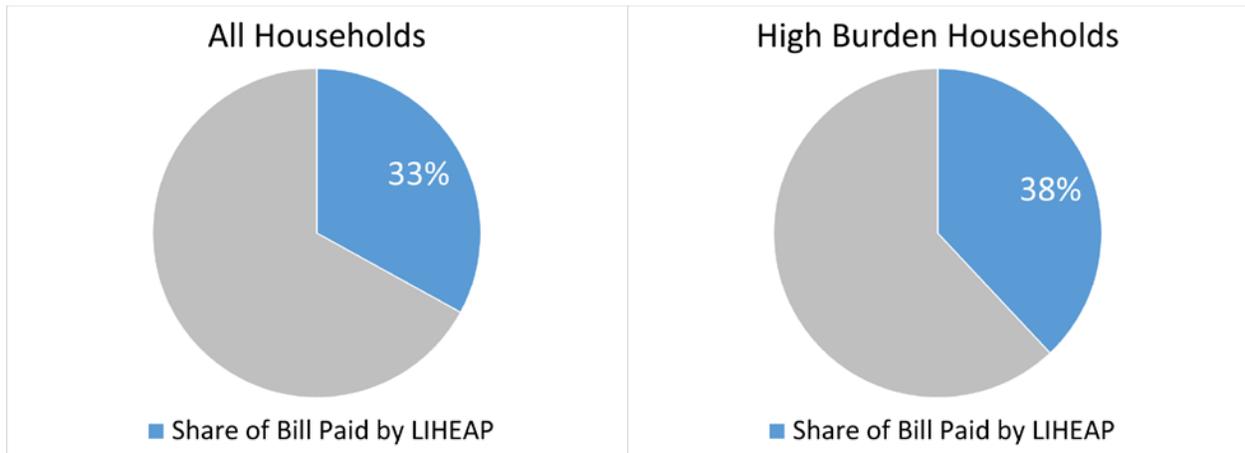
Figure ES2: Share of Bill Paid by LIHEAP for All and High Burden Households

In terms of the LIHEAP Performance Measures, Minnesota meets the objectives established for state grantees.

- Benefit Targeting Index – The benefit targeting index compares the average benefit for high burden households to the average benefit for all households. For Minnesota, the Benefit Targeting Index is 143, meaning that the program provided 43 percent higher benefits to high burden households.
- Burden Reduction Targeting Index – The burden reduction targeting index compares the average share of the bill paid for high burden households to the average share paid for all households. For Minnesota, the Burden Reduction Index is 112, meaning that the program paid a 12 percent higher share of the bill for high burden households.

By designing a benefit determination procedure that uses *actual* energy bills, accounts for differences in the share of the fuel use for heating by the type of fuel, and that accounts for the differences in energy burden resulting from differences in income, Minnesota accomplishes the goal of providing the highest level of assistance to households with the highest home energy burden.

Introduction

Home energy burden is the share of income a household spends on its home energy bills (i.e., heating and cooling). The LIHEAP statute requires grantees to provide the highest level of assistance to households with the highest home energy burden. To accomplish this, most states design benefit determination procedures that account for household income and energy bills in some way. This case study examines how Minnesota targets home energy burden reduction through its benefit determination procedures and shows the outcomes using FY 2016 program data reported for the LIHEAP Performance Measures.

Case Study: Minnesota

Benefit Determination Procedures

Minnesota's benefit determination procedure is designed to assign the highest benefits to the households with the highest home energy burden using the following procedure:

- Heating Fuel Expenditures – When a client applies for the LIHEAP program, Minnesota's information technology system (eHeat) obtains information on their heating fuel expenditures for the last 12 months from the client's heating fuel vendor.

- Estimated Heating Expenditures – The heating fuel expenditure data are a good starting point for measuring a household's home energy burden. However, households often use their heating fuel for non-heating purposes, such as water heating or cooking. To account for that, the benefit determination system then uses factors developed from the Residential Energy Consumption Survey (RECS) to estimate the portion of the heating fuel bill that was used for heating the client's home in the last year. For example, the RECS estimates that about 75 percent of annual natural gas costs are for home heating while only 40 percent of annual electricity costs are for home heating. Figure 1 shows the estimated percent heat factors for each main heating fuel.

- Percent of Heating Expenditures Paid – The benefit determination procedure then assigns a benefit that pays the highest share of the Estimated Heating Expenditures for the lowest income households. For example, the procedure pays 94.5% of the Estimated Heating Expenditures for households with income below 25% of state median income (SMI), but only 52.5% of the Estimated Heating Expenditures for households with income between 40% and 50% of SMI. Figure 2 shows the percent of the Estimated Heating Expenditures Minnesota pays for each income category.

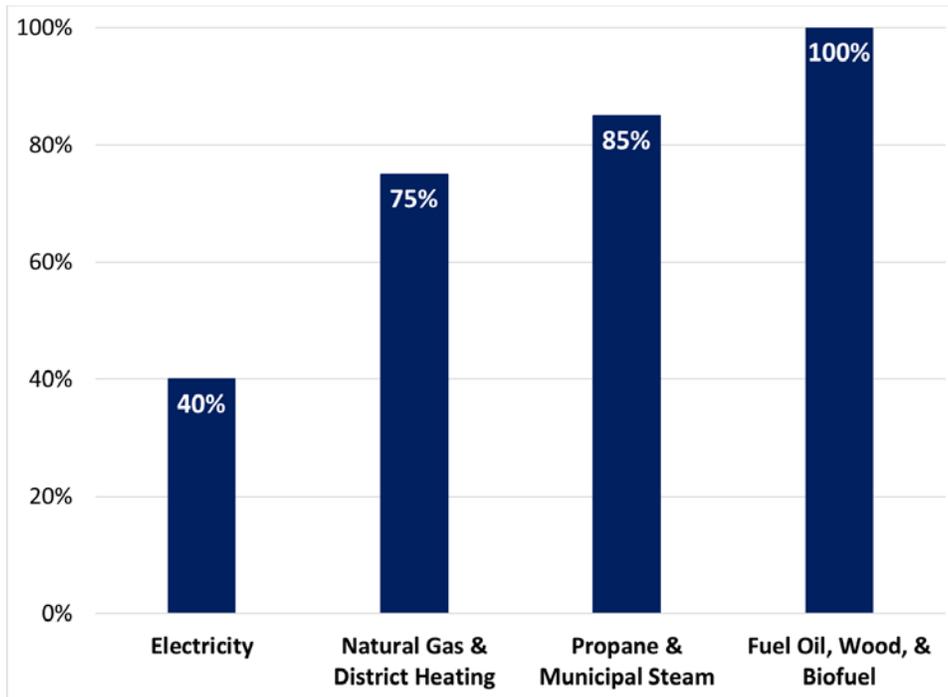**Figure 1: Estimated Percent Heat Factor by Heating Fuel**

Figure 2: Share of Estimated Heating Expenditures to Pay by Income Category
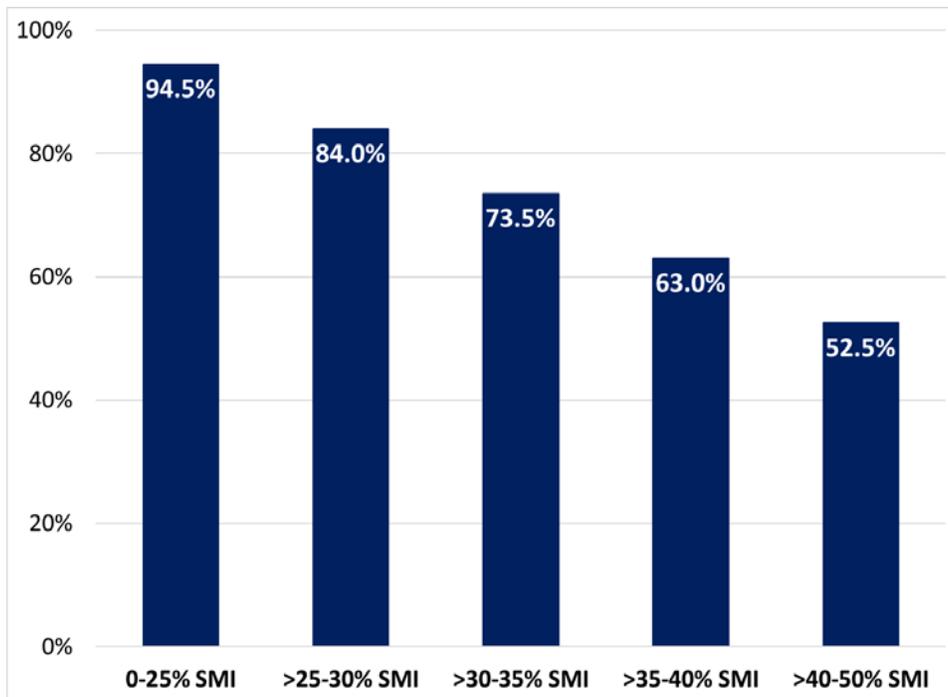
Table 1 shows the combination of the estimated percent heat factor (from Figure 1) and the share of the Estimated Heating Expenditures to pay for each income category (from Figure 2). The percentages listed in Table 1 represent the amount of the bill Minnesota pays in LIHEAP benefits. For example:

- A household that uses electric main heat and whose income is less than 25% of SMI will have 37.8% of its electric bill paid by Minnesota's LIHEAP program. [40% estimated percent heat factor for electricity multiplied by 94.5% share to pay for income between 0-25% SMI = 37.8%]

- A household that uses natural gas main heat and whose income is between 35-40% of SMI will have 47.2% of its natural gas bill paid by Minnesota's LIHEAP program. [75% estimated percent heat factor for natural gas multiplied by 63.0% share to pay for income between 35-40% SMI = 47.2%]

Table 1: Minnesota Cost-Based Benefits Matrix - Share to Pay of Heating Fuel Bill by Fuel Type and Income Category

Income Category	Electricity Heating	Natural Gas & District Heating	Propane & Municipal Steam Heating	Fuel Oil, Wood, & Biofuel Heating
0-25% SMI	37.8%	70.9%	80.3%	94.5%
>25-30% SMI	33.6%	63.0%	71.4%	84.0%
>30-35% SMI	29.4%	55.1%	62.5%	73.5%
>35-40% SMI	25.2%	47.2%	53.5%	63.0%
>40-50% SMI	21.0%	39.4%	44.6%	52.5%

When a household does not have heating bill information for the previous year at the time of application, Minnesota uses a backup matrix to determine the household's benefit amount. Under this procedure, Minnesota first estimates the heating bill for a household based on its main heating fuel type and type of housing unit (e.g., single family home), and then uses the same benefit determination procedures to pay the designated percentage of that heating bill.

Household Characteristics of Minnesota LIHEAP Recipients

The following section shows the characteristics of Minnesota LIHEAP recipients that are related to energy burden.

Figure 3 shows that the average annual income for all households for all fuel types was $18,626. For high burden households, income was $7,959, less than half of the income for all households. Among all LIHEAP recipient households, average annual income ranges from $17,196 for households using fuel oil main heat to $19,022 for households using natural gas main heat. Among high burden LIHEAP recipient households, average annual income ranges from $6,258 for households using natural gas main heat to $10,546 for households using fuel oil main heat. These data show that there is a large difference between the income of the average household and the

high burden household, but there is only a small difference in the average income by main heating fuel type.

Figure 3: Average Annual Income by Main Heating Fuel Type, Minnesota, FY 2016
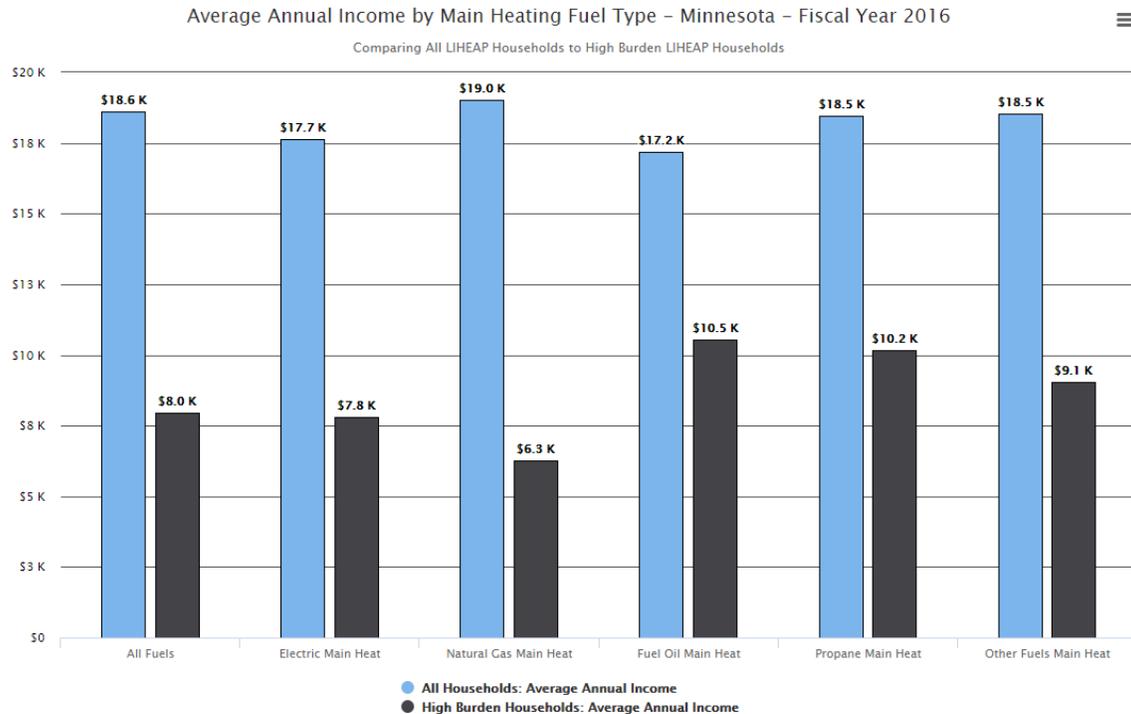
Fuel Type	All Households	High Burden Households	High Burden to All Households Ratio
All Fuels	$18,626	$7,959	0.43
Electric Main Heat	$17,652	$7,816	0.44
Natural Gas Main Heat	$19,022	$6,258	0.33
Fuel Oil Main Heat	$17,196	$10,546	0.61
Propane Main Heat	$18,466	$10,169	0.55
Other Fuels Main Heat	$18,541	$9,058	0.49

Figure 4 (below) shows that the average annual total residential energy bill (i.e., main heating bill and electric bill) for all households for all fuel types was $2,102. For high burden households, it was $2,600, about 24 percent ($498) higher than for all households. The average annual total residential energy bill varies widely across main heating fuel type, for all households and high burden households, with households using delivered fuels paying the most, on average.

Figure 4: Average Annual Total Residential Energy Bill by Main Heating Fuel Type, Minnesota, FY 2016
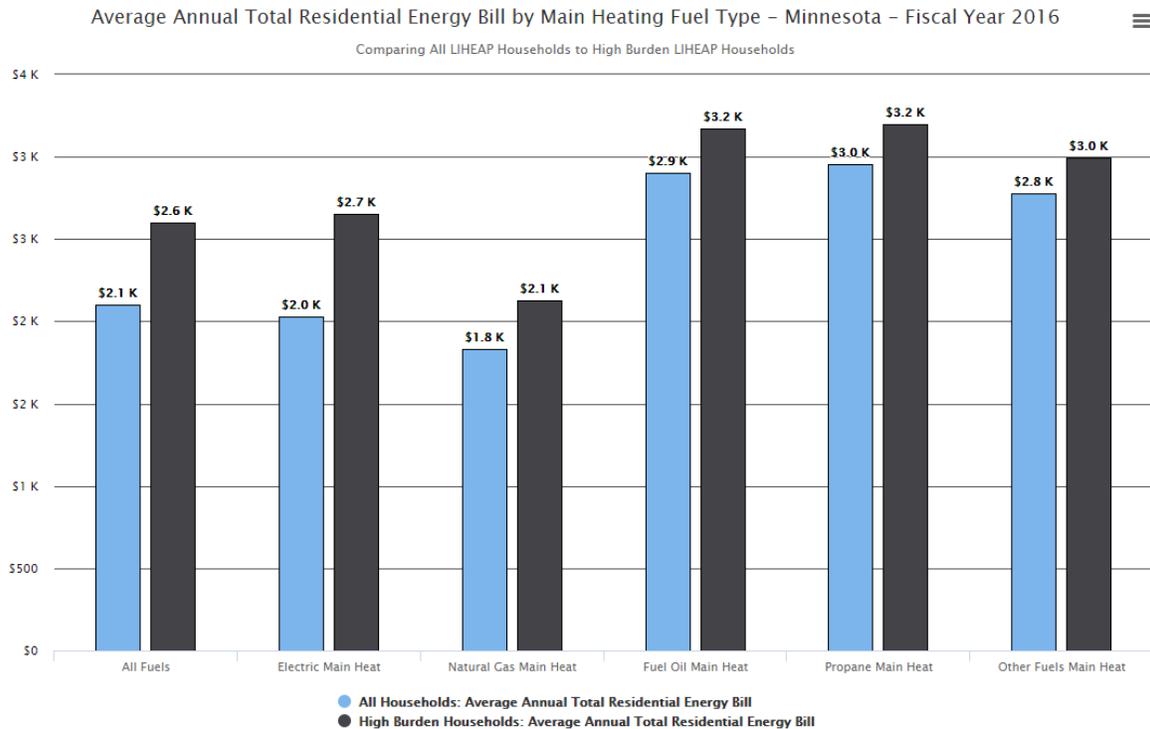
Fuel Type	All Households	High Burden Households	High Burden to All Households Ratio
All Fuels	$2,102	$2,600	1.24
Electric Main Heat	$2,026	$2,656	1.31
Natural Gas Main Heat	$1,835	$2,127	1.16
Fuel Oil Main Heat	$2,900	$3,172	1.09
Propane Main Heat	$2,952	$3,199	1.08
Other Fuels Main Heat	$2,777	$2,997	1.08

Figure 5 (below) shows that the average annual energy burden *before* receiving LIHEAP benefits for all households for all fuel types was about 11.3 percent. For high burden households, it was 32.7 percent, nearly three times higher than for all households. Energy burden *before* LIHEAP varies by fuel type, ranging from 9.7 percent for households using natural gas main heat to about 16.9 percent for households using fuel oil main heat. On average, energy burden before receiving LIHEAP benefits tends to be higher for households using delivered fuels (fuel oil and propane) than utility fuels (electric and natural gas). [Note: average annual energy burden before receiving LIHEAP benefits for high burden households is fairly uniform across main heating fuel types because these households have been individually classified based on having the highest energy burdens.]

Figure 5: Average Annual Energy Burden Before LIHEAP by Main Heating Fuel, Minnesota, FY 2016
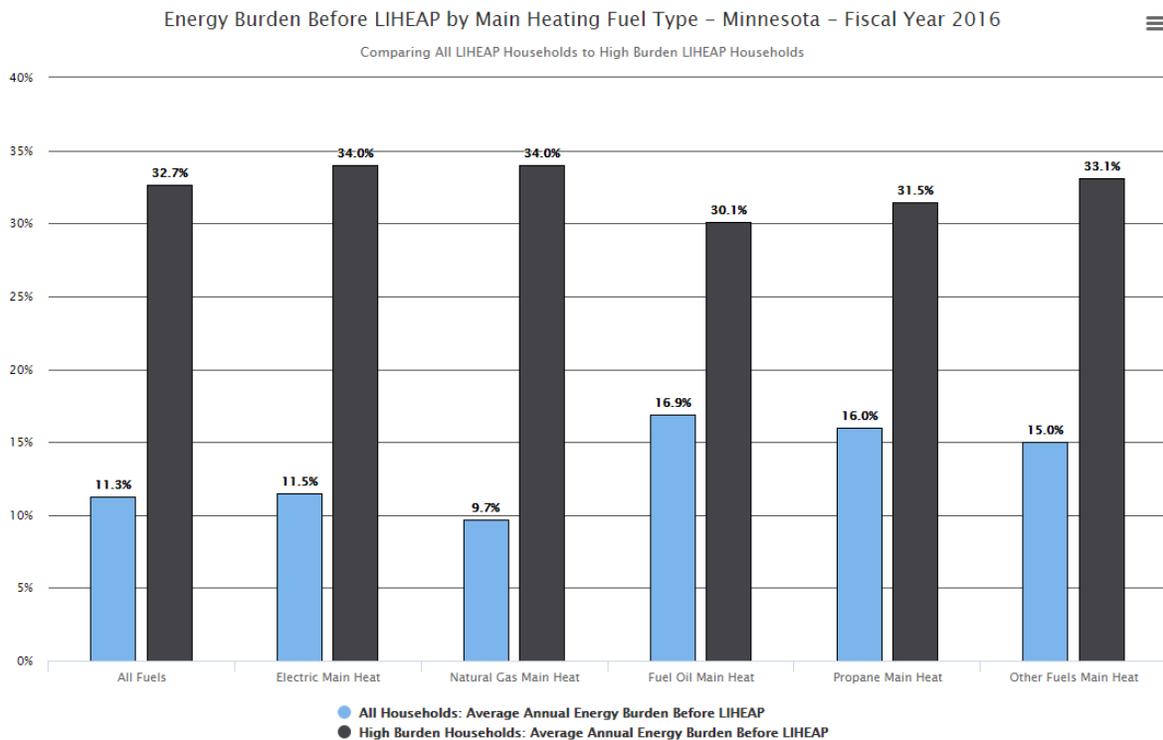
Fuel Type	All Households	High Burden Households	High Burden to All Households Ratio
All Fuels	11.3%	32.7%	2.89
Electric Main Heat	11.5%	34.0%	2.96
Natural Gas Main Heat	9.7%	34.0%	3.52
Fuel Oil Main Heat	16.9%	30.1%	1.78
Propane Main Heat	16.0%	31.5%	1.97
Other Fuels Main Heat	15.0%	33.1%	2.21

Figure 3 and Figure 4 demonstrate that while income is a major driver of high energy burden in Minnesota, energy costs also play a role. All else being equal, households using delivered fuels for home heating in Minnesota tend to have higher energy burden before receiving LIHEAP benefits than households using utility fuels for home heating. Minnesota's LIHEAP program targets the factors of energy burden in its benefit determination procedures by accounting for household income (relative to household size), main heating fuel type, and home heating bills.
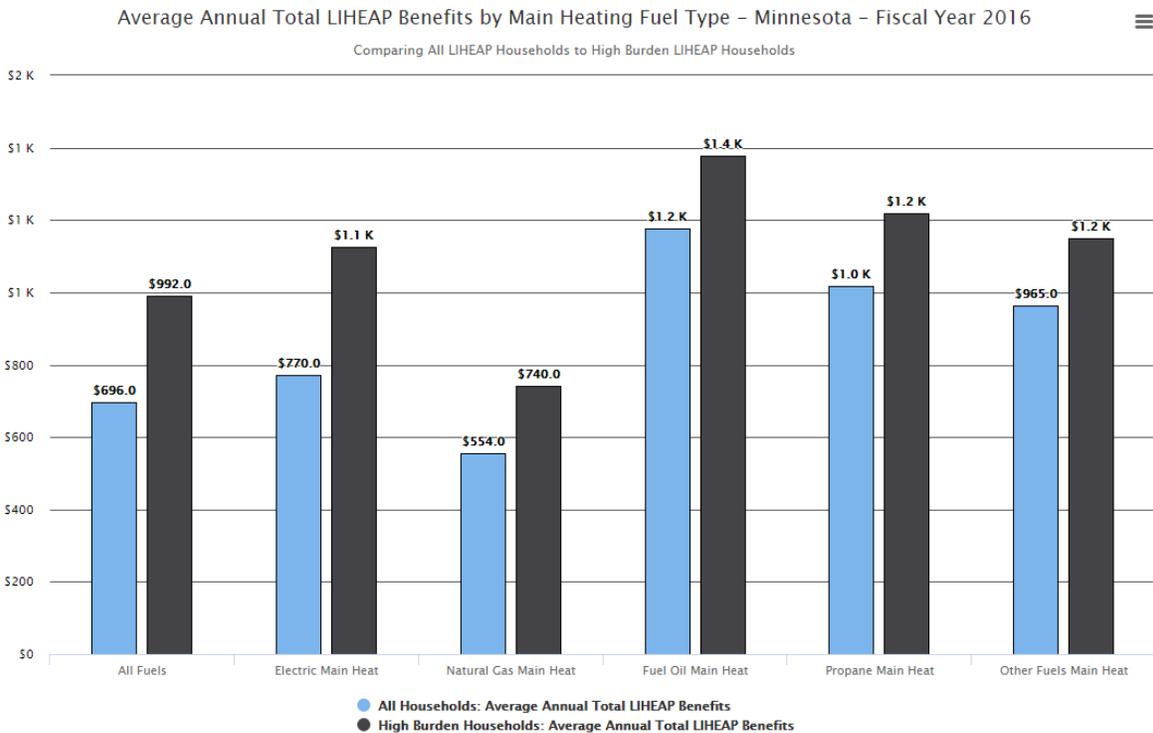
LIHEAP Benefits

The following section shows the results of Minnesota's benefit determination procedures and determines how effectively the LIHEAP program targets the energy burden of its clients.

Figure 6 shows that the average annual total LIHEAP benefits received by all households for all fuel types was $696. For high burden households, it was $992 – about 43 percent ($296) higher than for all households. Consistently across fuel types, Minnesota provides higher benefits to high

burden households compared to all households. Households using fuel oil main heat receive the highest benefits, with all fuel oil households receiving an average of $1,176 in benefits and high burden fuel oil main heat households receiving an average of $1,377. Households using natural gas main heat receive the lowest average benefits. This is consistent with the benefit determination procedures established by Minnesota and the factors driving energy burden among the recipient population in Minnesota.

Figure 6: Average Annual Total LIHEAP Benefits by Main Heating Fuel Type, Minnesota, FY 2016
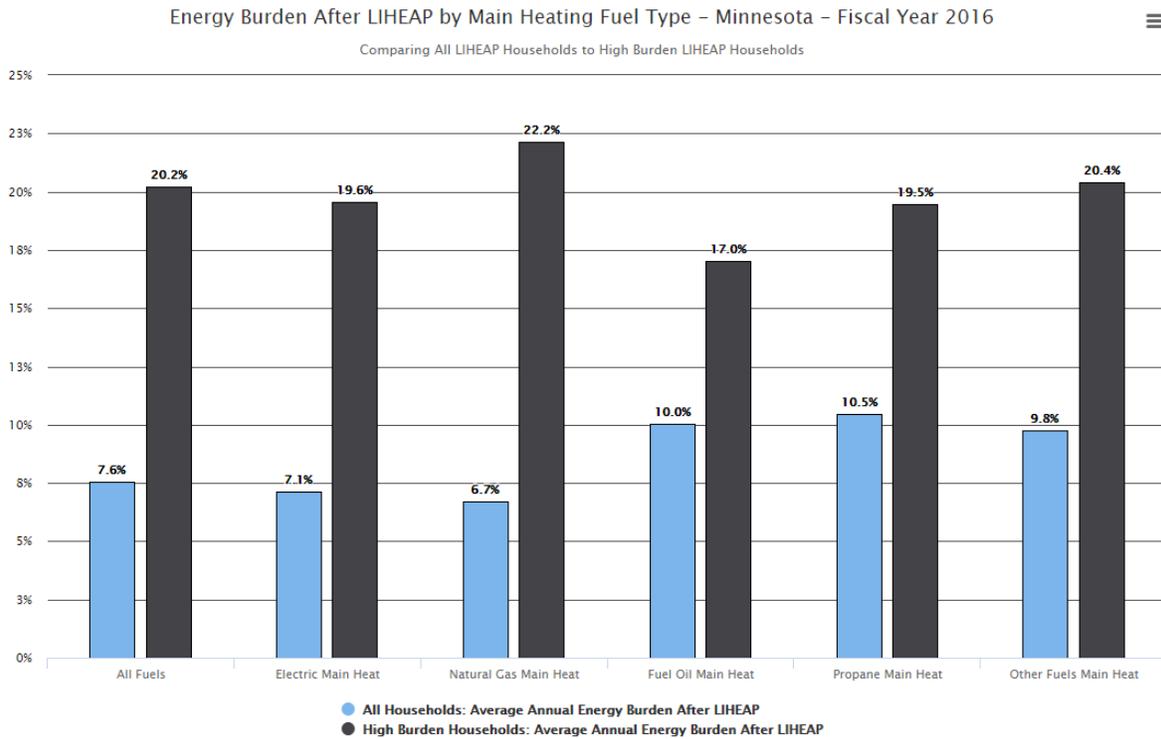

Average Annual Total LIHEAP Benefits by Main Heating Fuel Type – Minnesota – Fiscal Year 2016
Comparing All LIHEAP Households to High Burden LIHEAP Households

● All Households: Average Annual Total LIHEAP Benefits
● High Burden Households: Average Annual Total LIHEAP Benefits

Fuel Type	All Households	High Burden Households	High Burden to All Households Ratio
All Fuels	$696	$992	1.43
Electric Main Heat	$770	$1,127	1.46
Natural Gas Main Heat	$554	$740	1.34
Fuel Oil Main Heat	$1,176	$1,377	1.17
Propane Main Heat	$1,017	$1,220	1.20
Other Fuels Main Heat	$965	$1,151	1.19

Energy Burden Targeting

Figure 7 shows that the average annual energy burden *after* receiving LIHEAP benefits for all households for all fuel types was about 7.6 percent. For high burden households, average annual energy burden was about 20.2 percent after receiving LIHEAP benefits, still about 2.7 times higher than for all households. While households using delivered fuels for home heating still have higher energy burden after receiving benefits, on average, than households using utility fuels for heating, the gap between these groups is smaller because higher LIHEAP benefits (Figure 6) are provided to households using delivered fuels.

Figure 7: Energy Burden After LIHEAP by Main Heating Fuel Type, Minnesota, FY 2016


Energy Burden After LIHEAP by Main Heating Fuel Type – Minnesota – Fiscal Year 2016
Comparing All LIHEAP Households to High Burden LIHEAP Households

● All Households: Average Annual Energy Burden After LIHEAP
● High Burden Households: Average Annual Energy Burden After LIHEAP

Fuel Type	All Households	High Burden Households	High Burden to All Households Ratio
All Fuels	7.6%	20.2%	2.68
Electric Main Heat	7.1%	19.6%	2.75
Natural Gas Main Heat	6.7%	22.2%	3.29
Fuel Oil Main Heat	10.0%	17.0%	1.70
Propane Main Heat	10.5%	19.5%	1.86
Other Fuels Main Heat	9.8%	20.4%	2.09

Figure 8 (below) shows the Benefit Targeting Index and Burden Reduction Targeting Index for High Burden Households. These indexes are measures of the following:

- The Benefit Targeting Index measures whether the state's LIHEAP program provides higher benefits to high burden households compared to the average household receiving LIHEAP. A score greater than 100 means that higher benefits are paid to high burden households; less than 100 means that lower benefits are paid to high burden households. A score greater than 100 is an indicator that the state is achieving its goal of providing the highest benefits to the households with the highest energy burden.

- The Burden Reduction Targeting Index measures whether the state's LIHEAP program pays a greater share of the energy bill (and reduces energy burden by a greater percentage) for high burden households compared to the average household receiving LIHEAP. A score greater than 100 means that a greater share of the energy bill is paid by the LIHEAP program for high burden households; less than 100 means that less share of the energy bill

is paid by LIHEAP for high burden households. This measure goes beyond the goal of providing the highest benefits to the households with the highest energy burden to measure the *impact* that the LIHEAP program has on households with high energy burden.

Figure 8: Benefit & Burden Reduction Targeting Indexes for High Burden Households by Main Heating Fuel Type, Minnesota, FY 2016

Benefit & Burden Reduction Targeting Indexes for High Burden Households – Minnesota – Fiscal Year 2016
By Main Heating Fuel Type

● Benefit Targeting Index for High Burden Households
● Burden Reduction Targeting Index for High Burden Households
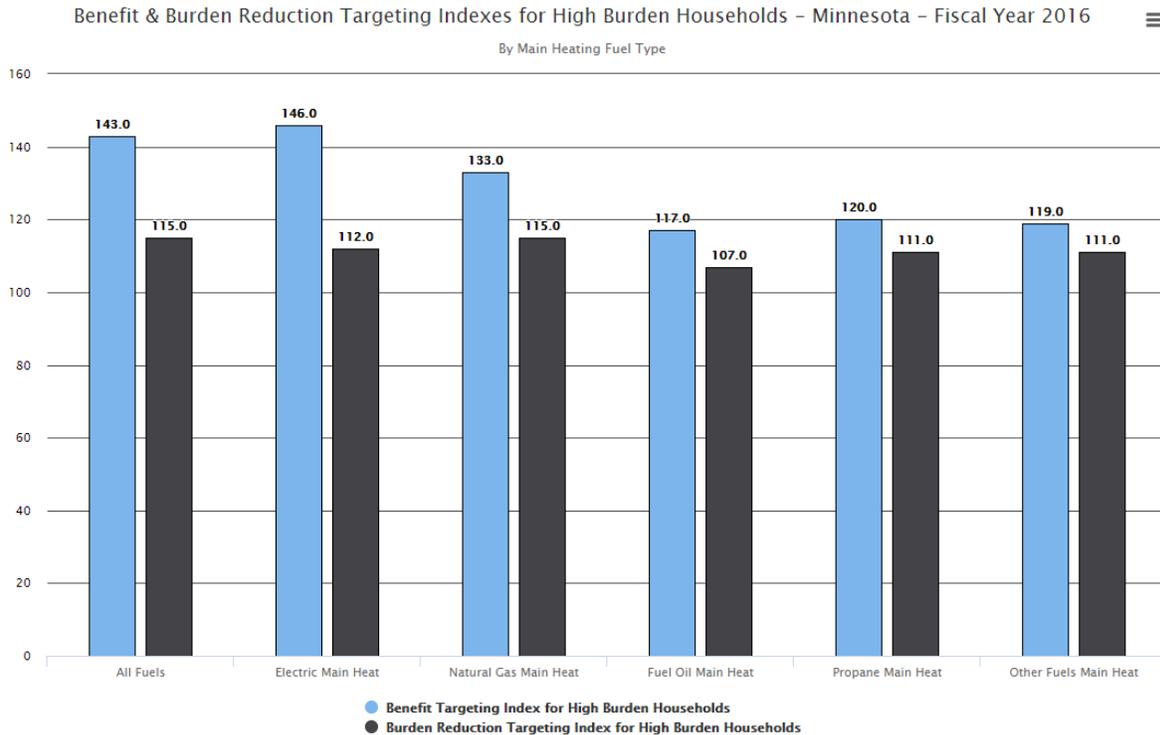
Fuel Type	Benefit Targeting Index	Burden Reduction Targeting Index
All Fuels	143	115
Electric Main Heat	146	112
Natural Gas Main Heat	133	115
Fuel Oil Main Heat	117	107
Propane Main Heat	120	111
Other Fuels Main Heat	119	111

Figure 8 shows that the Benefit Targeting Index for all high burden households is 143, meaning that the average benefit provided to high burden households ($992) is 43 percent higher than the benefit provided to the average household receiving LIHEAP ($696). The index is greater than 100 for all main heating fuel types, ranging from 117 for high burden households using fuel oil for home heating (meaning 17 percent higher benefits to high burden fuel oil main heat households than average fuel oil main heat households) to 146 for high burden households using electricity for home heating (meaning 46 percent higher benefits to high burden households using electricity main heat than average electricity main heat households). Since all main heating fuel groups exceed an index score of 100, the Benefit Targeting Index indicates that Minnesota's benefit determination procedures target energy burden by providing the highest benefits to households with the highest energy burden, overall and for each main heating fuel type.

Going beyond providing higher benefits to households with higher burden, Figure 6 also shows that the Burden Reduction Targeting Index is greater than 100, overall and for each main heating fuel type. For all high burden households, the index score is 115, meaning that LIHEAP paid 15 percent more of the energy bill for high burden households than all households, on average. By targeting the factors contributing to energy burden, Minnesota is able to achieve a greater impact for the households with the greatest need.

Summary of Findings

The LIHEAP statute requires grantees to provide, in a timely manner, the highest level of assistance to households with the highest energy burden (highest energy costs in relation to income and household size). To achieve this goal, Minnesota has designed a benefit determination procedure that accounts for factors underlying energy burden – household income (relative to household size), main heating fuel type, and heating bills (actual or estimated). The result is that the program not only targets higher benefits to higher burden households, but also has a greater impact (i.e., pays a greater share of the energy bill) for households with the highest burden.

Grantees are encouraged to examine this case study topic using data for their own state (see Appendix A for instructions to access the data using Data Warehouse Guided Search on the LIHEAP Performance Management Website). If you need assistance in examining this case study for your state, or have additional questions you would like to examine, please contact Kevin McGrath (kevin-mcgrath@appriseinc.org) and Dan Bausch (daniel-bausch@appriseinc.org) at APPRISE.

Appendix A:
Tutorial for Accessing the Data

Appendix A: Tutorial for Accessing the Data to Examine Case Study Topic

Access the Single State Program Reports in the Data Warehouse/Guided Search

Note: Data for FY 2016, including the new LIHEAP Performance Measures data, are now publicly available but considered preliminary until otherwise noted.

1. From the LIHEAP Performance Management Website, click the Data Warehouse tab on the blue main menu bar near the top of the page.

2. Click Standard Reports. This section of the Data Warehouse allows users to create predefined reports and tables that can help them better understand the performance of their LIHEAP programs, including reports to understand how vulnerable populations are being targeted with LIHEAP assistance.

3. The Standard Reports allow you to examine Single State Reports (information for a specific state), State Comparison Reports (information to compare multiple states), and National LIHEAP Program Reports (national statistics for the LIHEAP program). Click Single State Reports.

4. For this case study, the data to examine are found in the "Energy Burden" and "LIHEAP Targeting Indexes" sections. In this tutorial, we will access the data that shows how income varies by main heating fuel type. Click on "Energy Burden."

Appendix A: Tutorial for Accessing the Data to Examine Case Study Topic

5. A dropdown menu will appear. Click on "Average Annual Income by Main Heating Fuel Type – All & High Burden LIHEAP Households."

6. Choose the state you want to examine and then click "Next."

7. The report will default to the most recent year for which data are available. To see the report for a different fiscal year, adjust the slider or click on the year. Then click on "View report."

8. The report will now be displayed as a chart and table. The data can also be exported into Excel. Click on "Back to report selection" to return to the Single State Program Reports page. Repeat steps 5-9 to obtain the other data needed for this case study.
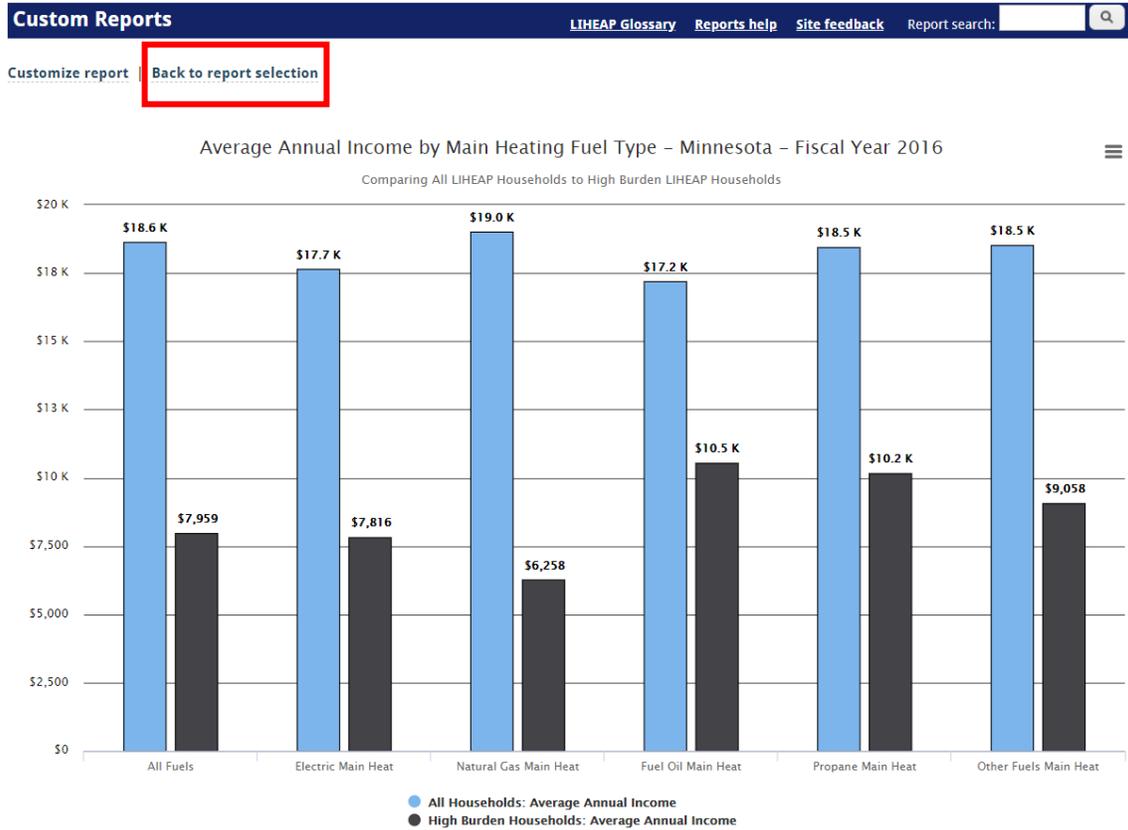
9. After you have selected your report, you can examine it in your web browser, download the data to a spreadsheet for external analysis, save an image of the chart to insert into another document, or print the chart and table directly from the website.

   To download the data to an external spreadsheet, click the button labeled "Export table data into CSV/Excel file" located beneath the data table for the report.

Benefit & Burden Reduction Targeting Indexes for High Burden Households - Minnesota - Fiscal Year 2016

Fiscal Year	Grantee	Benefit Targeting Index for High Burden Households - All Fuels	Burden Reduction Targeting Index for High Burden Households - All Fuels	Benefit Targeting Index for High Burden Households - Electric Main Heat	Burden Reduction Targeting Index for High Burden Households - Electric Main Heat	Benefit Targeting Index for High Burden Households - Natural Gas Main Heat	Burden Reduction Targeting Index for High Burden Households - Natural Gas Main Heat	Benefit Targeting Index for High Burden Households - Fuel Oil Main Heat	Burden Reduction Targeting Index for High Burden Households - Fuel Oil Main Heat	Benefit Targeting Index for High Burden Households - Propane Main Heat	Burden Reduction Targeting Index for High Burden Households - Propane Main Heat
2016*	Minnesota	143	115	146	112	133	115	117	107	120	111

Click here to export the data to Excel

Appendix A: Tutorial for Accessing the Data to Examine Case Study Topic

To save the chart as an image, or to print the chart and table directly from the website, click the icon in the upper right corner above the chart and then select which option best suits your needs:

- Print the chart; choose "Print chart" to print the image only; choose "Print report" to print the image along with the accompanying footnotes and table
- Download the chart as an image (choose to download in PNG, JPEG, and SVG vector image formats)
- Download the chart and table as a .pdf document