

More Tools in the Toolbox – An Examination of Metrics for Low-Income Customer Energy Burden

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ABSTRACT

Estimates of customer energy burden are often used to inform low-income program policy and program designs. Traditionally, these calculations are based on a standard metric that includes a household's energy costs and income. Circumstances of low-income households, however, are too complex and nuanced to be captured fully by a single ratio. This paper describes additional metrics for low-income household energy burdens, including: (a) modified energy burden that includes the non-cash benefits of government programs, (b) energy insecurity that includes customers' self-reported difficulty paying energy bills, and (c) material hardship that includes the household's poverty level and difficulty paying for basic living expenses. Comparison of these metrics broadens our understanding of hardship and energy burden among low-income households.

The research described in this paper utilizes customer billing data and responses to a 2016 phone survey with 900 low- and moderate-income customers in California. Self-reported income, ability to pay energy bills, difficulty paying for living expenses, and other indicators of hardship were used in combination with utility billing data to formulate the metrics discussed above.

By definition, income is tied to level of burden. When adjusting for other sources of support such as non-cash government benefits, however, the burden for households at the lowest levels of poverty is significantly reduced. Energy insecurity is the only metric that does not incorporate income, and energy insecurity among low-income households is not strongly correlated with income, energy costs, or degree of poverty. Low-income households with high levels of material hardship have lower incomes and higher energy burdens, but nearly the same energy costs.

Introduction

Energy affordability is an important consideration for low-income program administrators and policy makers around the country. In California, the California Alternate Rates for Energy (CARE) are mandated by law to help ensure that in-home energy is affordable for low-income households through reduced rates. The Energy Savings Assistance (ESA) Program seeks to improve health, comfort, and safety, as well as to reduce energy consumption. Reducing household energy consumption lowers energy bills and makes essential energy use more affordable. The program does this by providing energy efficient upgrades and energy education.

The degree to which households face difficulties with the cost of in-home energy for heating, cooling, and operating basic home appliances and lights can be measured in various ways. Traditional metrics for low-income energy research nationwide tend to focus on energy burden, while California and some other national studies have also explored a metric called energy insecurity. As part of a larger study on low-income energy-related needs in California, we investigated both energy burden and energy insecurity among California households, and added a broader metric of material hardship that encompasses more than energy costs to put energy affordability in a broader context for households

that have a difficult time making ends meet (Evergreen Economics 2016). In addition, we developed a modified version of the energy burden metric that includes a conservative valuation of non-cash benefits received by some households. Table 1 summarizes these four metrics of burden.

The methods and findings of our investigations into energy burden, energy insecurity, and material hardship for California households follow in the subsections below. We then compare, contrast, and discuss all three metrics.

Table 1. Measures of energy and household burden

Measure	What It Measures	Calculation Method	Meaning of Categories
Energy burden	Home energy costs as a percentage of household income	Household Energy Bill ÷ Self-Reported Gross Household Income	<ul style="list-style-type: none"> • High: 6.3% or higher • Medium: 3.9 to 6.3% • Low: 1.0 to 3.9% • Very low: energy burden < 1.0%
Modified energy burden	Home energy costs plus valuation of medical, housing, and food stamp assistance as a percentage of self-reported gross household income	Household Energy Bill ÷ (Self-Reported Gross Household Income + Valuation of Non-Cash Assistance)	Same breakpoints as for energy burden above
Energy insecurity	Household challenges regarding affordability of energy bills and monthly trade-offs between meeting energy needs and bill payments	Points allocated based on responses to survey questions about: <ul style="list-style-type: none"> • Difficulty household faces in paying energy bill • Household disposition to and motivation for saving energy • Equipment-related inability to keep home a comfortable temperature 	Primary assignment based on challenges paying energy bill (with adjustments based on other inputs): <ul style="list-style-type: none"> • High: Constantly struggle (or usually struggle with high degree of energy saving practices) • Moderate: Usually struggle • Low: Sometimes struggle • None: Never struggle and few energy practices motivated by need
Material hardship	Household challenges regarding broader affordability of basic necessities as food, shelter, and energy, etc.	Points allocated based on: <ul style="list-style-type: none"> • Federal Poverty Level (FPL)* • Survey question about difficulty of paying household bills and basic living expenses 	<ul style="list-style-type: none"> • High: Low Income (LI) and regularly or sometimes struggles with basic living expenses • Moderate: LI and sometimes or occasionally struggle with basic living expenses • Low: Moderate Income (MI) and occasionally or never struggle with basic living expenses • None: MI or HI and never struggle with basic living expenses

*Federal poverty level was based on self-reported income and household size.

Methodology

The primary source of data for this study was a customer telephone survey with 905 households in geographic areas with high concentrations of low-income and moderate-income utility customers. We defined low-income households as those whose income and household sizes place them at or below 200 percent of the federal poverty level (FPL), consistent with the ESA and CARE guidelines, and moderate-income as between 200 and 400 percent of the FPL. We utilized Athens Research data to select a

stratified random sample of customers from zip codes known to have high percentages of low-income and moderate-income households (Athens 2015). The sample was stratified by IOU, income level, and CARE enrollment status. We developed a sample design that maximized the concentration of low- to moderate-income households, minimized cost, and encompassed a wide geographic area.

The telephone survey included a number of questions that were used as inputs to the various burden metrics, such as: household income, receipt of government assistance, difficulty paying energy bills, energy conservation practices, difficulty keeping the home warm or cool enough (due to equipment limitations), and difficulty paying for basic living expenses. The other key source of data used in this study was utility billing data, which we obtained from each of the four California Investor-Owned Utilities (IOUs) for calendar years 2014 and 2015.

Our methods for calculating the energy burden, modified energy burden, energy insecurity, and material insecurity metrics follow in the sections below.

Energy Burden

Defined as the share of a household's income spent on home-related energy consumption, energy burden represents a well-established and easily measurable metric associated with a household's ability to pay for the energy. The energy burden metric discussed in this paper is based on a simple division of household energy costs by household income, as reflected in the equation below.

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

A mean monthly energy cost for each household was calculated from monthly utility billing data. If a customer was served by another utility for a second fuel (i.e. different utilities for electricity and gas), we estimated their energy costs for the second fuel by imputing a value based on the average consumption of homes of the same type in the same climate zone, and scaled that by the household's known fuel consumption.

Household income was self-reported by respondents to our phone survey. For survey respondents who refused to answer the income question, we estimated their income based on information reported in CARE or ESA income documentation or by using median Census block group income when other information was not available.¹

Modified Energy Burden

The modified energy burden metric is a variation of energy burden described above with an income adjustment for selected government assistance received by households. The specific government assistance programs that were asked about in the survey include: social security or disability; supplemental security income; unemployment compensation; housing assistance; CalFresh, SNAP, or other food stamps; medical assistance from MediCal or Medicaid; and other forms of cash assistance for households with financial need.

We assumed that benefits from social security, disability, supplemental security income, and unemployment were already included in self-reported income because these are cash benefits issued in regular time intervals with predictable values. The remaining benefits received from government assistance programs can have a substantial impact on a household's expenses, but the value of these benefits is likely not accounted for in self-reported income.

¹ Approximately 88 percent of survey respondents provided household income information.

The goal of this analysis was to calculate a modified energy burden by adding the value of any government assistance benefits a household receives to their total income. This modified income is intended to be an upper bound, with the true income (and thus energy burden) falling somewhere between this modified income and the original.

The remainder of this section describes the various benefits we calculated to create a modified energy burden, including the percentage of low-income households that reported each benefit and the average amount imputed for each benefit based on household characteristics.

Housing Benefits. Housing benefits include public housing, privately owned subsidized housing, and Section 8 housing choice vouchers. We estimated the value of these benefits using the fair market rent approach, which was developed as part of the supplemental poverty measure and is used by the U.S. Census Bureau (U.S. Census Bureau 2010). This approach takes into account household income and local housing costs. Twelve percent of low-income households reported receiving housing benefits, and the average value of benefits was calculated to be \$9,788.50.

Food Benefits. Food benefits consist primarily of food stamps from CalFresh (i.e., the Supplemental Nutrition Assistance Program, or SNAP), which have cash value but can only be used to purchase food. Many families with children who are eligible for food stamps also receive food benefits in the form of free lunches through the School Lunch program and vouchers for specific food items through the Women, Infants, and Children (WIC) program. Twenty-nine percent of low-income households reported receiving food benefits, and the average value of benefits was calculated to be \$4,382.74.

Medical Benefits. Our estimated value of medical benefits includes MediCal/Medicaid, but not Medicare. We estimated the value of Medicaid in terms of its impact on out-of-pocket spending (i.e., amount paid by self), rather than its impact on total medical expenditures (i.e., amount paid by Medicaid). Sixty-one percent of low-income households reported receiving medical benefits, and the average value of benefits was calculated to be \$1,810.90.

Other Cash Benefits. Other forms of cash assistance for households with financial need come from the California Work Opportunity and Responsibility to Kids (CalWORKs) program, which is California's version of the Temporary Assistance for Needy Families (TANF) program. The value of these benefits depends on the household composition, income, whether the caretakers are disabled, and many other factors. Our estimates for the value of these cash benefits come from the data reported by the U.S. Department of Health and Human Services Office of Family Assistance for fiscal year 2014. These data provide the average TANF subsidy issued by the number of children in each household in California. Seven percent of low-income households reported receiving some form of cash benefits, and the average value of benefits was calculated to be \$7,159.43.

For each survey respondent that answered affirmatively to receiving any of these benefits, we calculated the associated cash value and added that to their self-reported income. This modified income was then used to calculate a modified energy burden using the same calculation as energy burden:

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

Energy Insecurity

The energy insecurity metric and the survey questions on which it is based focus primarily on the household's overall struggle with energy bills. The metric incorporates an initial assignment into categories of high, moderate, low, or no energy insecurity based on the degree to which the household says it struggles to pay the energy bills. These initial assignments were then modified upward or downward based on responses to questions regarding the household's capacity to reduce energy use further without impacting health of family members as well as equipment-related challenges to

maintain comfortable temperatures. This assignment of energy insecurity scores was implemented as shown in Table 2 below.

Table 2. Energy insecurity scoring metric

Step	Based on...	Scoring
Step 1: Initial assignment	Q: I'd like to ask specifically about your home's energy bills. Which of the following best describes your situation? a) Paying the energy bills is not an issue for us. b) We occasionally struggle to pay the energy bills. c) We often struggle to pay the energy bills. d) We are constantly struggling to pay the energy bills.	Assign points based on household response: Constantly struggle (d) = 30 points Usually struggle (c) = 20 points Sometimes struggle (b) = 10 points Never struggle (a) = 0 points
Step 2: Adjustments based on self-reported conservation practices	Q: For each of the statements...please tell me whether you agree, somewhat agree or disagree. a) We only use electricity when it's really needed; there's no way we could cut down. b) We have to conserve energy at home because we can't afford to pay higher utility bills. c) My family's health would suffer if we heated our home any less in the winter. d) My family's health would suffer if we cooled our home any less in the summer.	If agree with both a and b: add 5 points. If agree with either c or d: add 5 points. If disagree with all four: subtract 10 points.
Step 3: Possible adjustments based on self-reported equipment limitations	Q: How often, if ever, is your home colder/warmer than you'd like because your heating/cooling system just can't keep up? Does that happen...? a) never b) no more than once or twice a year c) a few times a year d) often	If report equipment-related comfort issues (either heating or cooling) that occur often (d): add 10 points

We then assigned each household an energy insecurity level based on its total energy insecurity points. Table 3 below shows the cutoff points for each energy insecurity level and the distribution of low-income households across these levels.

Table 3. Energy Insecurity level assignment

Energy Insecurity Level	Points	Percentage of Low-Income Households
None	Less than 9	24.7%
Low	10 to 19	28.7%
Moderate	20 to 29	24.6%
High	30 or more	21.9%

Material Hardship

The metric for material hardship is derived exclusively from household federal poverty level (FPL) and household inability to cover basic living expenses. This simple approach allowed us to compare households more directly using a well-established measure of financial challenge and a single self-reported indicator of the ultimate issue we sought to measure (ability to cover basic living expenses) without unduly confounding the analysis with multiple other inputs to which household responses may be based on additional subjective standards. This metric allowed us to measure households' hardships beyond energy-related issues and served as a broader indicator of overall household insecurity levels.

Below, Table 4 shows the scoring allocation for the two inputs used in the material insecurity metric. Households were scored on a scale from zero to 60, where zero represents a household that has

an FPL ratio of 400 percent or higher and never struggles to pay for basic living expenses, and 60 represents a household with an FPL ratio of 100 percent or lower and regularly struggles to pay for basic living expenses.

Table 4. Material hardship scoring metric

Step	Based on...	Scoring
Step1	Federal poverty level (FPL)	Based on FPL ratio... 0-100% FPL: 30 points 101-200%: 20 points 201-400%: 10 points 400% or higher: 0 points
Step 2	Q: How often would you say that in the past three years, there has been a time that you were not able to pay all of your bills and cover your basic living expenses for such things as food and housing? Would you say...? a) never b) just once or twice c) a few times d) regularly/always e) don't know/refused	Assign points based on household response: Regularly/always = 30 points A few times = 20 pts Once or twice = 10 pts Never/don't know/skipped = 0 pts

Using this approach, we scored each responding household and assigned a material insecurity level based on the total material insecurity points from Step 1 and Step 2. Table 5 below shows the four levels of material insecurity ranging from “none” to “high.” The category break-points were designed to highlight the variety of different possible material insecurity levels and household types. For example, the break-points on the low end between “none” and “low” were designed to separate moderate-income and low-income households, even if both households never struggled on basic living expenses, with the assumption that low-income households inherently have at least some material insecurities that higher-income households do not have to deal with.

Table 5. Material hardship level assignment

Material Hardship Level	Points	Percentage of Low-Income Households
None	Less than 20	0%
Low	20 to 29	30.9%
Moderate	30 to 49	48.1%
High	50 or more	21.0%

Results

Energy Burden

Overall, we found that energy burdens decrease as incomes increase, as one would expect. Low-income households (i.e., those at or below 200% of the FPL) had an average energy burden of 5.6 percent. The median energy burden for this group was 3.9 percent.

Households below 100 percent of the FPL have disproportionately higher energy burdens with average burdens of 8 percent, as shown in Table 6. More importantly, the range is much greater at lower incomes, with some households facing energy costs as high as 40 percent of household income.

Table 6. Average and maximum energy burden by income category

Income Category	Average Energy Burden	25 th Percentile Energy Burden	50 th Percentile Energy Burden	75 th Percentile Energy Burden	Maximum Energy Burden
Low Income 1 (up to 100% FPL)	8.2%	3.5%	5.8%	9.8%	41%
Low Income 2 (101% - 200% FPL)	3.5%	1.8%	3.0%	4.6%	17%
Moderate Income 1 (201% - 300% FPL)	2.8%	1.3%	2.2%	3.3%	14%
Moderate Income 2 (301% - 400% FPL)	1.4%	0.8%	1.0%	1.7%	8%
High Income (over 400% FPL)	1.3%	0.6%	1.1%	1.8%	6%
Total All Households	3.7%	1.1%	2.2%	4.3%	41%

Two deeper explorations into the relationship between household characteristics and energy burden provide additional insight into the drivers of elevated levels of energy burden. One exploration focused on the relative contribution of the two inputs to the energy burden calculation: energy cost and household income. The other exploration attempted to identify the key household characteristics most associated with higher burden.

Both lower incomes and higher energy costs (and usage) seem to work together more or less equally to cause high energy burden. As shown in Table 7, households with high energy burdens have *both* lower incomes and higher energy costs, on average, than their peers with more moderate energy burdens. Neither of these factors seems to be the singular factor driving energy burdens across the population.

Table 7. Average energy burden, income, and bill cost by burden category

Burden Category	Average Energy Burden	Average Annual Income	Average Annual Energy Bill
High Burden Households (n=138)	13.5%	\$15,336	\$1,689
Moderate Burden Households (n=130)	4.9%	\$22,947	\$1,140
Low Burden Households (n=245)	2.4%	\$29,024	\$733
Very Low Burden Households (n=46)	0.7%	\$29,256	\$233
All Households (n=559)	5.6%	\$24,125	\$988

In addition, we examined energy burden of low-income households by geography, household type, and housing type. Each of these household characteristics are either associated with variations in energy burden or have causal relationships with an input to the energy burden calculation. We found that the following low-income households tend to face higher energy burdens than their counterparts:

- Households in the diverse desert/mountain region (7.6% average energy burden);²
- Multifamily renters (6.2% average energy burden);³
- Households led by working-age adults without dependents (6.6% average energy burden); and
- Households with members who have disabilities (6.0% average energy burden).

² Together, the mountain and desert regions represent the vast eastern portions of California with the highest heating and cooling loads in the state.

³ For this analysis, multifamily includes all housing types with two or more units. Twenty percent of these households live in buildings with two to four units, while 80 percent live in units with five or more units.

Modified Energy Burden

The modified energy burden resulting from the inclusion of government benefits causes some households' calculated burden to drop from the energy burdens described above. Average burden for low-income households dropped from 5.6 percent when these benefits were excluded (i.e., the energy burden) to 4.1 percent when they were included (i.e., modified energy burden). Households below the poverty line (i.e., 100% of the FPL) were affected most noticeably, as their calculated burden dropped from an average energy burden of 8.2 percent to an average modified energy burden of 5.2 percent. Figure 1 below compares energy burdens by income level using both reported income and a modified income estimate based on these additional analyses.

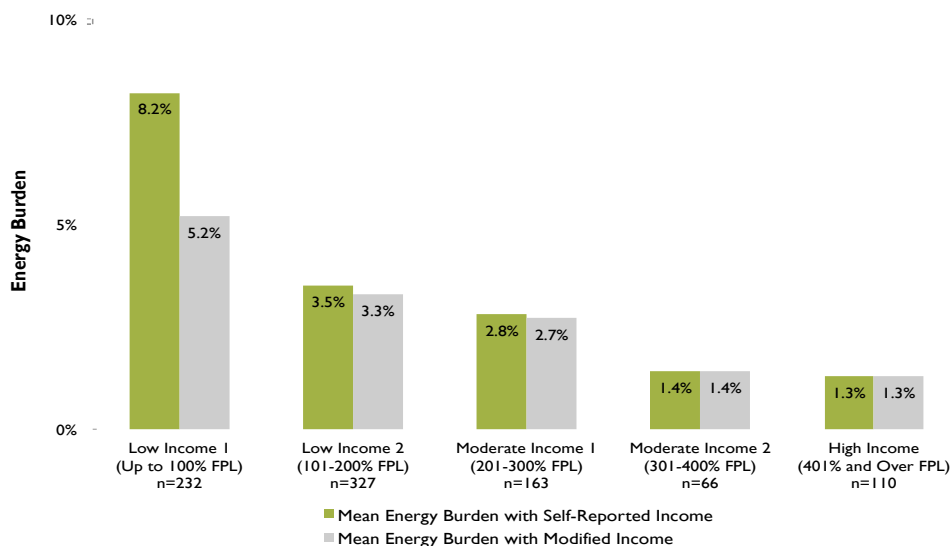


Figure 1. Energy burden using modified income estimates

We examined modified energy burden of low-income households by geography, household type, and housing type to identify which customer segments face comparatively higher modified energy burdens. By definition, differences in which customer segments face higher modified or traditional energy burdens are driven by tendencies of some groups to receive fewer (or more) non-cash benefits included in the modified energy burden calculations.

Generally, the same types of households have elevated energy burdens and modified energy burdens with two notable differences:

- When non-cash and TANF benefits are factored in as available resources, low-income multifamily renters' average modified energy burdens drop from 6.2 to 3.9 percent. Modified energy burdens for single-family owners and renters are both higher than those of multifamily renters.
- Modified energy burdens of low-income households in the Central Valley are equal to those of households in the mountain and desert regions. (Comparisons of traditional energy burdens alone had shown households in mountain and desert regions as having higher burdens than all other regions, including the Central Valley.)

Accounting for non-cash resources changed not only the energy burden values for households in different housing types, but also affected the energy burden ranking of these customer segments. This

change illustrates the effect and significance of considering non-cash resources available to households when computing household burden.

Energy Insecurity

Comparisons of this metric across various household characteristics indicate that the following households face comparatively higher levels of energy insecurity:

- Households below 300 percent of the federal poverty level;
- Households in the desert/mountain regions;
- Households in single-family homes, especially owner-occupants;
- Households with seniors; and
- Households with members who have disabilities.

Energy insecurity—when examined primarily in relation to struggles with energy bills—shows that households in the lower income ranges face similar levels of energy insecurity all the way up to 300 percent of the FPL. As illustrated in Figure 2, between a fifth and a quarter of households in these income ranges face high energy insecurity, which indicates that they struggle constantly to pay the energy bill or reported struggling often and had done as much as they can to cut back. The data show that customers above 300 percent of the FPL are significantly less energy insecure than those below that threshold.⁴

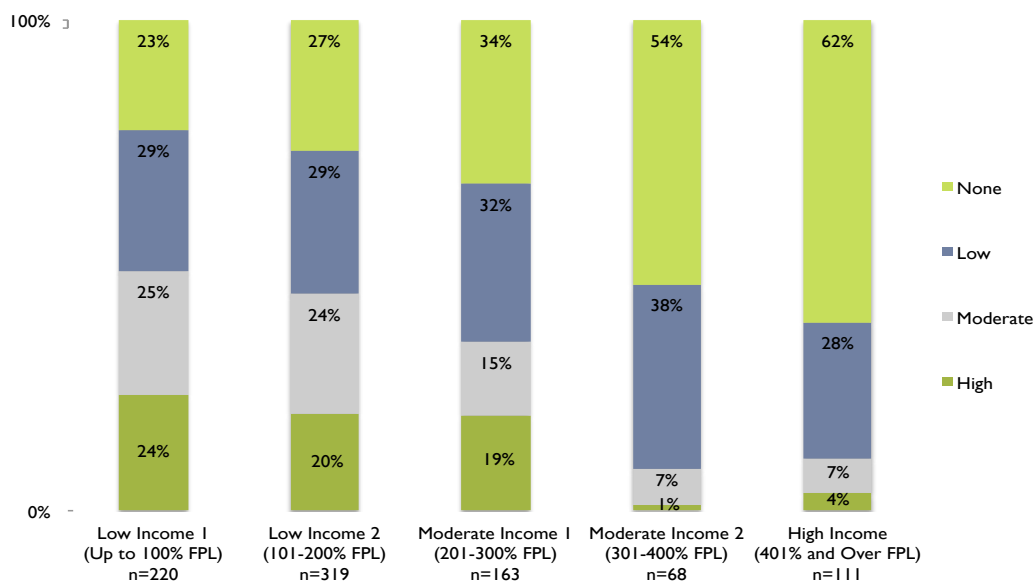


Figure 2. Energy insecurity level by income category

The data also show that low-income homeowners living in single-family homes are considerably more energy insecure than customers renting multifamily residences. Based on our analyses, it appears that significantly higher energy bills among single-family homeowners are driving these differences.⁵

⁴ Differences above and below 300 percent of the FPL are statistically significant for the share of households at high energy insecurity, as well as those at either high or medium energy insecurity.

⁵ Energy costs included in rents are not a meaningful factor. Only a handful of renters indicated that their energy costs are included in their rents.

Relative to multifamily renters, single-family homeowners also reported a greater likelihood that family members would suffer if they reduced their heat/cooling.

Material Hardship

A fourth metric of burden classifies households as facing a high, moderate, low, or no challenge to pay for basic needs. Because we used FPL categorical levels as an input to the material hardship metric, comparisons of hardship across these same income levels will naturally show higher hardship at lower FPLs by definition. This affects comparisons across 100-point FPL bins, such as 0-100 percent of FPL, 100-200 percent of FPL, and so forth. Differences *within* these income levels are due to self-reports by households on the challenges they face to meet basic living expenses and pay bills.

To better understand how households at all income levels compare, we examined their challenges in making ends meet. Among low-income households at varying levels of poverty, we saw no clear or statistically significant pattern in self-reported challenges to afford basic necessities and pay the bills.⁶ For households above 150 percent of the FPL, self-reported challenges in meeting everyday living expenses appear to diminish with the greater income, although clear decreases in challenges with bills do not appear until 400 percent of FPL.

Looking into differences in material hardship across low-income households by various characteristics, we found some differences between senior-led households and those run by working-age adults. Similar shares of households in both groups experience regular challenges paying household bills and expenses (a key input for material hardships), but a greater number of senior-led households reported that they always manage to handle their household bills and expenses.

Additionally, we found the following types of low-income households are more likely to face higher material hardships:

- Households in the desert/mountain regions;
- Renters of single-family and multifamily homes;
- Working age adults with dependents; and
- Households with members who have disabilities.

Comparing Energy Burden, Energy Insecurity, and Material Hardship

Energy burden, modified energy burden, energy insecurity, and material hardship are four different ways to look at the same issue—the challenge households face to meet their energy-related and basic needs. We compared these four metrics to better understand what they each can tell us about household circumstances.

The four metrics point to similar household characteristics as most associated with financially oriented hardships and challenges—whether energy-related or not—albeit with some differences and nuances. Table 8 summarizes the household characteristics we identified above as being associated with high burdens (i.e., across all four burden metrics). Not surprisingly, reported income is consistently a common denominator given how the metrics are defined. On the other hand, the income thresholds associated with higher burden varied across these indicators, as did some of the corresponding results (sometimes due in part to the way we defined the categories). For all four indicators, the desert and mountain regions were consistently associated with higher burdens. Households with members who have disabilities consistently showed somewhat elevated levels of burden.

⁶ There appears to be increasing ability to handle everyday expenses without struggle—and decreases in the share of households struggling to make ends meet regularly—beyond 150 percent of the FPL. The differences to the next higher categories are not statistically significant at our sample sizes, however.

For other variables, characteristics of the higher burden households differed across the four measures of burden. For example, while higher energy usage affects energy burden, it does not appear to be a primary driver for energy insecurity or material hardship. Households with seniors (as well as households led by seniors) were more energy insecure, but households with working-age adults and dependents experienced more material hardship overall. Similarly, renters of single-family homes, single-family owners, and renters of multifamily homes all appeared as the most challenged housing type for at least one of the four metrics.

Table 8. Comparison of characteristics associated with relatively higher burden metrics

Household Characteristics	Energy Burden	Modified Energy Burden	Energy Insecurity	Material Hardship
Demographics	Lowest income (below 50% of FPL) Higher usage (above \$1,000 in energy costs annually) Households with disabilities	Lowest income (below 50% of FPL) Higher usage Households with disabilities	Lower and moderate income (below 300% of FPL) Households with seniors Households with disabilities	Lowest income (below 100% of FPL) Households with working-age adults and dependents Households with disabilities
Housing	Renters in multifamily buildings	Single-family owners and renters	Single-family owners	Renters in multifamily and single-family homes
Geographic	Desert/mountain regions (i.e., areas with higher heating and cooling loads)	Desert/mountain regions Central Valley	Desert/mountain regions South coast region (i.e., areas with higher housing costs)	Desert/mountain regions

Differences regarding the reported struggles of low-income customers across the metrics are in part due to how the metrics are defined and how the thresholds are set to differentiate customers within each metric.

Conclusions

Our examination of household burden and hardship through the use of energy burden, modified energy burden, energy insecurity, and material hardship offers a broader perspective on the needs and challenges of California households. The methods used to calculate these metrics can be similarly applied in other jurisdictions. The energy insecurity and material hardship metrics lay a foundation on which to build and also offer additional perspectives on burdens and challenges faced by households that struggle with energy and other costs. In particular, they corroborate what is reflected by energy burden analyses while also revealing additional insights about customers that may be more vulnerable. Regardless of how burden was measured, this study demonstrates that:

- Low-income households in some parts of California—especially the mountain and desert regions, followed by the Central Valley—face higher energy burdens and energy-related challenges likely due to these regions’ higher heating and cooling loads.
- Low-income households with members who have disabilities tend to face higher energy-related challenges. These challenges are likely comprised of two factors: income-based constraints (i.e., lower levels of resources) and elevated energy-related needs (i.e., greater need for heating or cooling or the use of energy-using medical equipment). Income-based challenges are already

accounted for in program designs that differentiate based on household income, but energy-related constraints are not.

The analyses using different burden metrics also demonstrated some variation across households:

Variation at Different Poverty Levels

- The income-based program eligibility criteria do not necessarily reflect household need or challenges. Our data suggest that there are households below the ESA/CARE threshold of 200 percent of the FPL that demonstrate relatively little need or hardship while there are also households above the threshold that reflect relatively more burden-related needs.
- Households below 50 percent of the FPL have substantially higher energy burdens, and those below 300 percent of the FPL have higher energy insecurity.

Variation by Household Characteristics

- Low-income seniors and working-age adults with dependents differ in the type of need they identified. Seniors were more likely to describe energy insecurity and struggles with energy bills, while working-age adults with dependents exhibited higher levels of material hardship, potentially because they have more expenses (and fewer resources).
- Low-income households in all major housing types face some form of elevated hardship, but the type of hardship varies by housing type and ownership status. Based on reported income, multifamily renters have higher energy burdens than households in single-family homes. However, when non-cash resources and TANF are included with income, single-family owners face higher levels of burden as reflected in the modified energy burden metric. Single-family owners also experience higher levels of energy insecurity. Renters in multifamily and single-family homes face the highest overall material hardship.

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