

Data Update: City Energy Burdens

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Energy Equity for Homeowners

In cities across the country, many low-income families and other disinvested communities struggle with high energy burdens, including many homeowners. In this data update, we find that 25% of all low-income households in the United States have an energy burden above 15.2%. In many cases, low-income homeowners in particular experience very high energy burdens, with 25% of low-income homeowners having energy burdens over 17.2% and half having burdens over 9.4%.

Owner-occupied housing (especially in single-family homes and buildings with four units or fewer) makes up a significant portion of housing in cities. To reach their goals for climate action and energy affordability, local governments need to equitably include the owner-occupied sector as they tackle residential efficiency. ACEEE launched the [Energy Equity for Homeowners Initiative](#) in 2022 to help cities reach these goals.

ACEEE publishes data on energy burdens¹ (the percentage of household income spent on energy bills) to help governments, advocates, and other entities understand the scale of energy insecurity and inequity and prioritize energy investment (Drehobl, Ross, and Ayala 2020).² Households with high energy burdens are more likely to experience poor health and poverty (Lima, Ferreira, and Leal 2022; Hernández and Laird 2021; Partnership for the Public Good and PUSH Green 2022; Bohr and McCreery 2020; Goodson Bell et al. 2023; National Energy Assistance Directors' Association 2018).

We are presenting a limited data update to our [2020 energy burdens report](#) (which included energy burdens from 2017) to share more recent data on energy burdens faced by demographic groups across the country in the 25 cities included in the American Housing Survey (AHS).³ These data are especially important as many governments are actively working to equitably accelerate a clean energy transition that includes both the rental and owner-occupied residential sectors.

We highlight the energy burdens of metropolitan areas for a selection of highly impacted groups below.⁴ Consistent with previous research, energy burdens are higher for low-income communities and many communities of color than for all households overall, often due to inefficient housing.

¹ Energy burden is a term used to describe the percentage of annual household income that goes toward household energy costs. Households that exceed 6% or 10% of their income on energy costs are typically considered highly or severely energy burdened, respectively (APPRISE 2005).

² ACEEE's [energy burden page](#) provides more information on previous energy burden research.

³ Energy burdens were calculated using data from the Census Bureau's American Housing Survey (AHS), published in odd years. AHS includes a selection of metropolitan areas (based on the Census Bureau's designated [metropolitan statistical areas](#)), some of which are included in each edition of the survey and some of which are included in alternating editions. For a more detailed discussion of ACEEE's methodology for calculating energy burdens, see Drehobl, Ross, and Ayala 2020.

⁴ This data update includes a selection of highly impacted groups including low-income households, Black households, and Hispanic households. These groups were selected based on the previous publication and sample size in the AHS. However, other groups also face disproportionately high energy burdens, including Native American households, people with disabilities, and older adults. Additionally, energy burden is just one indicator of energy insecurity, and a low average burden does not indicate an absence of energy insecurity or broader systemic discrimination.

In this data update, we find that many households continue to pay excessive amounts of their incomes on energy bills, continuing a trend noted in earlier research and highlighting the importance of policy action. Key insights include:

- Low-income households in the United States spent a median of 8.3% of their annual income on energy bills (exceeding the threshold of 6% that traditionally indicates a high energy burden), while households overall spent a median of 2.9%.
- In many cities, 25% or more of households experience burdens above 6%.
- A quarter of low-income households have an energy burden above 15.2%, significantly above the traditional threshold of 10% to indicate severe burdens.
- A quarter of all households in the United States have an energy burden above 5.7%.
- Consistent with previous research, low-income residents, renters, Black households, and Hispanic households tend to experience higher median energy burdens than the median for all households in an area.
- Many of the most burdened low-income residents in cities own their homes and require support to affordably meet their energy needs.⁵ For example, of the low-income households included in the AHS survey, roughly half own their own homes. Low-income homeowners have higher energy burdens on average than low-income renters in many cities, and they require attention in city energy efficiency efforts in addition to renters.⁶

While this data update does not include a regional analysis, burdens were often particularly high for low-income households in cities in the Northeast and Mid-Atlantic, like Boston, Baltimore, New York, and Washington, DC, indicating a particular need for action in those locations.

DISCUSSION

Low-income households face high energy burdens across the country, with upper quartile burdens reaching over 15% in many cities (figure 1).

⁵ Renters also face extreme challenges with energy burdens and face additional barriers to accessing energy investment. ACEEE's [Energy Equity for Renters initiative](#) provides resources to equitably deploy energy efficiency to this burdened group. These findings emphasize the importance of including low-income homeowners in local energy efficiency efforts, in addition to the important focus on renters.

⁶ The data used for this resource include owners and renters living in all building sizes. However, most owners, 97% nationally, live in small buildings (four units or fewer). Therefore, efforts to lower energy burdens for homeowners should prioritize small buildings.

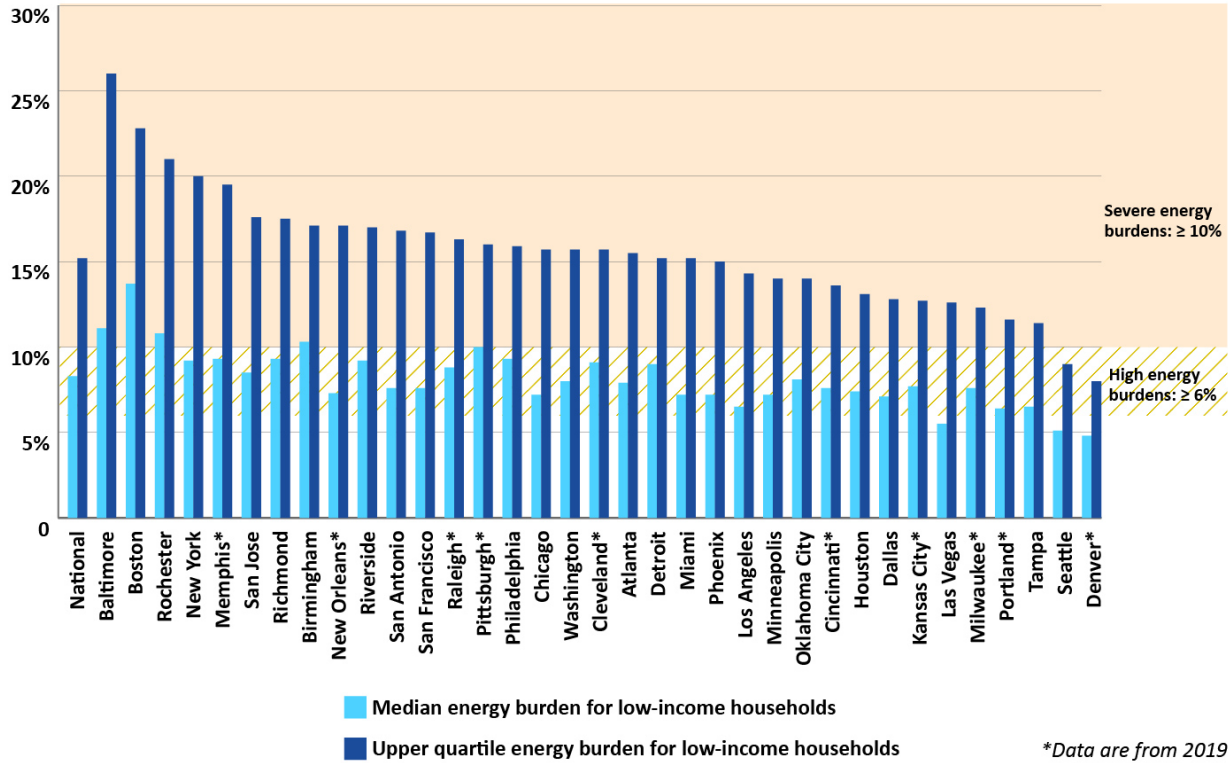


Figure 1. Upper quartile and median energy burden rate by city. A quarter of low-income households have an energy burden higher than the upper quartile threshold, while half experience energy burdens above the median. Energy burdens above 6% are traditionally considered high, while burdens above 10% are considered severe. *Data are from 2019.

Table 1 presents the upper quartile energy burden rates for each group, indicating that 25% of households in the group experience a burden higher than the rate listed in the the table.

Table 1. Upper quartile energy burdens in metro areas a selection of highly impacted groups¹. 25% of households in a group experience an energy burden above this number. Orange cells indicate high energy burdens, over 6%, while red cells indicate severe energy burdens, over 10%.

Metro Area	All households			Low-income households			Black households			Hispanic households		
	All	Owner	Renter	All	Owner	Renter	All	Owner	Rental	All	Owner	Renter
National	5.7%	5.4%	6.3%	15.2%	17.2%	13.2%	7.2%	6.7%	7.8%	6.2%	5.8%	6.8%
Atlanta	5.4%	5.1%	6.2%	15.5%	20.6%	11.0%	6.2%	6.2%	6.7%	6.5%	6.2%	7.4%
Baltimore	5.4%	4.9%	7.2%	26.0%	48.0%	17.7%	8.6%	7.6%	10.5%	7.2%	5.9%	8.0%
Birmingham	7.5%	7.0%	9.7%	17.1%	16.8%	17.1%	10.3%	9.6%	11.0%	7.6%	7.0%	9.5%
Boston	6.1%	6.0%	6.7%	22.8%	37.2%	19.4%	8.5%	6.6%	10.5%	7.4%	5.3%	8.1%
Chicago	4.1%	4.0%	4.7%	15.7%	14.9%	18.6%	9.1%	10.2%	6.9%	4.8%	3.8%	6.2%
Dallas	4.5%	4.3%	4.8%	12.8%	17.1%	10.0%	5.1%	5.3%	5.0%	5.2%	5.6%	5.0%
Detroit	6.0%	5.4%	8.3%	15.2%	14.1%	16.4%	8.8%	7.6%	9.7%	6.0%	5.4%	6.9%
Houston	5.3%	4.9%	5.9%	13.1%	18.3%	10.4%	6.3%	5.5%	7.2%	6.2%	6.3%	6.0%

Metro Area	All households			Low-income households			Black households			Hispanic households		
	All	Owner	Renter	All	Owner	Renter	All	Owner	Rental	All	Owner	Renter
Las Vegas	4.1%	3.9%	4.3%	12.6%	13.0%	12.4%	4.8%	4.3%	6.4%	4.2%	4.0%	4.3%
Los Angeles	4.1%	3.8%	4.4%	14.3%	17.3%	13.0%	5.7%	3.5%	6.0%	4.7%	4.4%	5.0%
Miami	5.0%	5.0%	5.4%	15.2%	16.6%	13.2%	4.9%	4.4%	6.0%	5.8%	5.5%	5.8%
Minneapolis	3.7%	3.5%	4.9%	14.0%	15.9%	12.2%	4.4%	2.7%	6.0%	4.6%	3.3%	9.0%
New York	5.4%	5.6%	5.1%	20.0%	25.1%	16.0%	5.1%	6.3%	4.9%	5.6%	4.5%	7.7%
Oklahoma City	5.7%	4.7%	7.2%	14.0%	14.6%	13.5%	6.9%	5.8%	9.1%	6.2%	5.7%	7.0%
Philadelphia	5.4%	5.1%	6.2%	15.9%	19.7%	15.4%	7.4%	6.0%	8.0%	6.6%	6.8%	6.6%
Phoenix	4.4%	4.3%	4.5%	15.0%	20.0%	10.0%	4.3%	3.8%	4.4%	5.6%	5.6%	5.4%
Richmond	5.1%	4.7%	6.6%	17.5%	17.5%	16.8%	6.9%	5.8%	7.8%	6.4%	7.2%	6.0%
Riverside	6.2%	5.8%	7.3%	17.0%	20.0%	15.4%	6.9%	4.2%	10.1%	6.2%	6.1%	6.8%
Rochester	7.3%	6.9%	8.4%	21.0%	23.3%	17.6%	10.4%	6.4%	14.8%	8.5%	9.9%	8.0%
San Antonio	5.4%	5.1%	6.5%	16.8%	17.3%	15.0%	5.6%	5.1%	7.0%	6.1%	5.5%	7.0%
San Francisco	3.1%	3.0%	3.2%	16.7%	20.0%	14.6%	5.9%	3.8%	7.2%	3.2%	3.7%	3.0%
San Jose	2.7%	2.7%	2.8%	17.6%	31.3%	14.0%	3.4%	3.7%	3.4%	3.9%	4.4%	3.7%
Seattle	2.4%	2.5%	2.2%	9.0%	10.2%	8.0%	3.4%	3.0%	3.4%	2.8%	3.0%	2.8%
Tampa	4.7%	4.6%	4.8%	11.4%	13.3%	8.7%	5.9%	7.7%	4.9%	5.6%	5.4%	5.8%
Washington	3.7%	3.6%	3.8%	15.7%	23.3%	11.4%	4.4%	4.4%	4.4%	4.3%	4.2%	4.6%
Cincinnati*	4.4%	4.3%	4.8%	13.6%	14.8%	10.9%	5.0%	4.3%	6.5%	6.5%	4.9%	6.5%
Cleveland*	6.3%	5.5%	8.3%	15.7%	15.7%	15.5%	8.8%	8.4%	9.1%	9.5%	4.9%	15.5%
Denver*	2.6%	2.6%	2.9%	8.0%	10.0%	6.7%	3.8%	3.9%	3.4%	3.2%	2.8%	3.3%
Kansas City*	4.9%	4.2%	6.6%	12.7%	13.6%	12.0%	6.3%	4.8%	8.6%	5.5%	4.0%	5.8%
Memphis*	7.3%	6.1%	8.3%	19.5%	27.8%	15.4%	8.6%	8.4%	9.0%	7.9%	4.4%	9.0%
Milwaukee*	5.1%	4.5%	6.3%	12.3%	16.0%	10.9%	7.5%	6.3%	8.0%	6.0%	5.7%	6.2%
New Orleans*	5.3%	5.1%	5.7%	17.1%	27.6%	10.9%	7.0%	7.2%	6.9%	5.4%	4.9%	6.5%
Pittsburgh*	5.8%	5.3%	8.4%	16.0%	15.5%	18.4%	7.6%	6.5%	12.6%	4.3%	3.5%	12.0%
Portland*	3.5%	3.4%	3.8%	11.6%	15.0%	8.2%	4.9%	4.5%	5.1%	4.5%	4.5%	4.8%
Raleigh*	4.9%	4.8%	5.3%	16.3%	19.2%	14.3%	6.9%	7.3%	6.2%	5.3%	5.5%	5.3%

Two example cities demonstrate the severity of energy burdens faced by too many households. For example, in Richmond, low-income households have a median annual income of \$20,000 and median annual utility bills of \$1,800. A household with a median income and utility cost would pay 9% of their income on energy bills. For a low-income Richmond household earning an income in the 25th percentile (\$11,700) and having energy bills in the 75th percentile (\$2,640), the energy burden skyrockets to 22.6%.

Boston provides another example, with a quarter of low-income homeowners in Boston having an energy burden over 37% of their annual income.⁷

CALL TO ACTION

The scale of energy insecurity across the country necessitates major action. Governments and utilities have a role to play in reducing these burdens and ensuring that all households can meet their energy needs and access the benefits of energy efficiency and weatherization. Doing so successfully requires prioritizing the most burdened households for energy investment and eliminating barriers that many disinvested households face to accessing energy programs. Appendix A lists resources on strategies to lower the energy burdens of low-income households and advance energy equity. Appendix B provides median energy burden data for a selection of highly impacted groups, providing additional information to help steer cities' efforts.

⁷ As the AHS includes a limited number of metropolitan statistical areas (MSAs), other jurisdictions can explore tools like the Department of Energy's [Low-Income Energy Affordability Data](#) (LEAD) tool and the White House Council on Environmental Quality's [Climate and Economic Justice Screening Tool](#) (CEJST) to better understand burdens faced by their specific community.

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APPENDIX A: RESOURCES TO REDUCE ENERGY BURDENS

The following ACEEE resources provide actionable guidance on the ways to meet the energy needs of low-income households and advance energy equity:

- [Adapting Energy Efficiency Programs to Reach Underserved Residents](#)
- [Strengthening Equity in Energy Efficiency Programs: Case Studies of Two Utilities](#)
- [Toward Affordable Energy Access: Approaches to Reducing Energy Unaffordability, Arrearages, and Shutoffs](#)
- [Equity and Electrification-Driven Rate Policy Options](#)
- [Energy Equity for Homeowners: Policy and Program Guide for Local Governments](#)
- [Toward More Equitable Energy Efficiency Programs for Underserved Households](#)
- [Advancing Equity through Energy Efficiency Resource Standards](#)
- [Leading with Equity: Recommendations for State Decision Makers, Utilities, and Regulators to Advance Energy Equity](#)
- [Meeting the Challenge: A Review of Energy Efficiency Program Offerings for Low-Income Households](#)
- [Energy Equity for Renters Toolkit](#)
- [Fostering Equity Through Community-Led Clean Energy Strategies](#)
- [A New Lease on Energy: Guidance for Improving Rental Housing Efficiency at the Local Level](#)

APPENDIX B: MEDIAN ENERGY BURDEN RATES

Median energy burdens in metro areas a selection of highly impacted groups.⁸ 50% of households in a group experience an energy burden above this number. Orange cells indicate high energy burdens, over 6%, while red cells indicate severe energy burdens, over 10%.

Metro area	All households			Low-income households			Black households			Hispanic households		
	All	Owners	Renters	All	Owners	Renters	All	Owners	Renters	All	Owners	Renters
National	2.9%	2.8%	3.1%	8.3%	9.4%	7.0%	3.5%	3.4%	3.6%	3.1%	2.9%	3.3%
Atlanta	2.9%	2.9%	1.7%	7.9%	10.3%	7.1%	3.2%	3.3%	3.2%	3.8%	3.0%	4.2%
Baltimore	2.8%	2.7%	3.1%	11.1%	14.6%	10.1%	3.7%	3.5%	3.8%	3.0%	2.6%	3.4%
Birmingham	3.8%	3.6%	4.4%	10.3%	11.0%	9.5%	5.1%	5.2%	4.9%	4.9%	5.1%	4.8%
Boston	3.2%	3.1%	3.2%	13.7%	16.8%	11.7%	3.9%	3.5%	4.1%	4.0%	3.1%	4.2%
Chicago	2.2%	2.2%	2.3%	7.2%	7.6%	5.7%	3.2%	3.6%	2.6%	2.5%	2.4%	2.5%
Dallas	2.5%	2.4%	2.6%	7.1%	8.8%	5.7%	3.0%	2.5%	3.2%	3.0%	3.2%	2.6%
Detroit	3.2%	3.0%	3.7%	9.0%	8.9%	9.0%	4.0%	4.0%	4.5%	2.8%	2.8%	3.2%
Houston	2.9%	2.6%	3.3%	7.4%	9.1%	6.2%	3.3%	2.9%	3.5%	3.5%	3.5%	3.5%
Las Vegas	2.2%	2.1%	2.4%	5.5%	6.0%	5.0%	2.5%	2.1%	2.6%	2.6%	2.4%	2.6%
Los Angeles	2.0%	1.9%	2.1%	6.5%	8.8%	5.9%	2.4%	2.5%	2.3%	2.4%	2.4%	2.4%
Miami	2.4%	2.4%	2.4%	7.2%	8.4%	5.8%	2.6%	2.5%	2.9%	2.6%	2.6%	2.5%
Minneapolis	2.2%	2.1%	2.7%	7.2%	8.3%	5.6%	2.6%	1.8%	3.4%	2.4%	2.0%	3.5%
New York	2.7%	2.9%	2.4%	9.2%	12.2%	6.8%	2.8%	3.1%	2.3%	2.8%	2.6%	3.3%
Oklahoma City	3.0%	2.7%	4.0%	8.1%	8.4%	7.4%	4.3%	3.6%	4.6%	3.4%	3.1%	4.0%
Philadelphia	2.7%	2.6%	3.0%	9.3%	10.5%	7.8%	3.6%	3.4%	3.7%	4.1%	4.5%	3.2%
Phoenix	2.3%	2.3%	2.3%	7.2%	8.3%	5.6%	2.1%	2.4%	1.8%	2.9%	2.9%	2.9%
Richmond	2.8%	2.7%	3.2%	9.3%	10.9%	7.8%	3.5%	3.4%	3.6%	3.2%	3.6%	3.0%
Riverside	3.1%	3.0%	3.4%	9.2%	9.8%	8.3%	3.0%	2.8%	3.8%	3.1%	3.1%	3.3%

⁸ Data in this table come from the 2021 AHS, with the exception of cities marked with *, for which data are available only from 2019.

Metro area	All households			Low-income households			Black households			Hispanic households		
	All	Owners	Renters	All	Owners	Renters	All	Owners	Renters	All	Owners	Renters
Rochester	4.0%	3.8%	4.6%	10.8%	12.5%	8.9%	4.8%	4.0%	5.8%	5.0%	4.2%	5.2%
San Antonio	2.8%	2.7%	3.1%	7.6%	8.2%	7.0%	2.7%	2.5%	3.6%	3.2%	3.0%	3.6%
San Francisco	1.5%	1.5%	1.5%	7.6%	8.8%	6.0%	2.5%	2.3%	2.8%	1.7%	1.9%	1.6%
San Jose	1.3%	1.3%	1.4%	8.5%	13.5%	6.5%	2.3%	2.4%	2.2%	2.1%	2.2%	2.1%
Seattle	1.2%	1.3%	1.2%	5.1%	6.4%	4.2%	1.7%	1.4%	1.9%	1.4%	1.4%	1.3%
Tampa	2.5%	2.5%	2.4%	6.5%	8.0%	5.3%	2.9%	3.4%	2.6%	3.1%	3.2%	3.0%
Washington	2.1%	2.1%	1.9%	8.0%	11.5%	6.7%	2.5%	2.7%	2.4%	2.5%	2.5%	2.2%
Cincinnati*	2.7%	2.6%	3.0%	7.6%	8.6%	7.2%	3.1%	2.9%	3.6%	3.2%	2.5%	3.6%
Cleveland*	3.1%	2.8%	3.9%	9.1%	9.1%	9.1%	4.3%	4.6%	3.9%	4.8%	3.5%	7.2%
Denver*	1.7%	1.6%	1.7%	4.8%	6.0%	4.0%	2.1%	1.9%	2.1%	2.0%	1.8%	2.1%
Kansas City*	2.8%	2.6%	3.5%	7.7%	8.3%	7.2%	4.0%	3.2%	5.2%	3.4%	3.2%	3.5%
Memphis*	3.8%	3.3%	4.8%	9.3%	12.0%	8.0%	4.9%	4.3%	5.1%	4.1%	2.4%	4.8%
Milwaukee*	3.0%	2.7%	3.5%	7.6%	9.0%	6.6%	4.0%	3.6%	4.2%	3.6%	3.7%	3.4%
New Orleans*	2.8%	2.7%	3.1%	7.3%	9.4%	5.7%	3.4%	3.1%	3.6%	3.0%	3.1%	3.0%
Pittsburgh*	3.4%	3.2%	4.4%	10.0%	10.1%	8.7%	4.4%	3.7%	5.1%	2.0%	1.9%	2.0%
Portland*	2.1%	2.1%	2.1%	6.4%	8.6%	4.8%	2.4%	2.7%	2.3%	2.7%	2.5%	2.8%
Raleigh*	2.9%	2.8%	3.0%	8.8%	10.8%	7.1%	3.7%	4.1%	3.4%	3.7%	3.7%	3.7%