AFFORDABILITY BEYOND THE RENT:

Utility Burdens and the True Cost of Housing in Louisville, Kentucky

EVERYHOME

Metropolitan Housing Coalition

SEEA
SOUTHEAST ENERGY EFFICIENCY ALLIANCE

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Dear MHC Members and Friends,

For more than 30 years, the Metropolitan Housing Coalition (MHC) has been committed to advocating for safe, fair, and affordable housing, and access to the energy and water it takes to live and thrive in those homes. Over the decades, MHC has worked to address the deep-rooted challenges surrounding utility affordability. The launch of MHC's EveryHome program a year ago has allowed us to build capacity and take another major leap forward. This initiative has provided education for over 10,000 Louisvillians in the year since it launched and strives to build bridges between affordable housing and affordable utilities through advocacy and education efforts.

In Louisville, housing and utility affordability is not just an economic issue, but a matter of equity, health, and long-term community well-being. Too many families in our city are burdened by the rising cost of housing, energy, and water. When housing and utilities consume the majority of a household's income, it becomes harder to afford food, transportation, healthcare, and education. Many forgo groceries and medications just to keep the lights on – a choice no one should have to make. These challenges are especially acute for our most vulnerable communities, including low-income families, seniors, and communities of color who have historically faced systemic barriers to stable housing.

We are proud to collaborate with the Southeast Energy Efficiency Alliance (SEEA) on this report, which assesses the state of housing and utility affordability in Louisville and within the larger context of the Commonwealth of Kentucky. This report examines the challenges of utility affordability, highlights current Kentucky Public Service Commission (PSC) cases and the regulatory environment, and offers policy recommendations to ensure our community has consistent access to affordable housing and essential utilities. We hope this report is a catalyst for continued collaboration and innovation as we work to ensure that every Louisvillian has access to fair, accessible, and affordable housing – and utilities.

Everyone deserves the dignity of a home they can afford to live in and access to water and energy utilities to create a safe and healthy living environment. Together, we can make this happen.

Felicia J. Nu'Man
MHC Board Chair

Anthony P. Curtis
MHC Executive Director

Executive Summary

In Louisville, Kentucky, the true cost of housing goes beyond rent or mortgage payments. For tens of thousands of households, high and rising energy and water bills are a growing barrier to maintaining stable, affordable homes. Utility costs that are rising in tandem with, or even outpacing, housing costs are straining household budgets, especially for those with the lowest incomes. The result is that thousands of households struggle with utility unaffordability, which undercuts housing affordability and stability and has other ripple effects that negatively impact health, resilience to disaster events, economic mobility, and more.

Key Findings:

- **Energy Insecurity:** One in three households in Kentucky faces energy insecurity, with more than 57,000 households in Louisville facing high (>6%) energy burdens. While the city's average energy burden is 4.5%, low- and moderate-income (LMI) households have an average burden of 8%, with the lowest-income residents (0-30% of area median income) facing burdens of 16% or more. These burdens have increased since 2013. Low-income residents and communities of color are disproportionately affected. LMI households across the city face a $33 million total annual gap between what they pay and what is considered affordable.
- **Inefficient Housing:** The quality and efficiency of housing is sharply stratified. In west and central Louisville, energy use intensity (EUI) is up to three times higher than in other neighborhoods, contributing to costs and cost burdens that fall most heavily on low-income households. Residents in these areas, particularly low-income residents and communities of color, often live in the least efficient housing and have the fewest resources to make improvements.
- **Water Costs:** Louisville ranks in the top 20 most expensive metro areas in the nation for water-related expenses. Wastewater service is the main driver of unaffordability in the city, with fixed charges making up over 60% of a typical bill. At a typical household monthly usage, 17.7% of households (58,377) in Louisville pay more than 4.5% of income for water and wastewater service. At this level, 9.9% of households in Louisville pay more than 2.5% of income for water service (32,668 households) while 28.5% of households (93,999 households) pay more than 2% of income for wastewater service.
- **Affordability Impacts:** Energy and water are essential, yet unpredictable, expenses which can consume more than 4 full workdays of a minimum wage worker's labor each month, squeezing out savings, home maintenance, or other necessities. In Louisville, this burden is unevenly distributed, disproportionately affecting nonwhite, low-income communities, primarily in west Louisville. High utility bills can lead to arrearages, disconnections, health risks, and economic immobility, undermining housing stability and financial well-being.

The Tipping Point

The current patchwork of assistance initiatives and policies is not enough to address community needs at scale. With significant commercial and industrial growth projected to increase utility demand and federal curtailment of critical sources of assistance, the city is at a tipping point. Without intervention, rising rates will further strain already burdened households and leave more families exposed to disconnections and housing instability.

High-Level Recommendations

To improve utility affordability, this report focuses on four strategic areas:

- **Improving Housing Energy and Water Use:** Implement policies and programs to address at-risk housing stock and improve building performance, such as establishing a critical repair fund and providing landlord incentives for upgrades.
- **Streamlining Assistance:** Expand and coordinate assistance programs, including creating a one-stop shop for applications and implementing automatic enrollment to ensure vulnerable households can access the support they need.
- **Reforming Utility Policies:** Pursue equitable utility pricing by mitigating the regressive impact of high fixed fees and considering alternative rate structures like Percentage of Income Payment Plans (PIPP).
- **Fostering Collaboration:** Bring together stakeholders from across the city, including utilities, nonprofits, and community groups, to ensure a unified and effective strategy for tackling utility affordability.

Introduction

The true cost of a home in Louisville, Kentucky, extends far beyond the monthly mortgage or rent payment. For tens of thousands of households, the burden of energy and water bills is increasingly dictating whether their home remains truly affordable. Over the past few decades, steady increases in the cost of housing have been mirrored, and in cases exceeded by, increases in the cost of energy and water service. Cost increases, along with seasonal variations in these costs, put a squeeze on household budgets for Kentucky's most financially insecure families, whose incomes have stagnated.

Millions of people throughout Kentucky struggle to afford these essential services. In recent years, this struggle has only gotten more acute, particularly with the unraveling of federal assistance, which leaves vulnerable families with fewer resources to absorb rising costs than ever before. This directly impacts their ability to secure and maintain safe, healthy, and affordable housing – with too many households forced to make difficult choices between keeping the lights on or a roof over their head.

These pressures have a direct impact on housing affordability in Louisville. High utility bills can push housing costs beyond reach for many families while older, less efficient housing stock – often the only affordable option upfront – can bring higher energy and water usage, worsening the cycle of unaffordability. Unprecedented energy and water demands projected from new commercial and industrial customers also threaten to strain the grid and water supply, likely driving utility rates higher and compounding the financial difficulties of utility burdened households.

Louisville is at a key tipping point. Despite robust assistance programs, tens of thousands of the lowest-income households in the city face growing pressures related to the cost of their energy and water utilities. However, with a multiprong approach the city can address multiple issues at once: improving long-term housing affordability and reducing the risk of displacement and gentrification, creating healthier living spaces for vulnerable residents, encouraging good paying jobs in green trades, and reducing greenhouse gas emissions associated with housing.

This report provides a timely assessment of utility affordability and its impact on the affordability of housing in the Louisville metropolitan region. It explores the current state of energy and water affordability in Louisville, outlines who is most impacted by high utility burdens, and considers how these costs impact housing affordability throughout the city. It also provides an overview of what programs and policies mediate affordability in Louisville as well as a series of policy and program recommendations for improving utility affordability for those who are most burdened.

ENERGY AFFORDABILITY IN LOUISVILLE

Millions of Kentuckians struggle with unaffordable energy bills, and energy insecurity – the "inability to adequately meet household energy needs" – is a significant burden for many Kentuckians that often goes unseen.[1] According to data from the U.S. Energy Information Administration's Residential Energy Consumption Survey (RECS), one out of every three households in Kentucky struggles with energy insecurity. This means roughly 570,000 households across the state constantly worry about whether they will be able to afford essential energy services like heating and cooling.[2] For these families, keeping the lights on or staying warm in winter isn't a given; it's a monthly gamble.

Energy insecurity is a complex issue rooted in the intersection of several household-level dimensions: resident financial instability, inefficient homes that drive up energy consumption and pose health risks, and the often-difficult coping strategies families must adopt to manage these costs. Unaffordable energy bills are a symptom of household stressors, but they are rooted in systemic issues that include a lack of housing choice, an aging housing stock, disparate access to capital, low incomes, the limited availability of weatherization and bill assistance, and longstanding regulatory policies that have favored keeping costs for energy generation and transmission low while investing little in demand-side efficiencies that benefit consumers.[3]

Energy Burden

One way to understand the financial impact of energy bills on household finances is through the metric of energy burden, which measures energy costs as a proportion of household income. The average energy burden for all households in metropolitan Louisville is 4.5% (with a median of 4.1%). This is below the 6% threshold typically used to denote unaffordable energy costs – a threshold which is tied to the affordability of housing.[4] Energy costs are considered affordable if they make up less than 20% of overall housing costs, and housing costs are affordable at 30% or less of the household income. The result is that energy costs below 6% of household income are considered affordable.

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[1] Diana Hernández, "Understanding 'energy insecurity' and why it matters to health," *Social Science and Medicine*, Vol. 167 (October 2016): 1-10.

[2] U.S. Energy Information Administration (EIA), Residential Energy Consumption Survey (RECS): Highlights for household characteristics of U.S. homes by state, 2020. Available at: https://www.eia.gov/consumption/residential/data/2020/; Hernández, "Understanding 'energy insecurity' and why it matters to health," 1-10.

[3] Hernández, "Understanding 'energy insecurity' and why it matters to health," 1-10.

[4] The 6% threshold is a helpful basic metric to assess the affordability of energy, but it does not adequately reflect the financial precarity that energy insecure households contend with or reflect an ability to pay bills. See William D. Bryan and Maggie Kelley-Riggins, *Energy Insecurity Fundamentals for the Southeast* (Atlanta: Southeast Energy Efficiency Alliance, 2021).

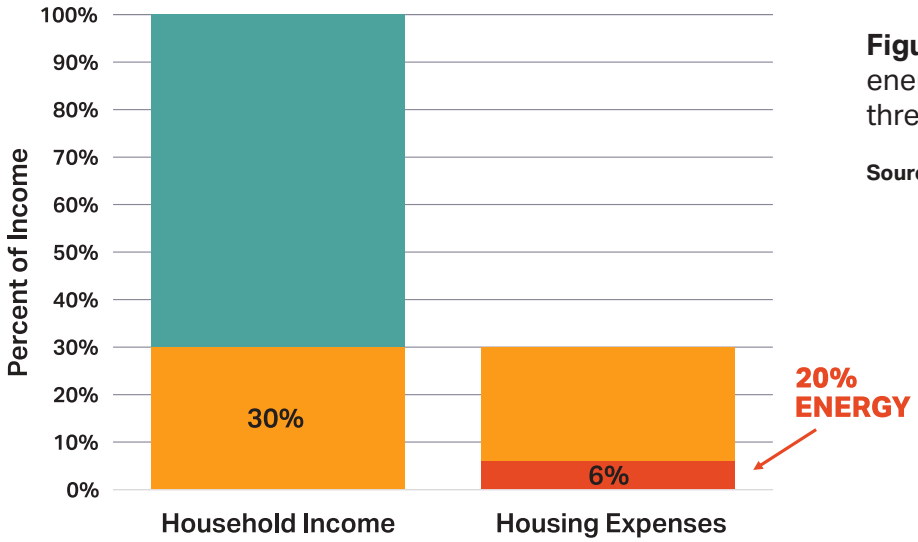


Figure 1: How is the 6% energy burden affordability threshold determined?

Source: SEEA

Although the average energy burden for all residents is below the 6% affordability threshold, energy burdens for low- and moderate-income (LMI) households are often well above it. The average energy burden in Louisville for LMI households – those at or below 80% of area median income (AMI) – is 8.2%, nearly twice as high as that for all households. As indicated in Figure 2, 57,000 households (18% of all households in Louisville) have energy burdens that are high (>6%), while 27,000 households (9% of all households in Louisville) have energy burdens that are severe (>10%).

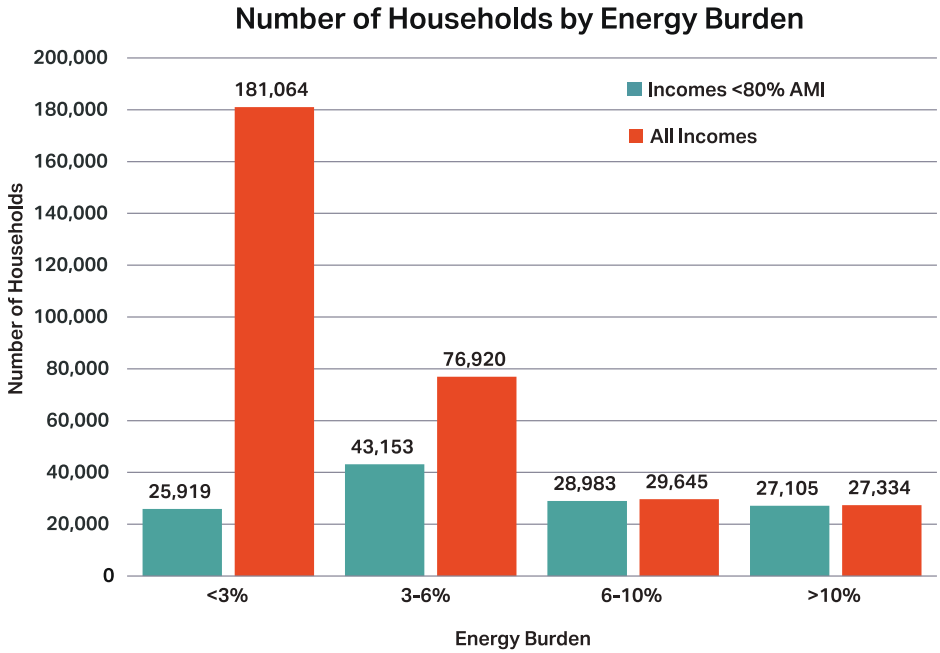


Figure 2: Number of households by energy burden severity, for LMI and all households.

Source: Energy burden calculations for Jefferson County based on electricity, utility gas and fuel costs as a ratio to household income in data collected for the American Community Survey (2022).

Even these figures tend to understate the affordability challenges that thousands of residents in the city face. Households in the lowest income brackets experience the highest energy burdens in Louisville, and the extreme nature of these burdens increases average burdens for LMI households overall. Households with an income between 0-30% of AMI have an average energy burden of 13.7% (with a median 13.3%) - nearly three times the average burden for all Louisville residents and double that of LMI households as a group. Of the 38,000 households with incomes between 0-30% of AMI, 29,700 of them have a high energy burden, and 24,100 have severe energy burdens. For households in this income bracket, 195 of 215 census tracts in the city have average energy burdens over 10%.

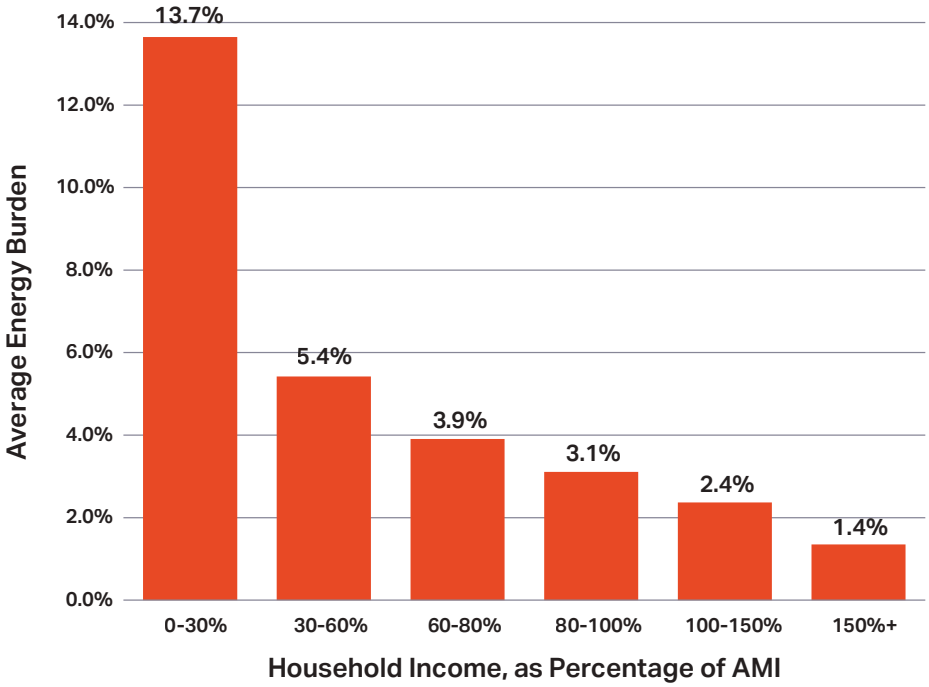


Figure 3: Average energy burden by income as a percentage of area median income (AMI).

Source: Energy burden calculations for Jefferson County based on electricity, utility gas and fuel costs as a ratio to household income in data collected for the American Community Survey (2022).

However, as shown in Figure 3, for LMI households in slightly higher income tiers, who earn 30-60% of AMI (5.4%) and 60-80% of AMI (3.9%), the average energy burden is below the 6% threshold for affordability. The skew between the highest and lowest income households in Louisville underscores an issue that impacts energy affordability: the city's pronounced income inequality. The top 20% of earners in the city make an average of 16.43 times more than the bottom 20% of earners, a gap that has been widening since 2020.[5] While median- and high-income households are generally not burdened by utility costs, very low-income households regularly pay more than 16% of their income to keep the lights on. Such a significant expense too often requires households to make tradeoffs in order to maintain energy service, with ripple effects on health, household financial security, economic opportunity, and housing affordability. This also suggests that to address utility cost burdens in Louisville it is critical to focus on those in the lowest income brackets, who bear the most significant cost burdens and have the least ability to pay.

[5] U.S. Census Bureau, "Income Inequality in Jefferson County, KY (2020RATIO021111)," FRED, Federal Reserve Bank of St. Louis. Available at: https://fred.stlouisfed.org/series/2020RATIO021111.

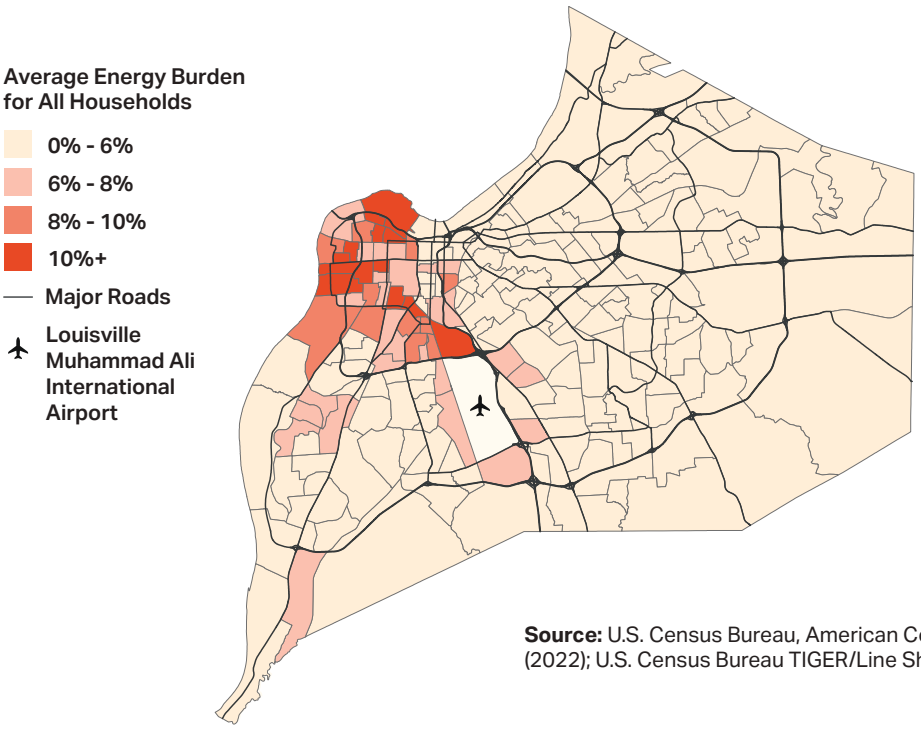


Figure 4: Average energy burden for all households by census tract, in Jefferson County, KY.

Source: U.S. Census Bureau, American Community Survey (2022); U.S. Census Bureau TIGER/Line Shapefiles (2022).

As indicated in Figures 4 and 5, the highest average energy burdens for LMI households are located in central Louisville, particularly neighborhoods west of the downtown core. These include downtown, Shawnee and Chickasaw in west Louisville, Portland in north central Louisville, and Park Hill and Algonquin in central Louisville. These neighborhoods tend to have among the lowest incomes in the city, highest proportions of residents in poverty, as well as high rates of non-white residents.

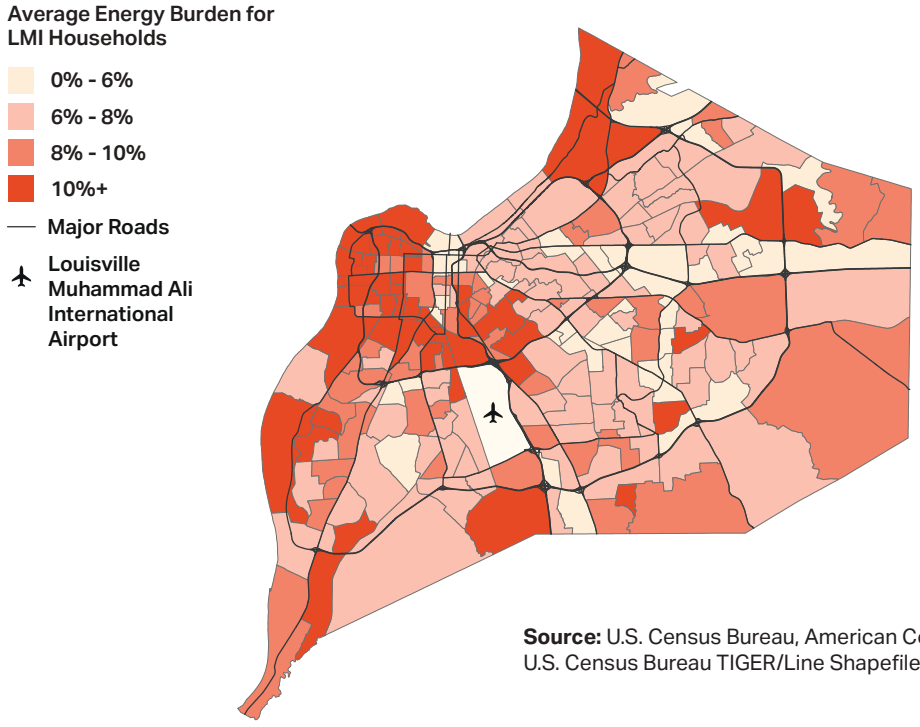


Figure 5: Average energy burden for LMI households by census tract, in Jefferson County, KY.

Source: U.S. Census Bureau, American Community Survey (2022); U.S. Census Bureau TIGER/Line Shapefiles (2022).

Comparing these findings with earlier research on Louisville suggests that energy burdens for the city's LMI residents have changed little over the last decade. Using data from 2013, the American Council for an Energy-Efficient Economy (ACEEE) found that the median energy burden for Louisville was 3.57%, with the median energy burden for LMI households at 7.60%. More than half of all LMI households in the city in 2013 had an energy burden that was at least twice the city's median, with the top quartile of LMI households having energy burdens of 12.74%.[6] The higher energy burdens experienced by residents today suggests that there has been little progress in reducing energy burdens at scale in Louisville over the past decade.[7]

Energy Costs

Energy burdens are a function of both household income and energy expenditures. LMI households in Louisville tend to use less energy overall than higher-income households, often because they are more likely to live in smaller homes.[8] Yet, lessened usage does not offset their lower incomes, resulting in outsized energy burdens.

Across Kentucky, the average household spends approximately $2,100 per year, or about $175 per month, including electricity, natural gas, and any other fuel costs. LMI households pay $1,800 per year on average, or around $150 per month for all energy costs.[9] As indicated in Table 1, these costs vary across incomes, with the lowest-income households paying 27% less than the city average, and the highest-income households paying 28% more.

	All	<80%	0-30%	30-60%	60-80%	80-100%	100-150%	150%+
Kentucky	$2,100	$1,800	$1,500	$1,800	$2,000	$2,100	$2,200	$2,500
Louisville	$2,050	$1,670	$1,490	$1,640	$1,910	$1,950	$2,020	$2,620
Difference from Louisville Overall		-19%	-27%	-20%	-7%	-5%	-1%	28%

Table 1: Average energy costs by income bracket for Louisville and Kentucky, showing the difference between Louisville costs by income cohort and the city's average costs.

[6] Ariel Drehobl and Lauren Ross, *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low Income and Underserved Communities* (Washington, DC: ACEEE, 2016), 46-50.
[7] These differences may be attributed, in part, to datasets and approaches. Drehobl and Ross use the U.S. Census Bureau's American Housing Survey (AHS) while this study uses the Census Bureau's American Community Survey (ACS) to estimate energy burden.
[8] Thomas Bowen, Allison Smith, Jamie Cutlip-Gorman, Isabel Langlois-Romero, and Shuchen Cong, *Louisville Communities LEAP Engagement: Improving Energy Efficiency in Affordable Housing* (Golden, CO: National Renewable Energy Laboratory, 2024), 17.
[9] This is comparable to average energy costs statewide, with slightly lower energy costs for LMI households in the city ($1,700 per year).

While low- and moderate-income (LMI) households in Louisville generally have lower bills than their higher-income neighbors, these reduced costs do not align with the significant income disparities they face. As Figure 6 illustrates, the average difference in energy bills between the city's highest and lowest earners is 43%, amounting to $94 per month. This difference in bills stands in stark contrast to the five-fold income differential between these two groups, highlighting the disproportionate burden that these costs carry for LMI households. Those in the lowest income bracket in the city pay just $38 per month less than even median income households, despite a more than 3-fold income differential.

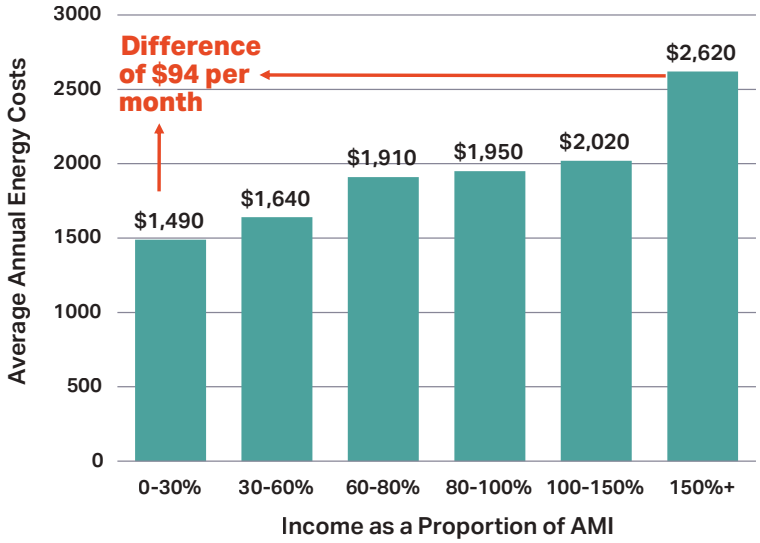


Figure 6: Energy costs by income, showing monthly difference between lowest and highest earners.

Source: Per-household energy costs for Jefferson County based on electricity, utility gas and fuel costs in data collected for the American Community Survey (2022).

This underscores that low incomes are a key driver of high energy burdens, but there are other factors that have an impact.

Quality and Efficiency of Housing

Unaffordable energy costs are not just a function of income; they are driven by the quality and efficiency of housing and access to efficient building technologies.[10] In Louisville, as in most cities, there are sharp disparities in access to efficient housing that can lower energy bills, reduce residential greenhouse gas emissions, and improve the quality of life of residents.

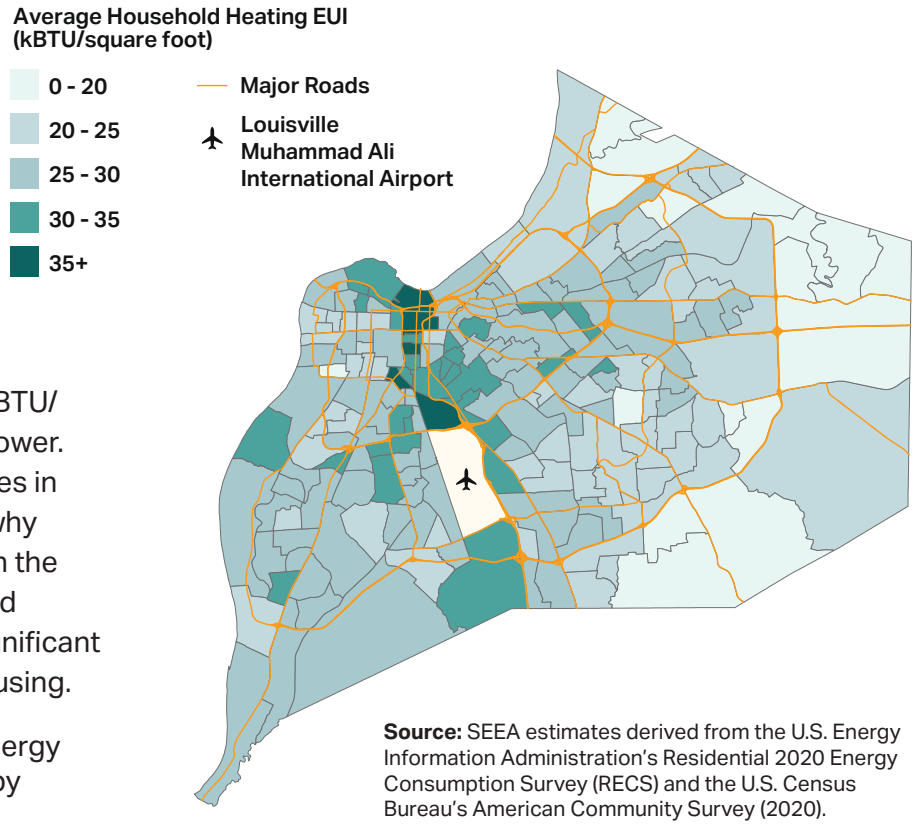
The Louisville Metro Government's 2024 *Housing Needs Assessment* update finds that neighborhoods in the west and northwest core, downtown, and those surrounding the University of Louisville campus have the highest rates of visible problems with the physical structure of homes, which affect 20% of all housing units in these communities. The issues include poor condition of siding, windows, roofs, and foundations – issues that overlap with the efficiency of

[10] Hernández, "Understanding 'energy insecurity' and why it matters to health," 1-10.

the home.[11] Not surprisingly, these are also some of the most energy-burdened communities in the city. A 2024 study by the National Renewable Energy Laboratory (NREL) used building energy modeling to conclude that 70% of homes in Louisville have a poor building envelope – the key factor in home efficiency. NREL found that low-income households were more likely to live in buildings with a poor envelope than higher-income households, putting them at a risk of inefficiencies that could drive excess energy expenditures and lessened thermal comfort.[12]

Building on this work, we use a methodology for estimating the energy use intensity (EUI) of residential heating across Louisville to understand the spatial distribution of efficient housing throughout the city. Because heating is closely correlated with physical characteristics and efficiencies of the home, including efficiency of the HVAC systems and the building envelope (insulation and window efficiency), it is a proxy for building quality and efficiency.[13]

Neighborhoods with the highest heating EUIs – those with the least efficient homes per square foot compared to other homes in the city – tend to be located in central Louisville (Figure 7). These include the central business district, Old Louisville, Algonquin, Meriwether, St. Joseph, Iroquois and Okolona – areas that also tend to have high energy burdens and energy costs. Homes in census tract 59.01, located in Phoenix Hill, for instance, have an estimated EUI of 40.29 kBTU/square foot. Homes in census tract 103.22, located in the Boston neighborhood, have an estimated EUI of 14.78 kBTU/square foot – nearly three times lower. This translates into real differences in energy bills, and it helps explain why there is such a small gap between the bills of the highest and lowest paid residents of Louisville despite significant differences in the size of their housing.



Source: SEEA estimates derived from the U.S. Energy Information Administration's Residential 2020 Energy Consumption Survey (RECS) and the U.S. Census Bureau's American Community Survey (2020).

Figure 7: Predicted residential energy use intensity (kBTU/square feet) by census tract.

[11] Louisville Metro Government and Louisville Affordable Housing Trust Fund. *Louisville Housing Needs Assessment: 5-Year Update* (Louisville, KY: Louisville Metro Government, 2024), 41-44.
[12] Bowen et al., *Louisville Communities LEAP Engagement*, 14.
[13] See Tony Gerard Reames, "Targeting energy justice: Exploring spatial, racial/ethnic and socioeconomic disparities in urban residential heating energy efficiency," *Energy Policy*, Vol. 97 (2016): 549-58; Dominic J. Bednar, Tony Gerard Reames, and Gregory A. Keoleian, "The intersection of energy and justice: Modeling the spatial, racial/ethnic, and socioeconomic patterns of urban residential heating consumption and efficiency in Detroit, Michigan," *Energy and Buildings*, Vol. 143 (2017): 25-34.

In this model, heating EUI is correlated with type of housing, income, housing vintage, and race of occupants. Households with the lowest incomes are associated with higher heating EUIs in their housing than households in the highest income bracket. Single family attached and multifamily units have lower EUIs compared to single family detached homes. Not surprisingly, homes built before 1980 are also associated with larger EUIs than homes built after 1980 – reflecting efficiency gains derived from the introduction of building energy codes. Finally, homes where the householder is Black have slightly lower EUIs than households with a white head of household – potentially reflecting the increased likelihood that Black residents live in multifamily units or use coping strategies to keep energy costs down. The full results are included in Appendix D.

Who Faces High Costs and Burdens?

Energy costs and burdens are not distributed evenly across the housing stock, with certain households shouldering a disproportionate share of energy costs relative to their income. This uneven distribution is mediated by income, as we have shown, but it is also influenced by the quality of a home's physical infrastructure, including its efficiency, type, age, and primary heating fuel. Whether a resident owns or rents their home can be another factor, with renters often having limited access to weatherization or energy assistance programs and fewer opportunities to make energy-saving upgrades to their homes compared to homeowners. Finally, sociodemographic factors like race can influence who has access to efficient housing as well as the utility burdens they face.

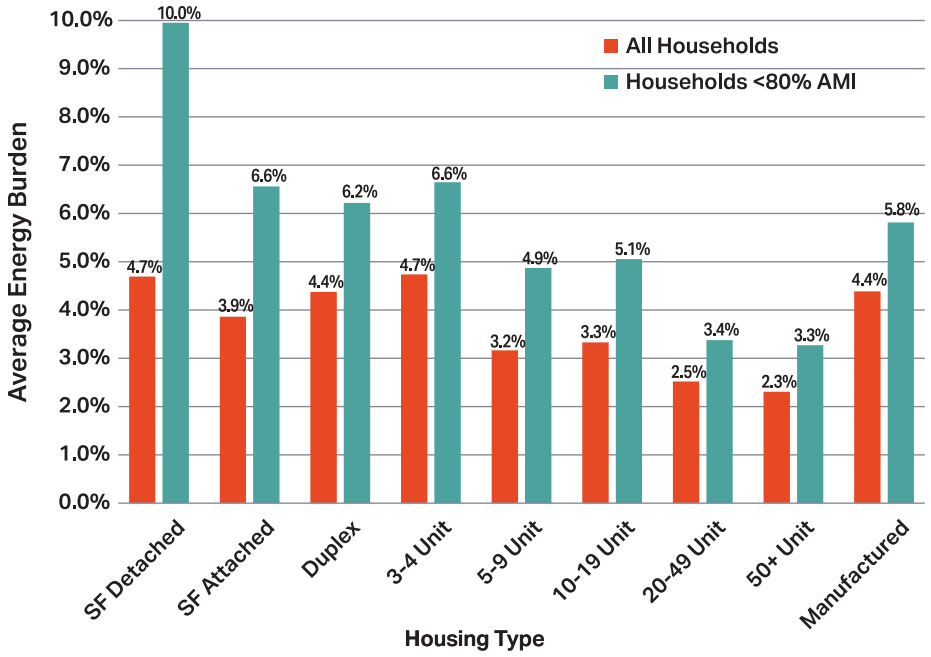
Type of Housing

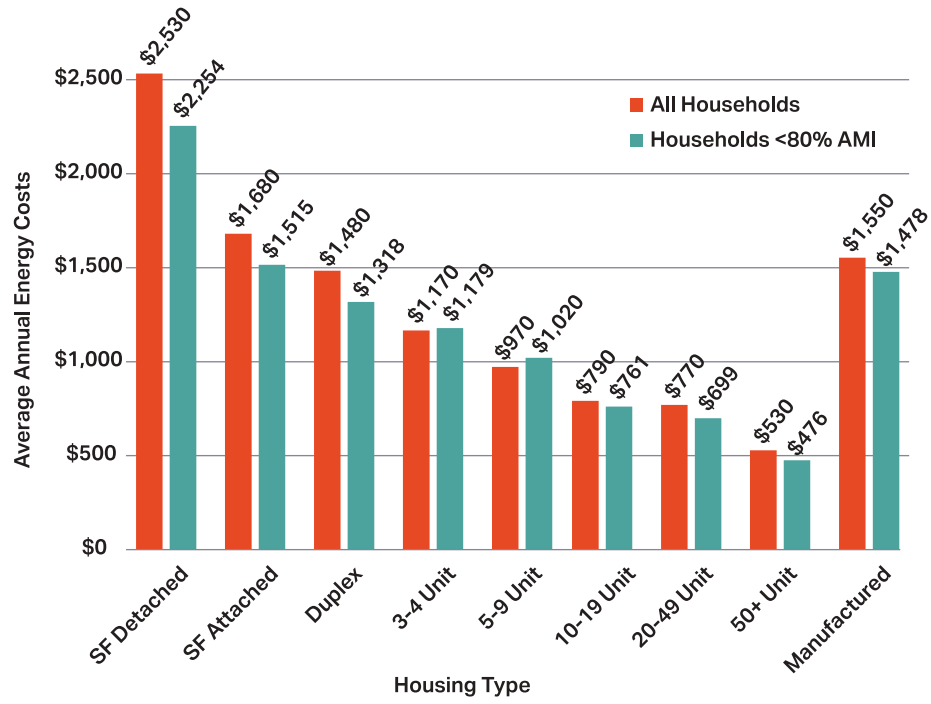
Residents of single-family detached homes have the highest average energy costs and energy burdens in the city.[14] While single-family homes are more prevalent for homeowners and households with higher incomes, nearly half of all LMI households in the city live in single-family detached homes and face energy burdens that average 10% of their income.

As indicated in Figures 8a and 8b, LMI residents of single-family attached homes, duplexes, and small multifamily buildings (3-4 units) have average energy burdens that exceed 6%. Larger multifamily units (5 units +) have some of the lowest energy burdens in the city, with the average resident paying less than 6% of their income on energy bills, regardless of income. Given the greater potential efficiencies of the shared building envelope in multifamily buildings and attached single-family households, the difference in housing type is a key influence in the difference in energy burdens for these groups. This finding is also reflected in lower EUIs in Louisville for these types of housing than for single-family detached housing.

[14] This is consistent with other energy burden research carried out in Louisville. See Bowen et al., *Louisville Communities LEAP Engagement*, 19-20; Drehobl and Ross, *Lifting the High Energy Burden in America's Largest Cities*, 46-50.

Manufactured housing is only a small proportion of the city's housing stock. While it may seem like a more affordable option upfront for low-income households, residents can face outsized energy burdens and often have limited options for improving the efficiency of their homes. Manufactured homes built before 1980 are only 26% of all manufactured housing in the city, and 0.5% of the total housing units constructed before 1980. Yet residents of these older manufactured homes have an average energy burden of 7.1%, nearly 58% higher than the average for all households.





Figures 8a and 8b: Average energy burden and costs by housing type, for LMI and all households in Jefferson County.

Source: Energy burden calculations for Jefferson County based on electricity, utility gas and fuel costs as a ratio to household income for housing type in data collected for the American Community Survey (2022).

Age of Housing

The age of a home is a primary indicator of high energy burdens, particularly for LMI residents. LMI residents of older homes (built before 1980) face average energy burdens of 8% or more, compared to 6% for those in newer homes that have been built to a higher standard of efficiency. This disparity is most acute for homes built before 1940, where both LMI and non-LMI households experience high average energy burdens (10% and 6% respectively).

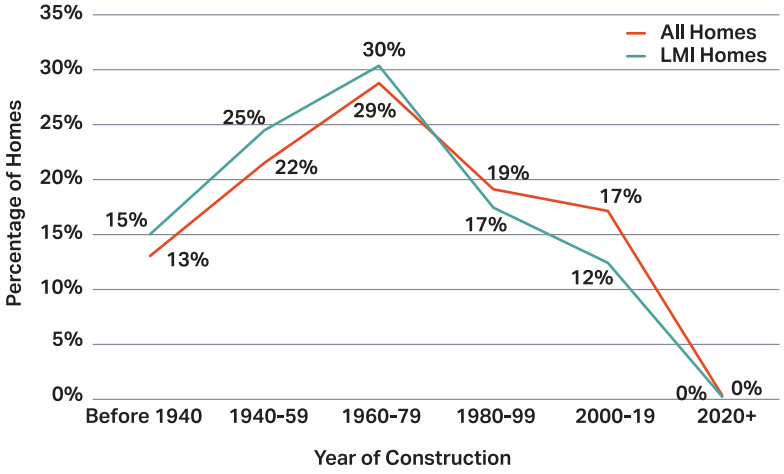


Figure 9: Percentage of homes in Louisville by year of construction, for LMI and all households.

Source: Percentage of homes by vintage for Jefferson County tabulated from the American Community Survey (2022).

Typical homes in the most energy-burdened parts of Louisville were often built before 1940, and may lack insulation, double-pane windows, and other characteristics that bring marked efficiency improvements.[15] Our EUI model finds that homes built before 1950 show a meaningful increase in EUI, with pre-1950 homes having EUIs that are 83% higher than homes built to a 2009 standard. NREL concludes that simple enclosure upgrades, including upgrades to the building envelope – adding attic and wall insulation and carrying out air and duct sealing – could save $139M across the city each year on energy bills, underlining the way that deficiencies in the building envelope due to age drive unaffordability.[16]

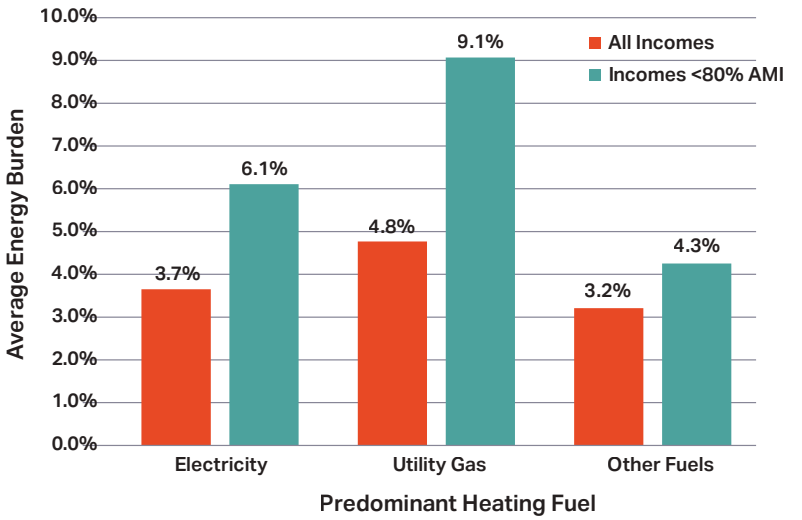
The efficiency of newer homes, largely due to building energy codes that have guided new construction in Kentucky since 1982, results in lower energy expenditures and cost burdens for residents. However, new homes are a rarity in Louisville, and homes built after 2020 represent less than 0.4% of the city's housing stock. Instead, more than 64% of Louisville residents and 70% of all LMI residents live in homes built before the state adopted any minimum standard for efficiency (Figure 9). Consequently, LMI households in pre-1940 homes often face energy burdens nearing the severe threshold of 10%. In Jefferson County alone, 42,200 households live in housing units built before 1940, with 19,500 (46%) being low-income households that face barriers to making efficiency improvements. Older homes are also located in areas where it is more likely that residents are LMI or people of color.[17]

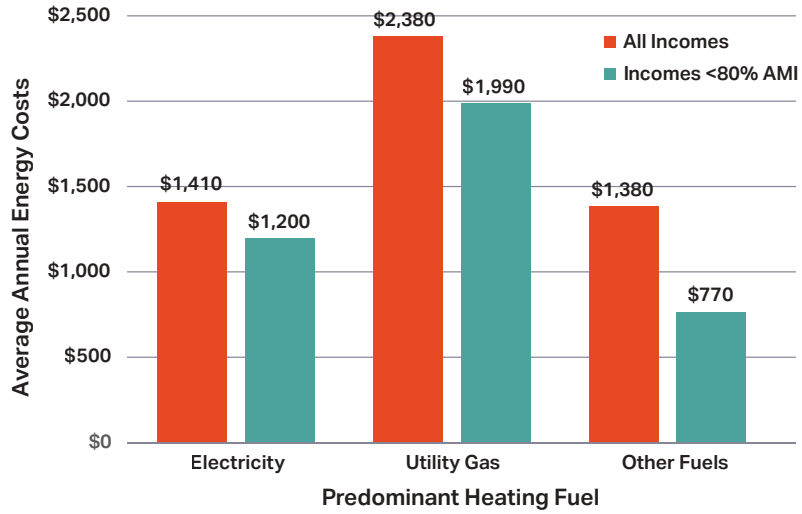
[15] Bowen et al., *Louisville Communities LEAP Engagement*, 12; Metropolitan Housing Coalition, *State of Metropolitan Housing Report* (Louisville, KY: Metropolitan Housing Coalition, 2008), 5.
[16] Bowen et al., *Louisville Communities LEAP Engagement*, vi.
[17] Metropolitan Housing Coalition, *22,000 Equities: Addressing Racial Gaps in Homeownership and Wealth* (Louisville, KY: Metropolitan Housing Coalition, 2019), 4-5.

Heating Fuel

Within the city, few households incur costs for fuel sources beyond electricity and utility natural gas, which are the most common fuels used for heating and cooling – typically the most significant energy use in the household. Residents who use natural gas for heating fuel have higher average energy burdens (4.8%) than those who use electricity (3.7%). For LMI residents, those heating with natural gas experience even greater energy burdens (9.1%) relative to LMI residents heating with electricity (6.1%) as shown in Figure 10a.

In Jefferson County, 193,000 households (61%) heat with natural gas, 117,000 (37%) with electricity, and only 5,300 (2%) use other fuel sources.[18] A lower proportion of LMI households use utility gas (55.8%) compared to non-LMI households (33.8%), likely because of the higher likelihood that LMI households live in multifamily buildings that are all electric.





Figures 10a and 10b: Average energy burden and costs by predominant heating fuel, for LMI and all households.

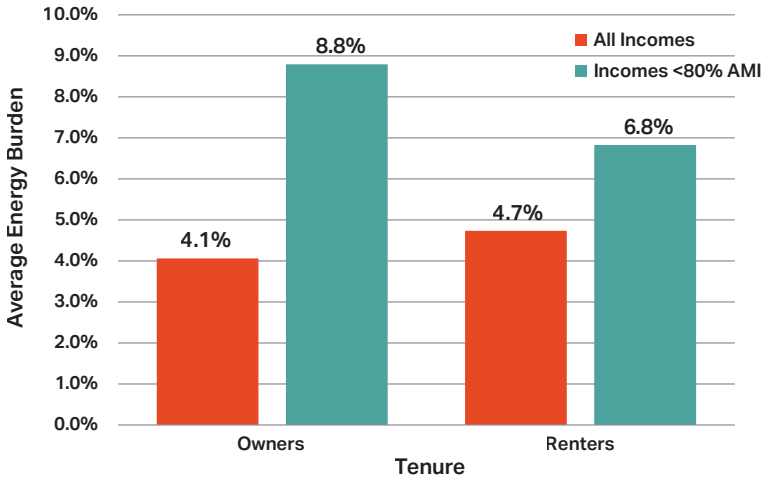
Source: Energy burden calculations for Jefferson County based on electricity, utility gas and fuel costs as a ratio to household income in data collected for the American Community Survey (2022).

[18] Metropolitan Housing Coalition, *The State of Housing in a Changing Climate*, 11.

Tenure

Across the United States, tenants typically face higher energy burdens than homeowners due to the "split incentive" issue – where landlords lack the financial incentive to invest in energy efficiency upgrades if tenants reap the savings – as well as the prevalence of financial insecurity among renters.[19]

This trend does not fully hold in Louisville, where tenants have lower average energy burdens (6.8%) than homeowners (8.8%) for LMI households, possibly because renters are more likely to live in multifamily housing. However, LMI renters do have higher energy burdens than LMI owners in single-family detached housing as well as large multifamily. Across all households, renters have higher energy burdens (4.7%) than homeowners (4.1%), as indicated in Figure 11.



Compounding these findings is the fact that Jefferson County's homeownership rate (62%) is among the bottom five statewide, lagging the Kentucky average (69%), which can make it difficult to invest in measures that will make energy more affordable due to the "split incentive" issue. Homeownership is also much less likely among Black residents, who face steeper barriers than others in accessing energy efficiency assistance simply because they are more likely to be renters.

Figures 11a and 11b: Average energy burden and costs by tenure, for LMI and all households.

Source: Energy cost tabulations and burden calculations for Jefferson County based on electricity, utility gas and fuel costs as a ratio to household income by tenure in data collected for the American Community Survey (2022).

[19] See Roxana Ayala and Amanda Dewey, *Data Update: City Energy Burdens*. (Washington, DC: ACEEE, 2024); Ariel Drehobl, Lauren Ross, and Roxana Ayala, *How High Are Household Energy Burdens?: An Assessment of National and Metropolitan Energy Burden across the United States* (Washington, DC: ACEEE, 2020); Drehobl and Ross, *Lifting the High Energy Burden in America's Largest Cities*. On the split incentive issue see Stephen Bird and Diana Hernández, "Policy options for the split incentive: Increasing energy efficiency for low-income renters," *Energy Policy*, Vol. 48 (September 2012): 506-14.

Race and Ethnicity

All of these issues – income, tenure, building type, vintage – are mediated through the lens of race. The city's current landscape cannot be understood without acknowledging its history of racial segregation, exclusionary zoning, and redlining, which continue to limit housing choice for people of color.

In 1914, Louisville enacted a racial segregation ordinance that prohibited Black residents from living in majority-white blocks. This ordinance laid the foundation for decades of discriminatory land use policies that systematically denied Black residents access to stable housing, neighborhood investment, and opportunities for upward mobility. Exclusionary zoning policies entrenched segregation by requiring larger lot sizes, banning multifamily housing, and favoring low-density development. These regulations encouraged sprawl, drove up housing costs, and excluded lower-income and minority households from new or better-resourced areas. This history has also denied people of color wealth-building opportunities available to white residents through homeownership, ensuring that there are still wide disparities in access to capital for home purchases and upgrades. The legacies of this lack of housing choice continue to circumscribe the ability of many people of color to secure efficient and affordable housing.[20]

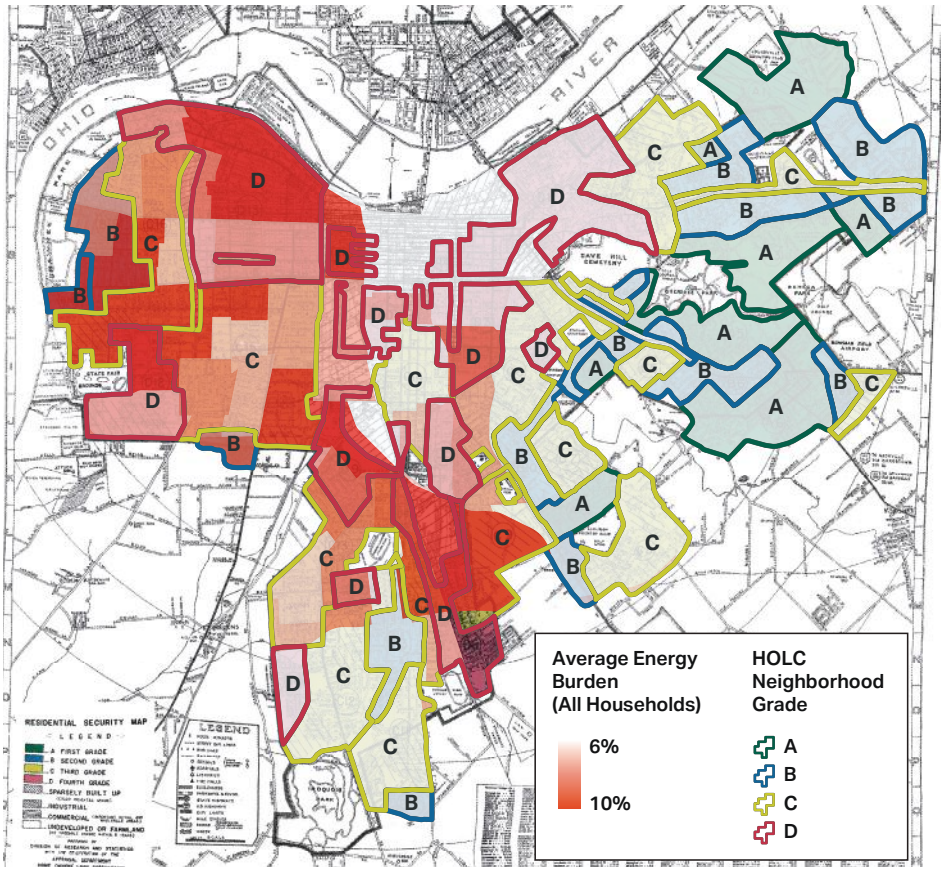


Figure 12: High energy burdens in formerly redlined neighborhoods.

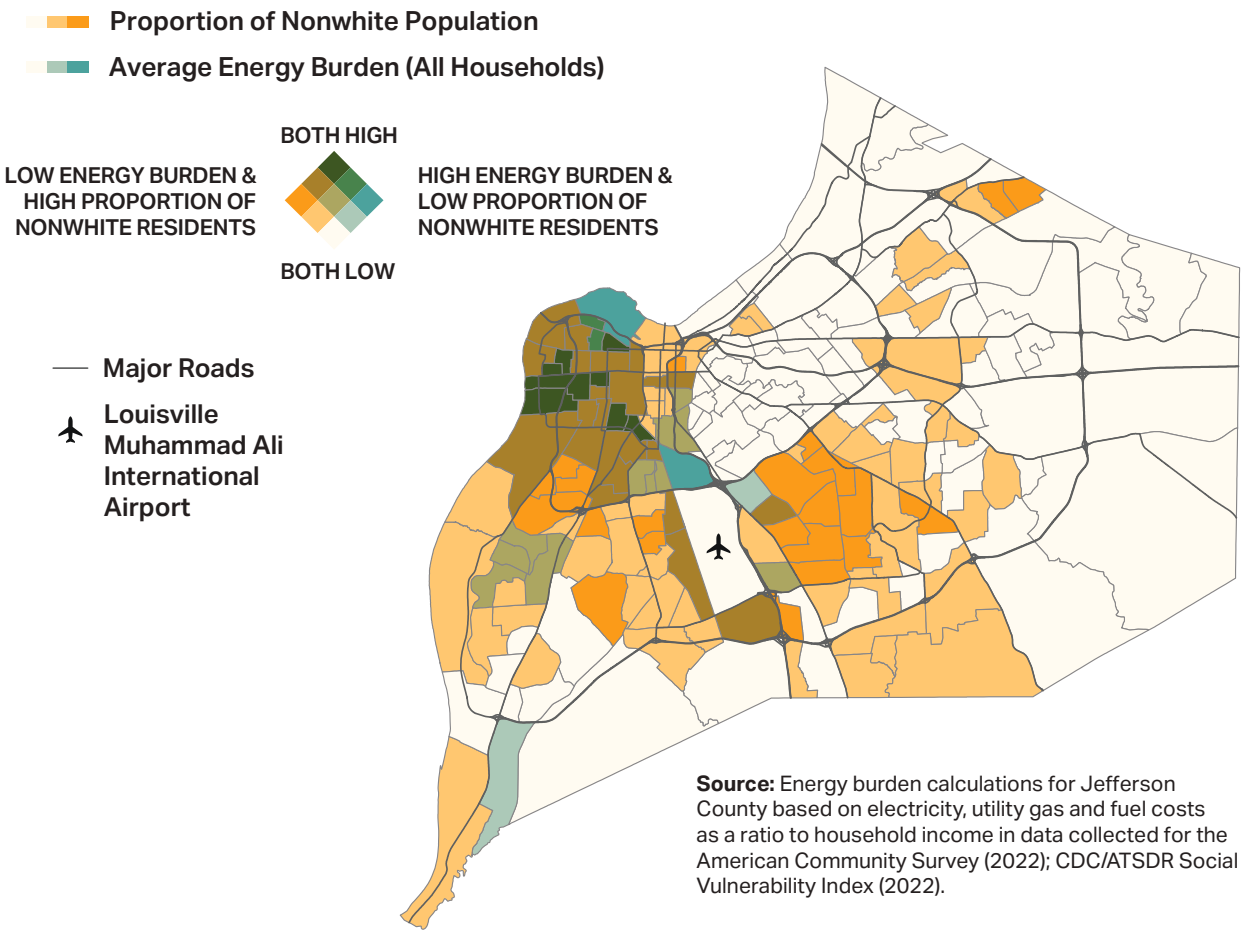
Source: Energy burden calculations from U.S. Community Survey (2022); Mapping Inequality, University of Richmond; Meier, Helen C.S., and Mitchell, Bruce C. Historic Redlining Scores for 2010 and 2020 US Census Tracts. Ann Arbor, MI: Inter-university Consortium for Political and Social Research, 2021.

[20] Louisville Metro Planning & Design. 2021. "Confronting Racism in City Planning and Zoning." ArcGIS StoryMaps. September 1, 2021. https://storymaps.arcgis.com/stories/8cd986b3c5ab4f1c8bedba85f195662f.

In the 1930s, for instance, the federal Home Owners' Loan Corporation (HOLC) institutionalized these patterns through a neighborhood grading system that rated areas from "A" (best) to "D" (hazardous). This system was intended to guide mortgage lending based on perceived lending risk, though grades were largely based on the racial and ethnic composition of residents.[21] Although HOLC maps themselves did not play a direct role in advancing redlining, they were symbolic of a broad set of assumptions about race, housing, and urban space that did.[22]

The long-term impacts of these policies remain visible in Louisville, where 40% of energy burdened census tracts are in majority BIPOC neighborhoods (Figures 12 and 13). In West Louisville, areas historically graded "D," "C," and "B" face disproportionately high (≥6%) or severe (≥10%) energy burdens, while formerly "A"-rated neighborhoods in east Louisville show virtually none.

Figure 13: Census tracts in Jefferson County where high energy burdens overlap with high proportions of nonwhite residents.



Source: Energy burden calculations for Jefferson County based on electricity, utility gas and fuel costs as a ratio to household income in data collected for the American Community Survey (2022); CDC/ATSDR Social Vulnerability Index (2022).

[21] Nelson, Robert K., LaDale Winling, et al. "Mapping Inequality: Redlining in New Deal America." In *American Panorama: An Atlas of United States History*, Ed. Robert K. Nelson (2023). Available at: https://dsl.richmond.edu/panorama/redlining.
[22] Todd M. Michney and LaDale C. Winling, "The Roots of Redlining: Academic, Governmental, and Professional Networks in the Making of the New Deal Lending Regime," *Journal of American History* 108, no. 1 (2021): 42-69.

Photo Credit: Adobe Stock

In summary, the households most likely to experience energy affordability challenges in Louisville are LMI residents living in:

- Single-family detached homes
- Owner-occupied properties
- Homes primarily heated by natural gas
- Older homes, particularly those built before 1980
- Census tracts with >80% BIPOC populations

While these households face the most severe financial constraints in the city, effective programs and policies must balance these energy affordability needs with other related constraints.

How Does Louisville Compare?

The Louisville metropolitan area experiences lower average energy burdens than the rest of Kentucky, particularly when compared to the eastern part of the state, where burdens for LMI households regularly exceed 10% of income for residents (see Figure 14). However, Jefferson County has the greatest number of housing units in the state, so the challenges of energy affordability affect more individuals and families there, and households in the lowest income brackets regularly experience extremely high energy burdens.

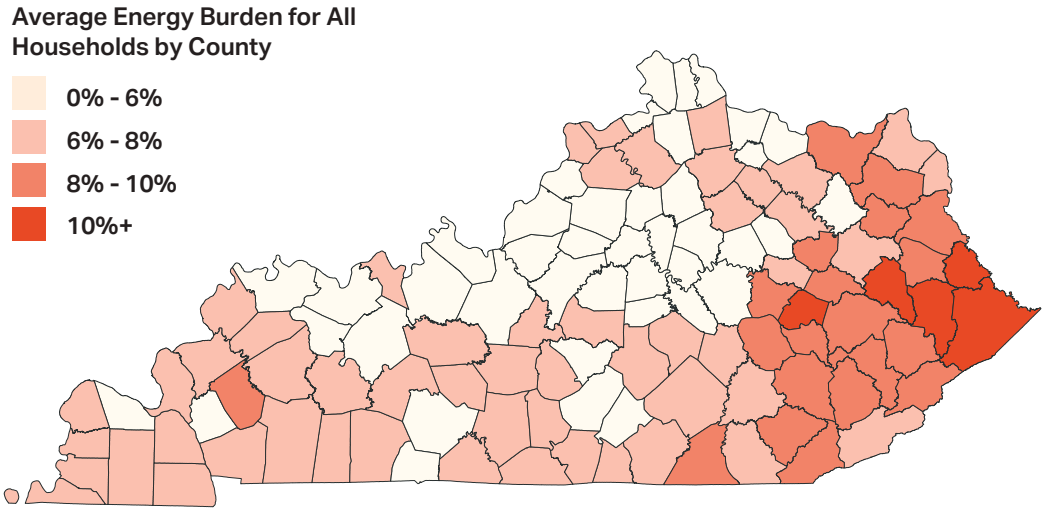


Figure 14: Average energy burden for all households by county in Kentucky.

Source: Energy burden calculations for Jefferson County based on electricity, utility gas and fuel costs as a ratio to household income in data collected for the American Community Survey (2022).

Despite these challenges, Jefferson County's average energy burden overall stands at 4.5%, making it one of only 20 counties statewide with an average burden under 5%. For LMI households, the average energy burden is 8.2%, placing it among 18 counties statewide with a burden under 9% for this group. Even for the lowest income bracket (0-30% AMI) – where residents of every county in the state face severe energy burdens – Jefferson County has energy burdens that are nearly 20% lower than the average for the rest of the state (15% compared to 18.7%). After including counties adjacent to Jefferson County – including Hardin, Bullitt, Spencer, Shelby, and Oldham – the broader metro area still has lower average energy burdens across nearly every category.

Average energy costs in Louisville are just over $2,000, which is on par with many comparable cities, though noticeably higher than Milwaukee ($1,700) and lower than Detroit ($2,500) and Tulsa ($2,300). Energy burdens in Louisville, both for all households, and for LMI households, fall in the middle of the comparison group. Note that all cities have high or severe energy burdens for LMI households, while only St. Louis and Detroit have an average energy burden that is considered high when averaged over all households (Figure 15).

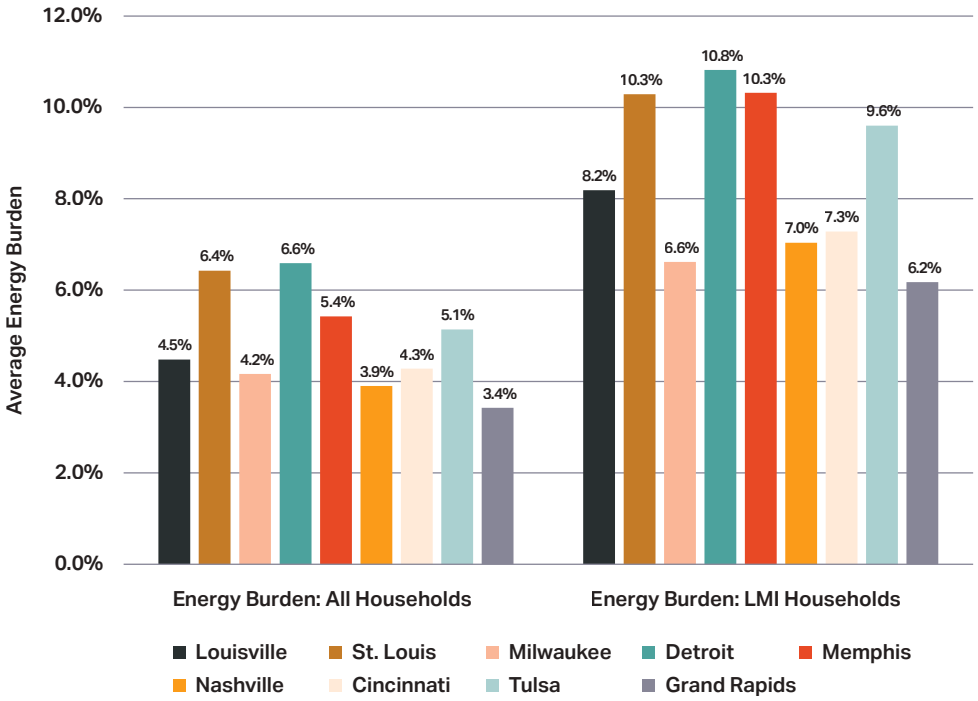


Figure 15: Average energy burden for LMI and all households in Louisville and comparison cities.

Source: Energy burden calculations for Jefferson County based on electricity, utility gas and fuel costs as a ratio to household income in data collected for the American Community Survey (2022).

Energy Affordability Gap

Energy unaffordability has significant impacts on household finances, but it can also intersect with other neighborhood-level dimensions to create "concentrated disadvantages."[23]

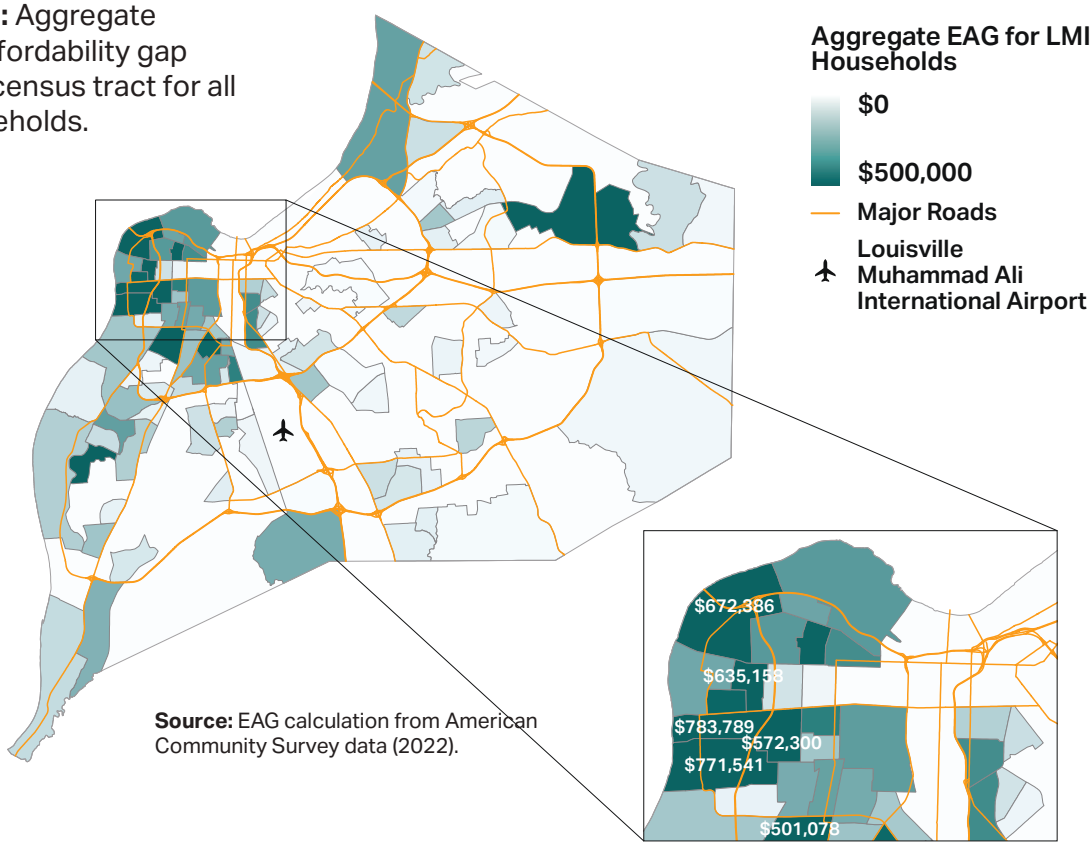
To understand the impact of energy costs at a neighborhood level, as well as to estimate how much funding may be needed to address these issues, we use the energy affordability gap (EAG). The EAG measures the difference between "affordable" energy bills and "actual" bills.[24] In this case, we calculate EAG based on the difference between actual bills and 6% of household income. This approach can shed light on how much money LMI households pay beyond what is affordable – money that could be used for other critical household needs like housing, healthcare, food, and medicine if their bills were affordable. The aggregate EAG can also provide an estimate of how much funding is needed to close affordability gaps across the city.

While the aggregate EAG for the entire city is negligible because many higher-income households pay less than 6% of their income, the EAG tells an important story for households with incomes between 0-30% of AMI. Across Louisville, our analysis shows that it would

[23] See Chien-fei Chen, Jimmy Feng, Nikki Luke, Cheng-Pin Kuo, and Joshua S. Fu, "Localized energy burden, concentrated disadvantage, and the feminization of energy poverty," *iScience*, Vol. 25, No. 4 (April 2022): 104139.
[24] Fisher, Sheehan & Colton, Home Energy Affordability Gap. Available at: http://www.homeenergyaffordabilitygap.com/01_whatIsHEAG2.html.

require at least $33M to close the affordability gap that these households experience. Some neighborhoods, particularly on the west side of Louisville, require more than $700,000 each to address the EAG across all LMI households, as indicated in Figure 16.

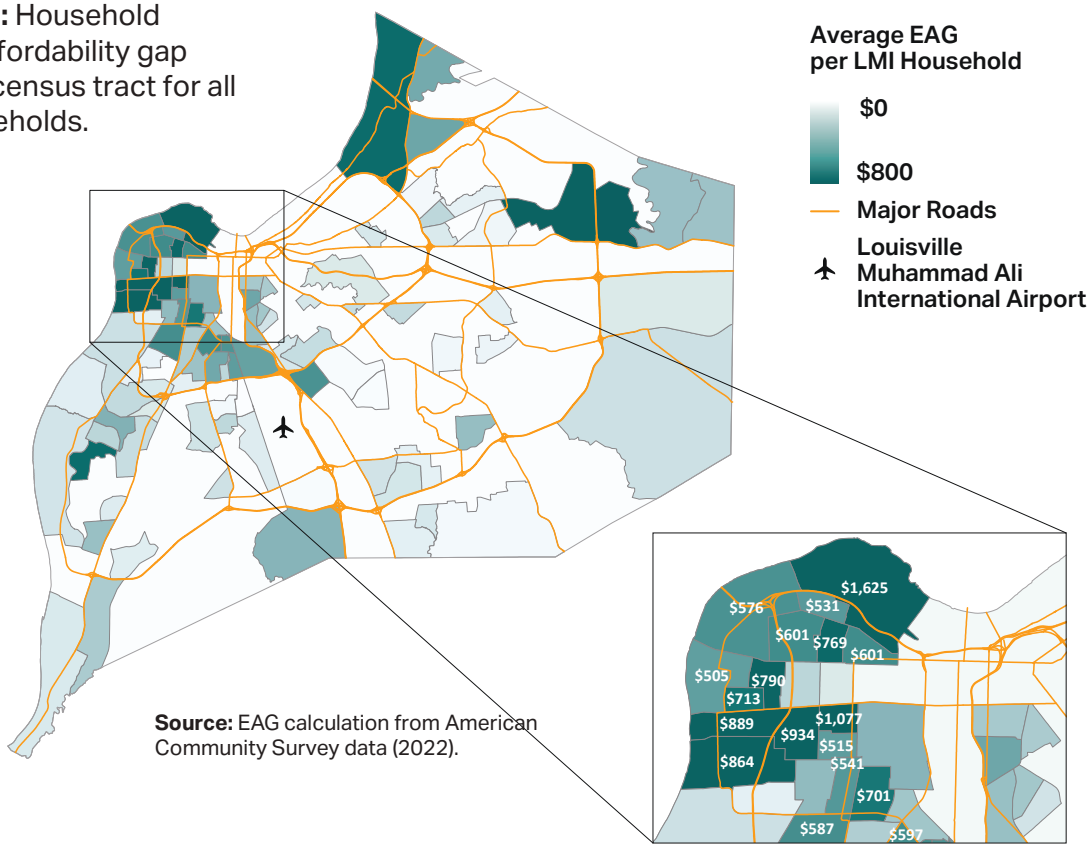
Figure 16: Aggregate energy affordability gap (EAG) by census tract for all LMI households.



Source: EAG calculation from American Community Survey data (2022).

At a household level, 96 census tracts (45% of all tracts) have at least some affordability gap, with 34% of tracts facing household gaps less than $150 annually, and 30% of tracts facing gaps that are more than $450 each year. Census tracts with the highest household EAG's are concentrated in west Louisville, with several neighborhoods in the outlying suburban communities in east Louisville also having high EAG's for LMI households, as shown in Figure 17.

Figure 17: Household energy affordability gap (EAG) by census tract for all LMI households.



Source: EAG calculation from American Community Survey data (2022).

EAG is not an abstract metric. It shows how much each household spends beyond what is considered affordable – expenses that could be used for housing payments or other household necessities. Across neighborhoods and the city, EAGs can help uncover the community-level impacts of these costs, shedding light on how unaffordable energy costs accumulate and undercut community security and stability.

Utility Landscape, Rates, and Policies

Besides income and physical infrastructure, utility policies and rates play a critical role in shaping energy affordability. Louisville residents are served primarily by Louisville Gas & Electric Company (LG&E), which provides both electric and piped natural gas service to households throughout the municipal area, with a service territory that is largely the same as the city's jurisdiction. LG&E serves 381,561 residential electric customers, with 36% of its electric load going to homes. The company also serves around 335,000 residential customers with natural gas. LG&E is the third largest utility in the state by both customer count and sales.[25]

The most direct way that LG&E impacts energy affordability is through the rates that it charges, which are determined through a ratemaking process managed by the Kentucky Public Service Commission (PSC). The PSC is the regulatory agency responsible for ensuring that utility rates are "fair, just, and reasonable" for consumers while allowing utilities the opportunity to earn a reasonable return on their investment.[26]

While natural gas rates and electric rates are comparably low, both have increased through ratemaking approvals, especially since 2015. This puts pressure on ratepayers and has an outsized impact on those with the least efficient housing or least financial resources to absorb cost increases.

Fixed charges currently make up a substantial part of both electric and natural gas bills available through LG&E. These regressive charges fall most heavily on low-income households, and impact customers no matter how much energy they use. For LG&E's current rates, fixed charges on an average natural gas bill (52 Ccf) equate to approximately 20% of the total bill of $94.51. Fixed charges on average (866 kWh) electric bills equate to approximately 13% of the total bill of $112.90.[27] LG&E does offer time of use and demand rates, which can provide cost savings by incentivizing customers to use power at off-peak times, but LMI households often face awareness barriers in accessing this kind of incentive.

In 2025, LG&E and KU filed a request with the PSC to increase their rates after nearly five years of a consistent base rate. LG&E/KU attribute the necessary increases to inflation, the rise in cost of labor and materials, capital infrastructure projects, and the need to harden the grid after recent storms. LG&E/KU are asking for an 8.3% increase in electric and 14% increase in gas rates for a total increase of 11.5%.

If approved, these increases will take effect no earlier than January 1, 2026. An average LG&E residential electric customer, consuming approximately 866 kWh per month, would experience

[25] U.S. Energy Information Administration, Form EIA-861, Annual Electric Power Industry Report (Washington, D.C.: U.S. Department of Energy, 2023); Claudette Ayanaba and Lily Smith. *Kentucky State Guide to Utility Energy Efficiency Planning* (Atlanta, GA: SEEA, 2022), 1-5.
[26] Ayanaba and Smith, *Kentucky State Guide to Utility Energy Efficiency Planning*, 1-5.
[27] LG&E, Rates, Terms, and Conditions for Furnishing Natural Gas Service, July 20, 2021; LG&E, Rates, Terms, and Conditions for Furnishing Electric Service, July 20, 2021. Both available at: https://lge-ku.com/regulatory/rates-and-tariffs. This is based on a sample bill from February of 2023, which is available at: https://lge-ku.com/residential/billing/understanding-your-bill.
[28] LG&E Customer Notice of Rate Adjustment, July 21,2025. Available at : https://psc.ky.gov/pscecf/2025-00114/rick.lovekamp%40lge-ku.com/05302025095212/06-LGE_Customer_Notice_of_Rate_Adjustment.pdf.

an estimated increase of $11.04 in their total monthly bill. Similarly, an average LG&E residential natural gas customer, using about 52 Ccf per month, would see their total monthly bill rise by an estimated $11.12.[28]

These cost increases are largely a function of LG&E's ongoing capital and infrastructure investments, which are mostly recovered through base rates, environmental surcharges, and regulatory asset treatment. This approach directly shifts the financial responsibility of these improvements onto ratepayers, leading to immediate bill increases even when the benefits are long-term.

Along with the ongoing rate case, LG&E and KU have requested a Certificate of Public Convenience and Necessity (CPCN) to build two new natural gas combined-cycle generation units and other infrastructure to meet projected energy demand in the state, mainly driven by the prospect of data centers locating in Kentucky. If approved, the CPCN will allow LG&E and KU to embark on these projects and recover costs during future rate cases, with significant increases expected to offset the costs of investing in fossil fuel generation infrastructure for uncertain levels of demand.[29]

While LG&E/KU asserts that even with these proposed increases, residential rates for electric service will remain below the national average, this comparison does not negate the real impact on household budgets. A substantial percentage of Louisville households are already cost-burdened, and any increase in utility bills will exacerbate existing financial strain, potentially pushing more families into financial hardship.

Furthermore, Kentucky's reliance on coal as its primary utility-scale fuel source for generation, which accounts for 68% of its electricity portfolio, requires substantial and ongoing environmental compliance costs. The Environmental Surcharge Mechanism ensures that "legacy" costs, stemming from both past and present coal-fired generation, are explicitly and directly passed on to customers as a separate line item on their bills. For instance, a 2016 environmental surcharge case for LG&E resulted in estimated rate impacts peaking at $2.26 per month (a 2.49% increase) in 2020 and projected at $1.90 per month (a 2.09% increase) in 2024 for an average residential customer. This non-discretionary charge directly impacts affordability and illustrates how historical energy choices continue to shape current and future energy affordability for consumers. The state's reliance on fossil fuels also means that residential energy efficiency efforts in Louisville can play an important role in reducing greenhouse gas emissions, and provide a key climate pathway for the city.[30]

Federal changes, especially the 2025 budget reconciliation act, are projected to increase energy prices in the state and bring heightened urgency to energy affordability. Energy Innovation, a nonpartisan think tank, predicts that the financial impacts of this legislation on Kentucky will place the state in the top five states nationally in terms of increased energy costs for consumers and decreased jobs in the energy sector. In Kentucky, they anticipate $200 spikes in household energy bills by 2030 and $630 increases by 2035 due to these changes, with a cumulative GDP loss of $2.4 billion by 2035.[31]

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[29] LG&E, "Joint Application," Kentucky Public Service Commission, Case No. 2025-00045, February 28, 2025. Available at: https://psc.ky.gov/pscecf/2025-00045/rick.lovekamp%40lge-ku.com/02282025010202/04-KU_LGE_Joint_Application_2025-00045.pdf; "LGE-KU Proposes to Spend $3.7 Billion in New Infrastructure and Files for Separate Rate Increase," Mountain Association, July 8, 2025. Available at: https://mtassociation.org/energy/lge-ku-proposes-to-spend-3-7-billion-in-new-infrastructure-and-files-for-separate-rate-increase/.

[30] Bowen et al., *Louisville Communities LEAP Engagement*, 2-3.

[31] Energy Innovation. Economic Impacts of the U.S. *"One Big Beautiful Bill Act" Energy Provisions on Kentucky* (San Francisco, CA: Energy Innovation, 2025), 1-2.

Case Studies: Promoting Energy Affordability through Smart Regulation

State legislatures are critical partners to advancing energy affordability through legislation that improves access to energy efficiency and clean energy. State legislatures in Virginia and North Carolina have successfully used utility regulations to improve energy affordability, and their approaches offer a blueprint for states like Kentucky. By mandating investments in energy efficiency and clean energy, these states have stabilized costs, reduced reliance on fossil fuels, and modernized their grids.

Virginia's Clean Economy Act (VCEA)

Passed in 2020, the VCEA is a comprehensive law that directly links clean energy investment with affordability. It establishes a mandatory Renewable Portfolio Standard (RPS), requiring major utilities like Dominion Energy and Appalachian Power to transition to 100% renewable electricity by 2045-2050. The act also created an Energy Efficiency Resource Standard (EERS), mandating that these utilities achieve a percentage-based reduction in energy consumption over time.

A key feature of the VCEA is how it incentivizes utilities to pursue energy efficiency: the State Corporation Commission (SCC) rewards utilities that meet their efficiency goals with a higher rate of return. The act also requires the SCC to consider the social cost of carbon when approving new power plants, ensuring long-term environmental and economic costs are accounted for. The VCEA includes provisions to support low-income customers and historically disadvantaged communities, such as establishing a Percentage of Income Payment Program (PIPP) and allocating a portion of non-compliance fees to job training and renewable energy projects in these areas.

North Carolina's Clean Energy and Energy Efficiency Portfolio Standard (CEPS)

Since its enactment in 2007, North Carolina's CEPS has been a model for the Southeast, demonstrating how a flexible, evolving standard can drive long-term affordability. The CEPS mandates that investor-owned utilities (IOUs) meet a certain percentage of their electricity sales with clean energy or efficiency measures. A 2023 amendment expanded the definition of clean energy to include nuclear and fusion energy, providing utilities with greater flexibility to meet their targets.

The CEPS prioritizes energy efficiency as a cost-effective solution. It allows utilities to meet up to 40% of the standard's requirement through efficiency measures, which directly reduces consumer demand and delays the need for expensive new power plants. The law also encourages a focus on "avoided costs" in energy planning - the savings from not building new infrastructure - which helps justify upfront investments in clean energy by demonstrating their long-term benefits for ratepayers. By setting clear, escalating targets and providing flexibility, the CEPS has lowered costs for consumers while promoting a cleaner energy system.

Kentucky could draw on the lessons of North Carolina and Virginia by:

- **Setting clear, escalating targets for clean energy and efficiency:** North Carolina's CEPS requires investor-owned utilities (IOUs) to meet 12.5% of their retail electricity sales through clean energy or efficiency measures and requires electric membership cooperatives and municipal utilities to meet 10%. Establishing similar, phased targets in Kentucky would provide certainty for energy providers and encourage sustained investment in affordable, clean energy solutions. EERS like those in VCEA also provide a pathway to require utilities to achieve a percentage-based reduction in energy consumption over time, with utilities being incentivized with higher rates of return for meeting efficiency goals.
- **Leveraging energy efficiency as a significant resource:** North Carolina allows up to 40% of its CEPS requirement to be met through energy efficiency measures, which emphasizes demand reduction as a key strategy. For Kentucky, a similar focus on energy efficiency can be the most cost-effective way to reduce energy consumption, delay the need for new power plants, and lower overall system costs for ratepayers.
- **Focusing on "avoided costs" in energy planning:** The CEPS encourages consideration of "avoided costs" (the savings derived from not building new power plants or purchasing fuel) due to energy efficiency and renewable energy. This helps to justify upfront investments in clean energy that lead to lower long-term system costs for consumers. By prioritizing avoided costs, Kentucky can make more economically sound energy decisions that benefit affordability.
- **Including a broad definition of clean energy resources:** North Carolina's expanded definition of clean energy resources, including nuclear and fusion energy facilities placed into service after January 1, 2007, offers flexibility in meeting CEPS goals. Kentucky could consider a comprehensive definition of clean energy that leverages all available low-carbon resources to meet targets efficiently and affordably.

WATER AFFORDABILITY IN LOUISVILLE

Water and sewer services are a critical part of the costs that can make housing unaffordable over the long term. Water and sewer costs have been increasing at a rate that outpaces inflation and many other household costs. Since 2012, Bluefield Research – a leading data analytics and market research firm in the water sector – has found that water and sewer bills have increased by 53.4% nationally, outpacing inflation, electric bills, and equaling the cost increase associated with natural gas service.[32]

Data from the Consumer Price Index (CPI) for urban areas also shows that water and sewer costs have been rising faster than housing costs in most metropolitan areas. While housing costs nationally have increased by around 31% since 2015, water and sewer costs have increased by 44% - nearly 1.4 times as fast.[33]

Growth in water and sewer costs is due to a variety of causes. Water and wastewater infrastructure are aging, and addressing infrastructure needs to ensure clean and sanitary water for municipalities and mitigate the environmental impacts of sewerage requires significant outlays of capital. Many municipalities do not have the capital to meet the level of infrastructure investments needed, and these costs are carried – at least in part – by ratepayers. Additionally, water rates have become regressive as fixed fees have increased so that utilities can maintain revenue in times of varying water demand.[34] All of this has placed pressure on residential customers through increased water and sewer rates and bills.

These issues are impacting the affordability of water and wastewater service in Kentucky and in Louisville. Unlike the state's energy landscape, where Louisville has energy burdens below the rest of the state, data from the 2023 U.S. Census Bureau's American Community Survey (ACS) suggests that Louisville has some of the highest average combined water and sewer bills of any part of the state. We estimate that the median water cost in Kentucky overall is $561 per year. The majority of households statewide are in the lowest cost bracket, as indicated in Figure 18, paying less than $125 per year on water and wastewater service.

In Jefferson County, however, water and sewer costs are nearly double the statewide rate, at $986 per year, and the county stands out starkly for having some of the highest costs in the state. In 197 out of 216 census tracts in Jefferson County, the majority of residents pay $1,000 or more each year for their water and sewer costs, the highest cost bracket available in ACS data. Only in 19 census tracts do a majority of residents pay less than $1,000 each year (Figure 19).

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[32] *Insight Report: U.S. Municipal Utility Water Rates Index 2024: Drinking Water & Sewer* (Boston: Bluefield Research, 2025).
[33] U.S. Bureau of Labor Statistics, "Consumer Price Index for All Urban Consumers: Water and Sewer and Trash Collection Services in U.S. City Average." FRED, Federal Reserve Bank of St. Louis, June 11, 2025.
[34] Manuel P. Teodoro and Ryan Thiele, "Water and Sewer Price and Affordability Trends in the United States, 2017-2023," *Journal AWWA*, Vol. 116, No. 8 (2024): 14-24.

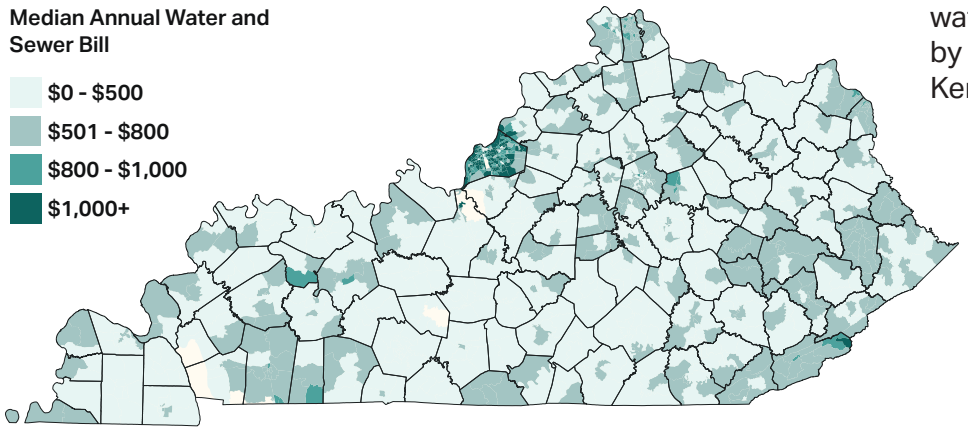

Figure 18: Median water and sewer costs by census tract for Kentucky.

Source: Estimate of census tract median derived from American Community Survey (2022).

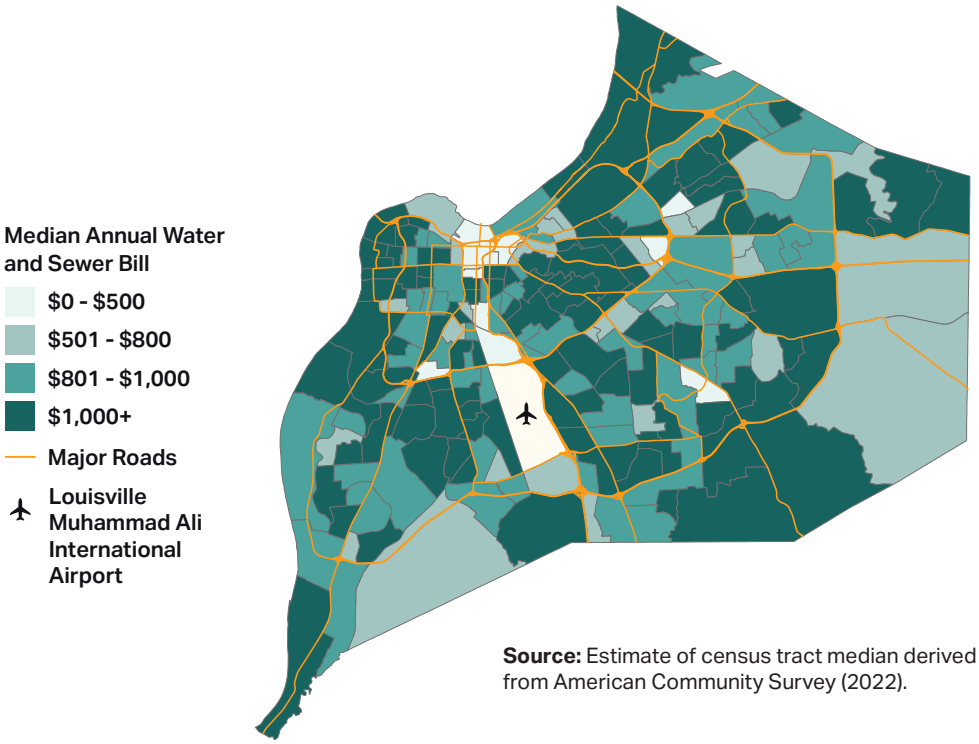

Figure 19: Median water and sewer costs by census tract for Jefferson County, KY.

Source: Estimate of census tract median derived from American Community Survey (2022).

This finding is consistent with other research. In 2024, for instance, Bluefield Research found that Louisville's combined water and sewer bill – while under the 4.5% of income threshold typically used by the EPA to denote affordability – was the sixteenth highest of metro areas nationally, with costs just below those in New York City and higher than costs in Honolulu.[35]

[35] *Insight Report: U.S. Municipal Utility Water Rates Index 2024: Drinking Water & Sewer* (Boston: Bluefield Research, 2025). See also Rebecca Shelton, Ricki Draper, and Mary Cromer, *Drinking Water Affordability in Kentucky* (Whitesburg, KY: Appalachian Citizens' Law Center, 2023). On the EPA threshold see *Water Affordability Needs Assessment: Report to Congress* (Washington, D.C.: U.S. Environmental Protection Agency, 2024). This is often broken down into 2.5% for wastewater and 2% for water service.

Income Dedicated to Water Service

To understand water and wastewater burdens in Louisville, we used Lauren Patterson and Martin Doyle's income dedicated to water service (IDWS) approach to estimate water and wastewater affordability.[36] IDWS provides a helpful method to estimate the number of households who spend a certain proportion of their income on water and sewer bills, particularly in the absence of direct utility data.

At a typical household monthly usage of 4,000 gallons (gpm), 17.7% of households (58,377) in Louisville pay more than 4.5% of income for water and wastewater service.[37] Wastewater contributes more to households being cost burdened than water service. At this level of usage, 9.9% of households in Louisville pay more than 2.5% of income for water service (32,668 households) while 28.5% of households (93,999 households) pay more than 2% of income for wastewater service, as indicated in Figure 20.

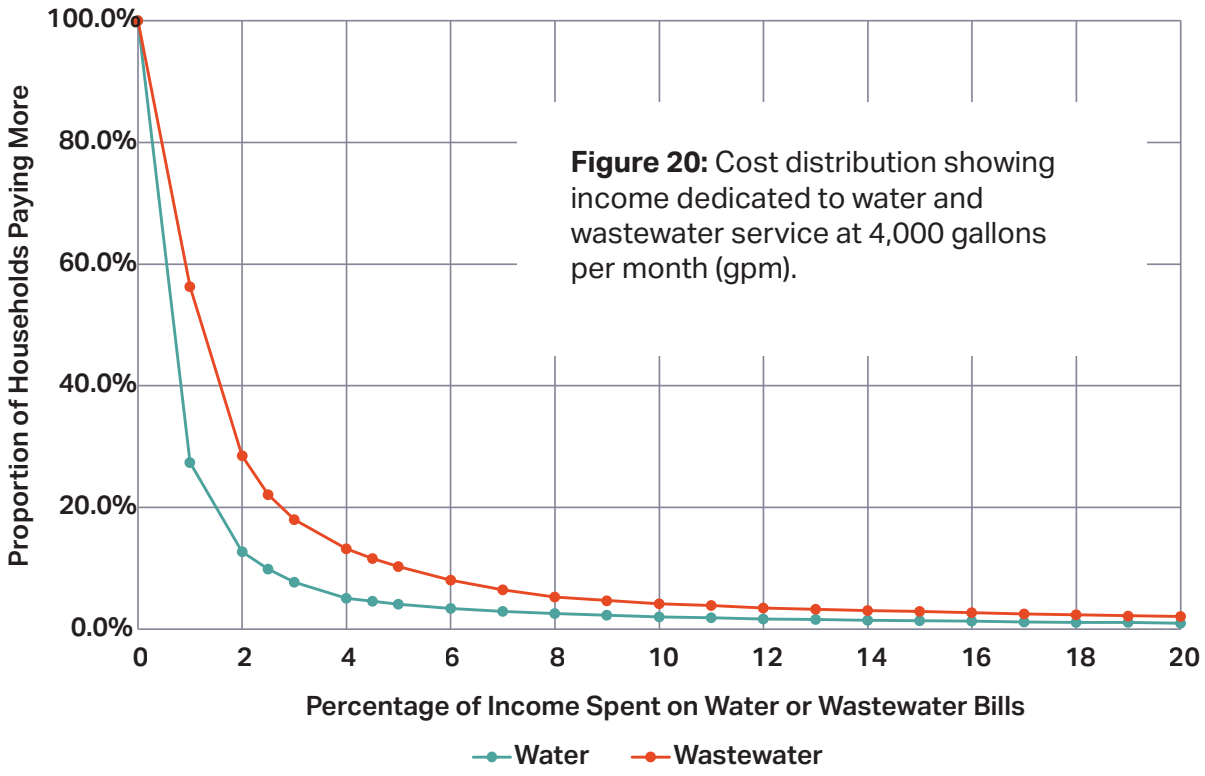

Figure 20: Cost distribution showing income dedicated to water and wastewater service at 4,000 gallons per month (gpm).

Source: Income dedicated to water and wastewater service estimates derived from Louisville Water and Louisville MSD rate schedules.

[36] L. A. Patterson and M. W. Doyle, "Measuring Water Affordability and the Financial Capability of Utilities," *AWWA Water Science*, Vol. 3, No. 6 (November/December 2021): e1260; L. A. Patterson, S. A. Bryson and M. W. Doyle, "Affordability of Household Water Services Across the United States," *PLOS Water* Vol. 2, No. 5 (2023): e0000123.

[37] We established this typical volume from Louisville Water reports. See "New Year, New Rates," Louisville Water, January 21, 2022. Available at: https://louisvillewater.com/news/new-year-new-rates/. See also Patterson and Doyle, "Measuring Water Affordability and the Financial Capability of Utilities," e1260.

Median Income Households

Another way to measure affordability is to assess what proportion of income typical water and wastewater costs make up for the median household income (MHI). At 4,000 gpm, the overall water and wastewater burden for residents of Louisville at the median income is just 1.62%, well below 4.5%. At this volume, water costs make up 0.53% of the income of a median household, while wastewater costs make up 1.09% of the income of a median household.

While this suggests that the median household in Louisville is not highly burdened by either water or wastewater costs, it is important to note that the median income varies a great deal depending on where within the city a household is located. The median household income in census tract 14 in west Louisville is $24,574, for instance, while the median household income of census tract 115.20 in southeast Louisville is $148,468. Even median income households located in parts of the city that have lower overall incomes can be burdened by these costs.

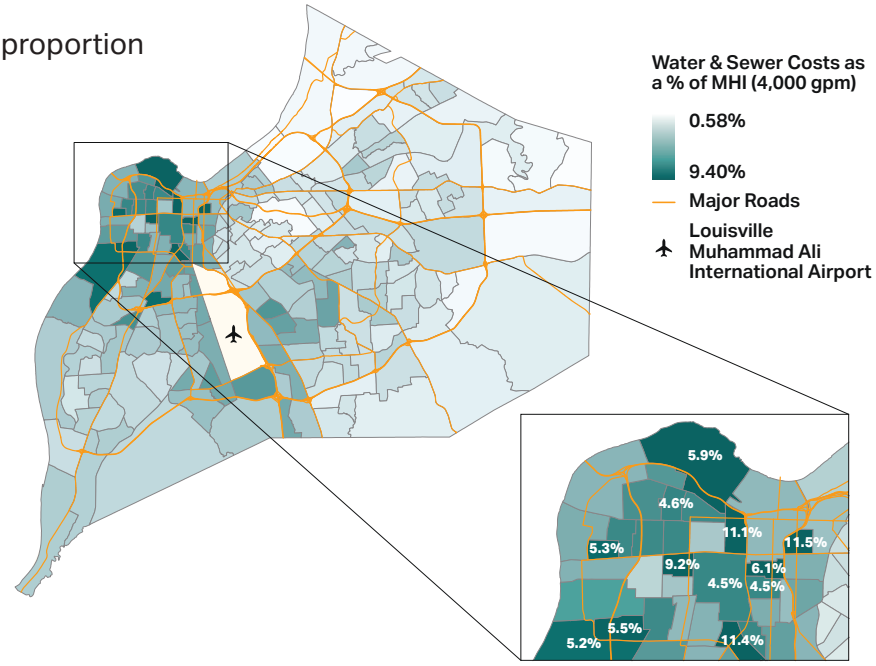

Figure 21: Water and sewer costs as a proportion of median household income (MHI) by census tract, for Jefferson County, KY, at a volume of 4,000 gpm.

Source: Estimate derived from American Community Survey (2022) and Louisville Water and Louisville MSD rate schedules.

The map in Figure 21, for instance, shows that several neighborhoods in downtown and west Louisville are burdened by water and wastewater costs, even if a household makes the median income for their census tract. This includes neighborhoods in west and south Louisville like Shawnee, Portland, Chickasaw, Jacobs, and Shively; neighborhoods in central Louisville like Portland, Russell, and California; and, neighborhoods in east central Louisville like Phoenix Hill, Smoketown, and Limerick, among others. All of the census tracts with the highest costs relative to MHI are majority Black and have some of the highest proportions of economic poverty in the city, as noted in Table 2 below.

CENSUS TRACT ID	WATER/SEWER COSTS AS A % OF MHI	BLACK RESIDENTS (%)	PEOPLE IN POVERTY (%)
21111005901	11.50%	63.45%	61.09%
21111003502	11.40%	74.22%	88.91%
21111003000	11.10%	71.64%	71.93%
21111001800	9.20%	94.13%	69.33%
21111005000	6.10%	55.08%	56.70%

Table 2: Proportion of Black residents and people in poverty for census tracts with the highest water/sewer costs as a proportion of income.

Lowest Quintile Income (LQI)

A final approach to understanding water affordability is to estimate the water burden borne by households making the lowest quintile income (LQI), or the bottom fifth of all incomes. There are approximately 65,945 households in Louisville below this income, around 20% of all households. At 4,000 gpm, the typical water burden for LQI homes is 3.81%, below the 4.5% threshold.

However, wastewater and water costs diverge significantly. The LQI indicator for water usage does not become burdensome until nearly 11,000 gpm of usage (2.64% of LQI). For wastewater, any usage at or over 2,000 gpm results in a water burden that exceeds the 2% threshold recommended by EPA for LQI households.

The map in Figure 22 shows how LQI water and wastewater burdens are distributed geographically at a volume of 4,000 gpm. At this volume, LQI households in virtually the entire downtown area are highly burdened by water and wastewater costs, which regularly exceed 10% of income for residents with an income in the lowest quintile.

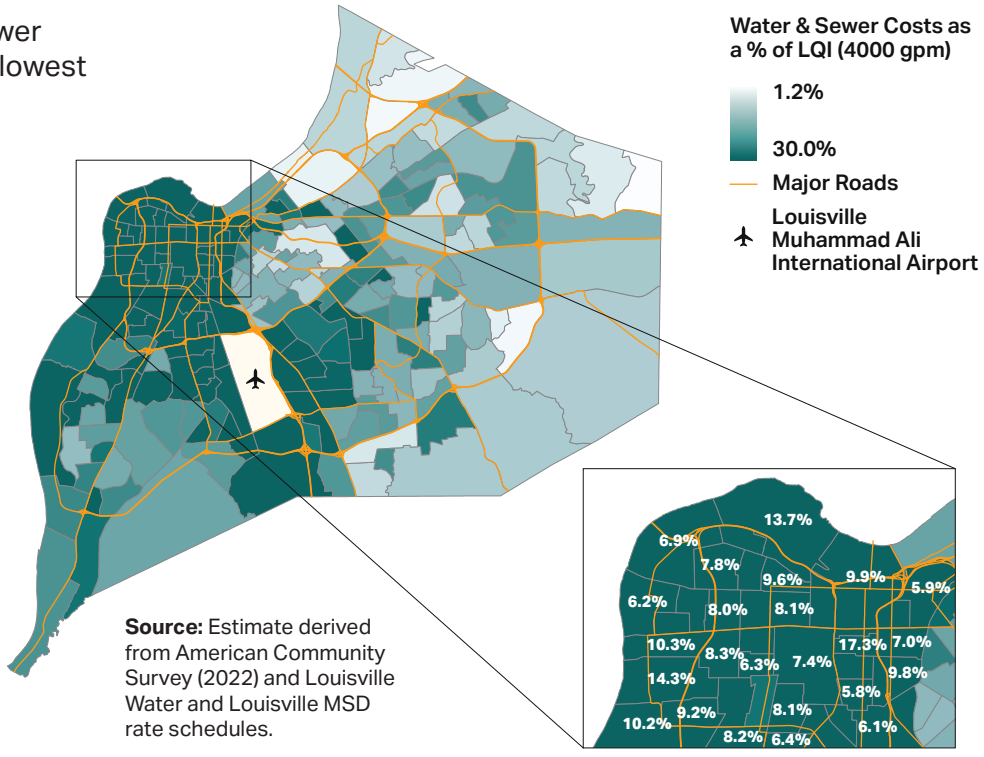

Figure 22: Water and sewer costs as a proportion of lowest quintile income (LQI) by census tract, for Jefferson County, KY, at a household volume of 4,000 gpm.

Source: Estimate derived from American Community Survey (2022) and Louisville Water and Louisville MSD rate schedules.

This underlines the way that water burdens are shaped by income, with the lowest-income households being burdened by water and wastewater costs at virtually any volume of usage.

Water and Sewer Rates

As scholars have observed, water and wastewater rates in the United States have become increasingly regressive in recent years.[38] This is largely driven by the urgent need for utilities to fund major infrastructure improvements, particularly in communities facing federal mandates to reduce sewer overflows and upgrade aging systems. Because wastewater systems are capital intensive, utilities often rely on fixed service charges to recover these costs, rather than on volumetric (usage-based) rates.

Louisville is a prime example. Since entering into a federal consent decree in 2005 (with amendments in 2008), the Louisville Metropolitan Sewer District (MSD) has been required to undertake billions of dollars in infrastructure upgrades to address combined sewer overflows and other Clean Water Act violations.[39] To fund these improvements, MSD relies in part on fixed charges on residential bills:

- Residential Wastewater Service Charge: $22.68 per month (regardless of usage)
- Consent Decree Surcharge: $18.54 per month (regardless of usage)[40]

These fixed fees alone are $41.22 per month for every residential customer, before any charges for actual water usage are applied. The result is that for a typical household using 4,000 gpm, fixed charges make up 63% of the total bill ($41.22 out of $66.26), with only $24.28 coming from volumetric charges. For customers who use less water, the proportion is even higher: at 2,000 gallons per month, 77% of the typical bill is derived from fixed fees.

This rate structure, while understandable given the scale of infrastructure needs, is regressive. It places a disproportionate burden on low-usage – and often lower-income – households, who pay the same fixed charges as high-usage customers. This not only impacts affordability for those who can least afford it but also removes much of the incentive for water conservation and efficiency.

[38] Teodoro and Thiele, "Water and Sewer Price and Affordability Trends in the United States, 2017-2023," 14-24.
[39] See Louisville Metropolitan Sewer District (MSD), "Consent Decree," Louisville MSD. Available at: https://louisvillemsd.org/consentdecree.
[40] The Consent Decree surcharge is earmarked specifically for federally mandated infrastructure projects.

How Does Louisville Compare?

Louisville MSD's reliance on fixed fees is placed in sharp relief when compared to other major cities, including those also under federal consent decrees. In this table, all of the other utilities examined had fixed fees that were between 23% and 86% of Louisville MSD, with the Boston Water and Sewer Commission using a rate structure that generates revenue only through volumetric charges.

CITY	UTILITY	FIXED (4000 GPM)	VOLUMETRIC (1000 GAL)	BILL (4,000 GPM)	% FIXED	CONSENT DECREE? (Y/N)	NUMBER OF WASTEWATER ACCOUNTS	% OF FIXED FEES BELOW MSD
Louisville, KY	Metropolitan Sewer District	$41.22	$6.26	$66.26	62.20%	YES	200,000	
Nashville, TN	Nashville Metro Water Services	$9.49	$10.94	$53.25	17.80%	YES	220,000	23.00%
Indianapolis, IN	Citizens Energy Group	$26.28	$8.53	$60.40	43.50%	YES	230,000	63.80%
St. Louis, MO	Metropolitan Sewer District	$30.14	$8.26	$63.18	47.70%	YES	430,000	73.10%
Milwaukee, WI	Metropolitan Sewerage District	$23.83	$5.42	$45.51	52.40%	YES	1,100,000	57.80%
Detroit, MI	Detroit Water and Sewerage Department	$10.48	$7.88	$42.00	25.00%	NO	230,000	25.40%
Washington, DC	DC Water	$35.28	$17.21	$104.12	33.90%	YES	110,000	85.60%
Boston, MA	Boston Water and Sewer Commission	$0.00	$8.86	$35.42	N/A	YES	90,000	N/A

Table 3: Comparison of Louisville MSD's fixed fees to other similar wastewater utilities.

The bottom line is that Louisville's fixed sewer charges are among the highest in the nation, both in dollar terms and as a share of the total bill. These fixed fees are used to address real infrastructure needs, including maintaining and operating water treatment facilities and complying with the federal consent decree by upgrading infrastructure to prevent sewer overflows and improve the water quality of local waterways. Even compared to other cities under consent decrees – such as Indianapolis, St. Louis, and Milwaukee – Louisville stands out for its fixed fees, which have an outsized impact on low-income households and are a key reason that wastewater is such a significant driver of unaffordability in the city.

Louisville Water and MSD are not regulated by the PSC, and rate hikes for water and sewer must be approved by the board of each utility during the annual budget process. In the last two years, Louisville Water rates have increased by around $1.20 per month (beginning in January of 2025) for an average residential customer, while MSD rates increased by 6.9% in August of 2024. Another increase of 3.9% for MSD customers will go into effect in August of 2025.[41]

[41] "Louisville Water Company approves slight increase to bills starting in January," WDRB, November 19, 2024. Available at: Louisville MSD, "Adopted Budget in Brief FY 2025," LouisvilleMSD.org, July 1, 2024, https://louisvillemsd.org/sites/default/files/file_repository/Finance/Annual%20Budget%20Report/FY25%20Budget%20in%20Brief%20-%20Final_0.pdf; Killian Baarlaer, "Louisville MSD board approves rate hike. Here's by how much and when it will begin," *Louisville Courier Journal*, July 28, 2025. Available at: https://www.courier-journal.com/story/news/local/2025/07/28/louisville-msd-rate-hike-for-2026-rate-increase-start-date-and-more/85412687007/.

Who is at Risk?: Water and Wastewater Burdens

As with energy, certain housing and socioeconomic characteristics are associated with higher water and wastewater burdens, including income, housing quality, and sociodemographic factors. These characteristics often intersect, exacerbating vulnerabilities and creating complex challenges for affected households and communities. Households at the most risk for unaffordable water and wastewater burdens in Louisville are typically:

Low-income households

As we have shown, LMI households (particularly those below 80% of AMI) are primarily at risk from financial burdens due to water and wastewater service and a limited ability to pay as bills increase. Census tracts with the lowest median incomes in the city have some of the highest MHI and LQI costs as a proportion of their income. These households bear a more significant burden from regressive rates that cannot be reduced through water conservation. Higher poverty rates and greater proportions of cost-burdened homeowners are also significantly associated with a greater share of income required for water and wastewater service.

Older Homes and Home Improvement Spending

As with energy, housing age and quality are significant players in driving water and wastewater burdens, with older homes – especially houses that have deferred maintenance or plumbing due to costs – being more likely to experience leaks or lack water efficient components.

Higher overall housing spending and higher housing vacancy rates are also associated with a lower proportion of income needed for water service, highlighting the ways that deferred maintenance can lead to outsized water and wastewater costs. Lower levels of housing spending are associated with higher water and wastewater costs, likely because of a lack of capital for home improvements, as well as serving as an indicator of less access to capital generally that can inhibit housing choice and upkeep. These issues are also intertwined with tenure, as renters have fewer options for reducing their water usage through the installation of water conservation measures or home upgrades.

Vulnerable Age Groups

Higher water and wastewater burdens are associated with an increase in the proportion of people in a census tract living in a vulnerable age group, either younger than 18 or older than 65. Research shows that these groups are at a higher risk of experiencing financial hardship, limited mobility, or health issues that can impact their ability to manage utility costs or access available services, or that make them less resilient generally to the impacts of water insecurity.[42] For seniors, increasing water and wastewater rates can strain fixed household finances, particularly due to fixed fees that cannot be reduced through water conservation.

Race

[23] Patterson, Bryson, and Doyle, "Affordability of household water services across the United States," e0000123.

Recent scholarship has underlined an association between nonwhite households and burdensome water and wastewater bills.[43] As we have already noted, the top five census tracts in the city with the highest water and wastewater costs as a proportion of MHI are all majority Black, underscoring the ways that the legacies of segregation and differential access to capital have impeded housing choice and maintenance, contributing to persistent disparities in who faces the highest burdens in the city. Water and wastewater burdens for households at the LQI are also centered on central and west Louisville, with neighborhoods in the eastern parts of the city facing a lower prevalence of burden.

ENERGY AND WATER: THEIR IMPACT ON HOUSING AFFORDABILITY

The long-term affordability of housing is significantly impacted by the often-underestimated costs of energy and water, which are essential household needs. These financial burdens can foreclose opportunities for LMI households to achieve housing stability and accumulate wealth. These costs are also highly uncertain and variable, with renters or homeowners having little insight into what utility costs may be for a home before deciding to live there. This can severely undercut a household's ability to accurately budget and plan, leading to unexpected financial strain. According to Jeremiah Bohr and Anna McCreery, energy-burdened communities have a 150-200% greater risk of falling into, or staying in, economic poverty.[44]

These burdens are not experienced evenly across the city. The highest rates of energy burdens are concentrated in west Louisville, in predominantly low-income and BIPOC communities. These communities often face a host of intersecting issues that magnify the impact of high energy costs, including low incomes, little access to capital, older homes, health risks from poor housing quality, and others.[45]

[43] Diego S. Cardoso and Casey J. Wichman, "Water Affordability in the United States," *Water Resources Research*, Vol. 58, No. 12 (December 2022): e2022WR032206.
[44] Jeremiah Bohr and Anna C. McCreery, "Do Energy Burdens Contribute to Economic Poverty in the United States?: A Panel Analysis," *Social Forces*, Vol. 99, No. 1 (September 2020): 155-77.
[45] See Drehobl and Ross, *Lifting the High Energy Burden in America's Largest Cities*.

To illustrate the impact of these costs, consider that a worker making Kentucky's minimum wage ($7.25 per hour) would have to work 19.5 hours just to pay for one typical month's energy bill, almost 2.5 full-time workdays. This financial burden is not evenly distributed throughout the year, however, because energy consumption fluctuates with seasonal weather and climate. Households may have to devote more of their working time to pay these bills during the hottest parts of summer or coldest parts of winter, when the danger of a missed payment and utility disconnection is heightened.

Although water costs do not vary as much seasonally, a minimum wage worker paying for 4,000 gallons in monthly water usage would have to work 4.4 hours and 9.0 hours to pay associated sewer bills – almost two full days of their labor.

In short, paying for typical energy and water services combined would take a minimum wage worker in Louisville almost 33 hours of work, more than 4 full workdays every month, in the best case. The significant labor required to cover utility costs directly erodes housing affordability, leaving less disposable income for other necessities, savings, or investments that could improve long-term financial well-being.

Not surprisingly, many workers in Louisville have not been able to keep up with these costs. They face utility arrearages and disconnections that often lead to additional household burdens. Since July of 2021, LG&E has disconnected more than 121,000 electric customers and 3,400 gas customers for nonpayment, with some households being disconnected for arrearages as low as $75.[46] The spatial pattern of disconnections reflects the prevalence of disconnections among low income and nonwhite residents and can be a first step to housing displacement.[47]

With the onset of the COVID-19 pandemic, Louisville Water and MSD faced a spike in customers who were behind on bills and in danger of disconnection, with more than 11,000 customers facing potential disconnection when the city's moratorium was slated to end. The city put a hold on all fees, provided increased bill assistance using federal funding, and developed an innovative outreach strategy to reach customers and enroll them in payment plans.[48] These efforts were successful in reducing disconnections, and can be a model for other communities. There is still a level of need that is unmet by citywide assistance. In FY 2024, for instance, Louisville MSD faced $3.57M in bad debt and expects a similar figure for FY 2025.[49]

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[46] Sanya Carley and David Konisky, "Utility Disconnections Dashboard," Energy Justice Lab, University of Indiana, 2023.
[47] Metropolitan Housing Coalition, *Zoning In on Change: Building Stronger Communities through Bold Action* (Louisville, KY: Metropolitan Housing Coalition, 2024), 32.
[48] US Water Alliance, *Modern, Effective, and Compassionate Billing: How Louisville Made an Overdue Upgrade to Assistance Programs and Improved the Utility-Customer Relationship* (US Water Alliance, 2023), 2-7. See also US Water Alliance, *An Equitable Water Future: Louisville* (US Water Alliance, 2023).
[49] *Adopted Budget in Brief, FY 2025* (Louisville: Louisville/Jefferson County Metropolitan Sewer District, 2025), 10.

The effects of energy and water affordability also ripple beyond direct financial strain and potential utility disconnections to impact other critical aspects of household well-being:

- **Home Maintenance and Necessities:** When a significant portion of a household's budget is consumed by utility bills, there is less capacity to invest in housing maintenance, critical repairs, or efficiency improvements. Households experiencing utility insecurity often report that they have to cut back on household necessities, which can contribute to a decline in housing quality over time, perpetuating a cycle of inefficient and potentially unsafe living conditions.[50]

- **Health Outcomes:** Research has demonstrated that there are clear links between the energy efficiency of a home and the healthiness of that home. Less energy-efficient housing is tied to inadequate insulation, poor ventilation, and outdated heating/cooling systems. These conditions can lead to thermal discomfort, including excessively hot or cold indoor temperatures that can exacerbate existing respiratory conditions such as asthma and allergies. In some cases, households who struggle with utility insecurity report cutting back on their consumption of food or medicine, which can have dire ramifications for the health of household members. Furthermore, the financial stress associated with high utility bills can contribute to overall reduced well-being.[51]

- **Economic Mobility:** The ongoing struggle to cover basic utility costs can trap LMI households in a cycle of poverty, limiting their ability to save, invest in skills development, or pursue opportunities that could lead to upward economic mobility. One of the leading reasons that people turn to predatory payday loans, for instance, is to cover utility bills, particularly during extreme weather.[52] This reinforces systemic inequalities and hinders broader community development and wealth building opportunities that housing has long provided for higher-income communities.

[50] Maria M. Cardona, "Household energy insecurity: A qualitative study of low-income families' experiences," *Journal of Environmental Psychology*, Vol. 71 (2020), 101481.
[51] Hernández, "Understanding 'energy insecurity' and why it matters to health," 1-10.
[52] Bohr and McCreery, "Do Energy Burdens Contribute to Economic Poverty in the United States?," 155-77; *Payday Lending in America, Report 2: How Borrowers Choose and Repay Loans* (Washington, DC: The Pew Charitable Trusts, 2013); Shihan Xie, Victoria Wenxin Xie and Xu Zhang, "Extreme Weather and Low-Income Household Finance: Evidence from Payday Loans," Bank of Canada Staff Working Paper, January 8, 2024.

EXISTING PROGRAMS

The preceding analysis shows that there is a high level of need for utility assistance for low-income residents of Louisville. The city is fairly well-resourced with support organizations and programs that are intended to support cost burdened households through bill/emergency assistance, critical repair support, and longer-term weatherization and water conservation home upgrades. Yet there are still critical service gaps that must be addressed to ensure that energy and water burdened households can access the support they need.

The table below provides an overview of key energy-related programs in Louisville for energy bill assistance, renewables, and weatherization support.

Energy Assistance and Weatherization Programs

PROGRAM	SOURCE	DESCRIPTION	ELIGIBILITY
Low Income Home Energy Assistance Program (LIHEAP)	Federal, U.S. Department of Health and Human Services (HHS)	Bill assistance and limited weatherization funding for low-income households to help cover the cost of energy costs.	Combined household income at or below 150% of the federal poverty level (FPL).
Weatherization Assistance Program (WAP)	Federal, U.S. Department of Energy (DOE)	Funding through community action agencies to weatherize low-income households.	Combined household income at or below 200% of FPL.
Solar for All	Federal, U.S. Environmental Protection Agency (EPA)	The EPA awarded Kentucky $62.42 million through the Solar for All grant program to increase solar energy access for low-income communities across the state.	The program is currently being planned by the Kentucky Office of Energy Policy (OEP), and will be directed towards low-income Kentuckians.
WeCare for Homeowners and Renters	Utility, Louisville Gas & Electric (LG&E)	Provides free home energy audits and efficiency upgrades to low-income customers, including lighting, smart thermostats, air sealing, duct sealing and insulation, attic/wall insulation, and HVAC tune-ups.	Income-qualified through participation in a state/federal program, including LIHEAP, SNAP, HUD/Section 8, or other; renters must obtain consent from homeowner; can participate once every 3 years.

Table 4: Energy Assistance and Weatherization Programs

PROGRAM	SOURCE	DESCRIPTION	ELIGIBILITY
WeCare for Apartment Building Owners	Utility, LG&E	Funding for multifamily property owners to upgrade efficiency of their buildings at no cost, including energy audits and efficiency upgrades in common areas and unoccupied units.	Building must have at least 4 units and at least 50% of tenants must be receiving federal/state assistance via income-based programs at or below 200% of FPL.
Residential Demand Conservation Program	Utility, LG&E	Bill credit in exchange for permission to remotely access customer HVAC, water heaters, and pool pumps during peak demand periods.	Available for residential and small business customers but currently is not accepting new enrollees.
Bring Your Own Thermostat	Utility, LG&E	Allows residential customers to purchase a discounted smart thermostat and opt-in to allow remote utility access during peak demand. Customers receive an incentive of $50 for participating, along with $5 for each participating event.	Available to all residential customers.
Online Marketplace and Appliance Rebates	Utility, LG&E	Online portal to purchase energy efficient thermostats, smart plugs, and power strips at a discounted rate. This includes up to $75 reduction for thermostats and a $10 reduction for plugs and power strips.	Available to all residential customers.
Utility Assistance Program	Nonprofit, Association of Community Ministries (ACM)	Funded in part through LG&E and Louisville Water Foundations.	Provides bill assistance to customers who are facing disconnection from energy or water service.
Repair Affair	Nonprofit	The Repair Affair program provides free home repairs for single-family owner-occupied homes in Louisville and focuses primarily on seniors or individuals with disabilities who meet income requirements.	Homeowners over 60 or homeowners with a verified disability; must make less than 50% of the AMI.

Table 4: Continued

PROGRAM	SOURCE	DESCRIPTION	ELIGIBILITY
Project Warm	Nonprofit	Project Warm provides free year-round weatherization repairs and energy management workshops.	Residents of Jefferson County; must own or rent their home and household income must be at or below 200% of the FPL.
Community Winterhelp	Nonprofit, with funding from LG&E	Up to $250 in one-time assistance for heating bills for income-qualified residents.	Demonstrated financial need that may cause a household to lose heat.
Solarize Louisville Program	Nonprofit	The Solarize Louisville Program allows residents to purchase solar photovoltaic installations at a discounted wholesale rate.	Residential homeowners and small non-residential property owners in Jefferson County or surrounding areas.
Home Electrification and Appliance Rebates (HEAR) Home Efficiency Rebates (HER)	State, with funding from DOE	IRA program that provides up to $14,000 per household in rebates for energy efficiency improvements, including appliance upgrades, insulation, and wiring. Rebates can cover up to 100% of project costs for income-qualified households.	All households are potentially eligible, with the largest rebates for lower-income households (<150% of AMI). Rebates can cover up to 100% of project costs for income-qualified households. The state plans to launch this program in 2025.
Buildings Upgrade Project	Local Government, with funding from DOE	The Louisville/Jefferson Metro Government has been awarded funding through the Buildings Upgrade Initiative to design and implement a pilot and full-scale initiative focused on weatherizing and installing efficient technologies in multifamily buildings which primarily house low-income individuals. The full-scale initiative can result in energy savings and energy cost savings for between 100 – 1,000+ households living in multifamily units.	The city is currently working with River City Housing for their technology demonstration. Once the project moves onto its pilot phase, multifamily buildings that house low-income residents will be the primary target for this work.

Table 4: Continued

WATER ASSISTANCE PROGRAMS

Louisville Water and Louisville MSD offer or support several initiatives to reduce the cost of water and waste utilities for their customers, encourage water conservation, and manage payments. Their main approach to water affordability is through offering customer affordability programs like EWRAP and Drops of Kindness, tiered pricing rate structures, and engagement in national partnerships like the U.S. Water Alliance's Water Equity Taskforce.

Water Affordability Programs

PROGRAM	SCALE	DESCRIPTION	ELIGIBILITY
WaterTA	Federal, U.S. United States Environmental Protection Agency (EPA)	WaterTA connects communities with experts who provide TA for drinking water, sewage, and stormwater needs.	Eligible entities include local governments, water and wastewater facilities, states, tribes, and non-profits.
Community Development Block Grant	Federal, U.S. Department of Housing and Urban Development (HUD)	CDBG are formula grants that can help fund water and sewer facility upgrades and construction.	Eligible entities include principal cities, metropolitan cities, qualified urban counties, and states.
State Revolving Funds	Federal, U.S. United States Environmental Protection Agency (EPA)	CWSRFs and DWSRFs are low-interest loans and financing which can help upgrade water and wastewater systems.	Eligible entities include public entities, non-profit organizations, and some private entities.
Water Infrastructure Finance and Innovation Act of 2014	Federal, U.S. United States Environmental Protection Agency (EPA)	WIFIA is administered by the EPA and provides credit assistance which can be bundled with SRFs to fund critical water infrastructure projects.	State, local, and tribal governments, partnerships and joint ventures, corporations and trusts, and state revolving fund programs.

Table 5: Water Affordability Programs

PROGRAM	SCALE	DESCRIPTION	ELIGIBILITY
Kentucky Water and Wastewater Assistance for Troubled or Economically Restrained Systems Fund	State, Kentucky Infrastructure Authority	KY WWaters is administered by the Kentucky Infrastructure Authority and allows water systems to seek funding for upgrades and maintenance.	Governmental organizations and associations operating water and wastewater systems are eligible.
WeCare for Homeowners and Renters	Utility, Louisville Gas & Electric (LG&E)	Provides free home energy audits and efficiency upgrades to low-income customers, including water saving measures.	Income-qualified through participation in a state/federal program, including LIHEAP, SNAP, HUD/Section 8, or other; renters must obtain consent from homeowner; can participate once every 3 years.
Utility Assistance Program	Nonprofit, Association of Community Ministries (ACM)	Provides water and wastewater bill assistance to customers. Funded in part through LG&E and Louisville Water Foundations.	Focused on customers who are facing disconnection from water service.
Drops of Kindness	Utility, Louisville Water	Provides flexible financing to support customers paying their water utilities.	Current residential or commercial customers with an overdue balance.
Emergency Wastewater Rate Assistance Program	Utility, Louisville MSD	Qualifying customers can receive a 30% reduction on their water utility costs.	Applicant must be the main account holder and receive metered service. Cannot be a recipient of the Senior Citizen Discount Program, and must have a household income at or below 150% of FPL.
Senior Citizen Discount Program	Utility, Louisville MSD	Qualifying seniors can receive a 30% reduction on their water utility costs.	Applicant must be the main account holder and receive metered service. Cannot be a recipient of EWRAP and must have an annual total income at or below $35,000.

Table 5: (Continued)

ENERGY AND WATER ASSISTANCE: PROGRAMMATIC GAPS

While Louisville has comparatively robust programmatic offerings that can address energy and water affordability, these programs cannot meet the current level of need in the city and are not well-resourced enough to meet expected affordability needs in the future. The existing landscape of programs faces challenges related to both scale and eligibility, leaving a significant portion of Louisville's burdened households underserved.

Funding and Reach

A primary issue is that available programs simply do not have enough reach to meet the overwhelming demand for bill assistance and/or home upgrades among Louisville residents. As our analysis shows, 57,000 households in the city pay more than 6% of their income towards utility costs and are considered energy burdened and 58,377 Louisville families pay more than 4.5% of their income towards their water and wastewater service. While current programs provide critical support to households in need, their reach falls short of the citywide need:

- Local repair programs like Repair Affair and Project Warm served a combined 349 households with weatherization and urgent repairs in 2024.
- Between 2022 and 2024, the nonprofit Association of Christian Ministries (ACM) provided bill assistance to 10,878 unique clients, with some people receiving multiple rounds of assistance, which equated to more than $6.5M in bill assistance.
- According to Louisville Gas & Electric Company (LG&E), their low-income weatherization program, WeCare, aims to serve around 4,000 customers each year, with a little more than half of these households being located in Jefferson County.[53]
- LG&E's Residential Demand Conservation Program has fallen short of projected enrollment but has still enrolled at least 150,000 customers each year. While far-reaching, this program has a minimal impact on energy affordability other than through a small bill credit provided to customers for participating.[54]
- In 2024, both EWRAP and the Senior Citizen Discount Program, available through Louisville MSD, served 3,000 customers each.
- Between State Revolving Loan Funds and KY WWaters, the state of Kentucky received a total of $701,099,094 to support water infrastructure construction, maintenance, and upgrades in 2024. This is only a drop in the bucket of the total capital investments needed over the next twenty years for drinking water supply upgrades alone.

[53] https://psc.ky.gov/pscecf/2025-00045/rick.lovekamp%40lge-ku.com/04172025035922/28-JI_DR1_LGE_KU_Attach_to_Q93%28b%29_-_DSM-EE_costs,_participation,_savings.xlsx. This is from FY21. See Louisville Gas and Electric Company and Kentucky Utilities, *WeCare Program Impact and Process Evaluation* (Madison, WI: Tetra Tech, 2022), 44.
[54] https://psc.ky.gov/pscecf/2025-00045/rick.lovekamp%40lge-ku.com/04172025035922/28-JI_DR1_LGE_KU_Attach_to_Q93%28b%29_-_DSM-EE_costs,_participation,_savings.xlsx.

Federal Disinvestment

In past years, federal programs have also played a key role in providing residents with bill assistance, access to weatherization, and support for expensive capital projects:

- For FY25, DOE has provided $6,613,322 to the state to fund WAP, of which only 7.5% can be used for administrative costs. Although exact figures are not available for Louisville, this is enough funding to weatherize several hundred homes across the state.
- In FY23, LIHEAP served 117,373 households across the entire state of Kentucky with a funding allocation of more than $89M from HHS. This included providing $6.8M to support WAP retrofits.[55]
- Kentucky led the nation in the number of utility disconnections prevented and/or resolved through LIHEAP bill assistance in FY25, with more than 158,000 disconnections averted. Since 2016, LIHEAP has prevented or ended more than 1.25M disconnections across the state.[56]

While the federal government has traditionally been the largest programmatic supporter of bill assistance and weatherization through LIHEAP and WAP, the future of these federal energy assistance programs is uncertain. The White House proposed eliminating the program in its FY26 budget recommendations, and the entire staff at the U.S. Department of Health and Human Services (HHS) responsible for administering LIHEAP was terminated in April of 2025.[57]

Ending this program will leave millions of households in Kentucky with no stopgap for unaffordable energy. While it is impossible to predict the full impact that this will have on Louisville if such cuts are implemented, it will mean that the households in the city eligible for LIHEAP will no longer have this as a first option to avoid shutoffs, provide a crucial buffer for their household finances, or benefit from expanded weatherization services. Additionally, the White House proposed reducing Housing Choice Vouchers (HCV) and eliminating the Continuum of Care (CoC) program, both of which provide beneficiaries with utility assistance.

Since 2006 the federal government has also offered ways to reduce energy costs through the Residential Clean Energy Credit (24D) and the Energy Efficiency Home Improvement Credit (25C). Both of these encourage energy affordability by providing annual 30% tax credits for the cost of qualified clean energy investments or energy efficiency home improvements. Just in tax year 2023, nearly 6,000 taxpayers in Kentucky claimed a residential clean energy tax credit and 24,640 taxpayers claimed an energy efficiency tax credit. Cumulatively, these projects provided $45,967,000 in investments throughout the state. While these tax credits tend to benefit higher-income households with upfront capital to spend on clean energy or energy efficiency resources, their elimination will still foreclose pathways to improve affordability for all ratepayers.[58]

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[55] U.S. Department of Health and Human Services (HHS), Kentucky: LIHEAP FY2023 State Profile. Available at: https://liheappm.acf.gov/sites/default/files/private/congress/profiles/2023/FY2023KentuckyProfile-508Compliant.pdf.

[56] U.S. Department of Health and Human Services, Office of Community Services, "LIHEAP Data Warehouse," LIHEAP Performance Management. Available at: https://liheappm.acf.hhs.gov/datawarehouse. See William D. Bryan, "July Map of the Month," Southeast Energy Efficiency Alliance, July 28, 2025. Available at: https://www.seealliance.org/july-map-of-the-month-2/.

[57] Office of Management and Budget, Fiscal Year 2026 Discretionary Budget Request (Washington, DC: Office of Management and Budget, May 2, 2025), https://www.whitehouse.gov/wp-content/uploads/2025/05/Fiscal-Year-2026-Discretionary-Budget-Request.pdf; Brad Plumer, "Entire Staff Is Fired at Office That Helps Poorer Americans Pay for Heating," *The New York Times*, April 2, 2025. Available at: https://www.nytimes.com/2025/04/02/climate/trump-layoffs-energy-assistance-liheap.html.

[58] See William D. Bryan, "January Map of the Month," *Southeast Energy Efficiency Alliance*, January 28, 2025. Available at: https://www.seealliance.org/january-map-of-the-month/.

Eligibility Requirements

Besides scale and funding, eligibility requirements for programs tend to exclude certain households who might benefit from weatherization, renewable energy, or bill assistance support. The programs listed in the table above predominantly serve low-income single-family owner-occupied housing, which coincides with the Louisville residents experiencing the highest energy burdens (10%). A scan of program eligibility, however, suggests that renters and residents of multifamily buildings have fewer assistance options that can help them reduce energy bills in the long term.

Additionally, most of the programs available in the city are accessible to a wide range of LMI households (typically ≥150% or 200% of FPL). Our analysis indicates that households with critical needs are largely in the lowest income bracket. For instance, in 2017 LG&E expanded income criteria for WeCare from 150% of FPL to 200% of FPL. While this allows the program to serve a wider range of customers, helping LG&E meet program targets, it also means that the program has reduced capacity to serve the lowest income households in the city with the highest energy burdens.[59]

Lack of Coordination

Conversations with Louisville stakeholders and survey responses highlight a clear need for greater program coordination across the programs currently working to address energy and water affordability. While Louisville has a robust assistance network compared to other comparable cities, stakeholders noted in interviews and survey responses that there is little coordination between these programs, whether through coordinated program entry or stacked/braided funding.

One stakeholder emphasized this by stating they were "constantly looking to broaden our network of investors, philanthropists, builders, contractors, workforce, and community organizations." Another echoed this sentiment, remarking on "many great suggestions in the survey of organizations we have either limited or no partnership with at this time." These insights underscore the potential for more effective and comprehensive support through improved collaboration among these vital programs.

Initial findings from a network analysis of stakeholders engaged in energy and water affordability issues, summarized in Appendix C, underscore this need. The network map reveals that while some organizations, such as the Metropolitan Housing Coalition (MHC) and the Louisville Metropolitan Sewer District (MSD), appear to be central connectors to many other critical stakeholders, there are also many organizations with limited ties to others. The presence of various Louisville Metro Government entries also indicates a distributed effort that could benefit from more centralized coordination, with the city potentially serving as a key conduit between these different stakeholder groups. The analysis suggests that bridging these gaps and fostering more direct connections between entities like Community Winterhelp, Drops of Kindness, and Project Warm as well as with broader community development organizations, could enhance the reach and impact of assistance programs.

[59] Louisville Gas and Electric Company and Kentucky Utilities Company, "Joint Application for Review, Modification, and Continuation of Certain Existing Demand-Side Management and Energy Efficiency Programs," Case No. 2017-00441, December 6, 2017, Kentucky Public Service Commission.

RECOMMENDATIONS

Louisville faces a significant challenge in ensuring the affordability of utilities for tens of thousands of its residents. Louisville is at a key inflection point to address utility affordability, with federal disinvestment and unprecedented load growth threatening energy and water affordability. Yet the city has an array of assistance programs and a deep bench of advocates, and our recommendations are intended to leverage these unique assets, building on Louisville's existing program and policy infrastructure to mitigate energy and water burdens across the city.

Programs to Address At-Risk Housing Stock

To directly tackle the increased energy and water consumption associated with older, less efficient homes and to protect vulnerable residents, we recommend:

- **Establish a municipal critical repair and maintenance fund:** A city-run dedicated fund would enable critical repairs and regular maintenance for households that cannot access the capital for these costs, ultimately improving energy efficiency and reducing utility costs for residents in older housing. Many residents live in underperforming, older homes but have few resources available for critical repairs and regular maintenance to prevent breakdowns.[60] This kind of program can be coordinated with other initiatives like WAP, WeCare, and Project Warm to reduce deferrals from existing weatherization initiatives.

- **Adopt a Building Performance Standard (BPS) or other municipal policy that can improve existing buildings:** Building energy codes are adopted at the state level and only apply to new construction, and the city cannot adopt a building code that exceeds the state standard. However, the city can consider adopting a building performance standard (BPS), which provides a policy mechanism to upgrade existing buildings. BPS have traditionally focused on commercial buildings, but can also apply to multifamily buildings, reducing energy costs for tenants. This can be paired with assistance for building owners and landlords to support building upgrades at reduced cost.

- **Update the state residential energy code and improve compliance with existing statewide building energy codes through funding and education for builders and code officials:** Since 2012, the state has used the 2009 International Energy Conservation Code (IECC) as its base standard for new construction. Updating this statewide code to the 2021 IECC, which contains more stringent efficiency requirements, can save an average of $687 on annual utility costs for the average home in Kentucky.[61] There are also efficiency gains possible through better compliance with existing codes. Between 2015 and 2017 a residential energy code field

[60] This is in line with recommendations provided by May 8 Consulting, *Louisville Home Repair Needs Assessment* (Philadelphia, PA: May 8 Consulting, 2025).
[61] Victor R. Salcido, Yan Chen, YuLong Xie, and Zachary T. Taylor, *Cost Effectiveness of the 2021 IECC for Residential Buildings in Kentucky* (Richland, WA: Pacific Northwest National Laboratory, 2021), ii.

study carried out by the Midwest Energy Efficiency Alliance (MEEA) assessed 140 newly constructed single-family homes and found that there were six high-impact areas that offer the greatest potential for energy and cost savings in Kentucky through improved compliance: duct leakage, foundation insulation, wall insulation, lighting, ceiling insulation, and envelope air tightness. Improving compliance in these areas would unlock an estimated $928,585 in annual energy savings for households across Kentucky. The study also demonstrates that investing in training and education for builders to improve compliance with existing codes can deliver measurable energy savings, without requiring new legislation.[62]

Programs to Address At-Risk Renter Households

LMI renters in Louisville have lower average energy burdens than LMI homeowners, but less access to resources that could lower energy bills in the long term due to the "split incentive" issue. Louisville's homeownership rate is also among the lowest statewide, and access to homeownership is sharply stratified by race, which can make it difficult for many households to invest in measures that will make energy more affordable. Developing specific opportunities for renters could include:

- **Develop a program to provide landlord incentives for upgrades:** Encourage both single-family and multifamily landlords to invest in energy efficiency improvements by providing access to financing and a rent boost that can offset costs of investing in efficient building technologies, while requiring a rent freeze to avoid displacing tenants. A successful model is Atlanta Housing's Energy Efficiency Rent Boost (EERB) program, which provides incentives to landlords who accept Section 8 vouchers.
- **Implement a PAYS (Pay As You Save) program at LG&E or the city:** Implement a tariffed-on-bill energy efficiency program through the utility or municipality, which funds energy efficiency upgrades through a tariff on the meter. These programs require no credit check and are available to both renters and owners, and they provide reduced utility bills for residents while still paying down the original investment.
- **Expand access to education on energy-saving behaviors:** Empower renters with knowledge to manage their consumption, either through energy tracking technologies or resources to address common inefficiencies and encourage water conservation. This should flow through organizations already providing this kind of assistance, like Project Warm.

Robust Coordination

Program stakeholders across the city, particularly those offering energy and water assistance programs, should coordinate more closely. MHC and the Office of Sustainability are both uniquely positioned to play central roles in orchestrating a more cohesive approach to energy and water affordability. We recommend:

[62] R. Bartlett et al., *Kentucky Residential Energy Code Field Study: Final Report* (Richland, WA: Pacific Northwest National Laboratory, 2022).

- **Fostering increased collaboration among all stakeholders:** MHC and the Office of Sustainability can develop collaborative structures that ensure that utilities, municipal offices, nonprofits, and community-based organizations are effectively working together, to ensure a unified strategy to address utility affordability as well as an efficient delivery of all assistance. Given their wide stakeholder networks, MHC and the Office of Sustainability are well positioned to be point organizations who facilitate collaboration.
- **Coordinate fundraising and share resources for energy and water assistance:** Coordinate development strategies and activities across multiple service providers and streamline/join program budgets across multiple initiatives to magnify and encourage opportunities for private and philanthropic funding.
- **Develop infrastructure for coordinated program entry and stacked funding, and pair with automatic enrollment in eligible programs:** Simplify the process for residents seeking assistance by implementing a "one-stop shop" or similar coordinated entry system. This centralized approach would provide a single point of contact for individuals and families to access information and apply for various energy and water affordability programs, reducing the administrative burden and improving the ease of accessing critical assistance. This can be paired with automatic enrollment in programs, to further reduce barriers to accessing assistance. A single local government entity or regional planning organization can be a successful host for this kind of coordinated entry system. One successful model is the Central Pines Regional Council, in North Carolina's Research Triangle, which developed a system to coordinate entry in homeowner assistance programs across multiple local governments and service providers.[63]

Expand Targeted Affordability Initiatives

To directly address the financial burden of utility costs for Louisville's most vulnerable residents, we recommend:

- **Advocating for increased funding for, and targeting of, existing utility programs:** Particularly with the potential loss of federal utility assistance through LIHEAP, Continuum of Care (CoC) and Housing Choice Vouchers (HCV), efforts should be strategically directed towards channeling resources to the most vulnerable households and those residing in the least energy-efficient housing, as outlined in this report. This includes extremely low-income households, households in older homes, residents in vulnerable age groups, and households in high-burden geographies. Additionally, LG&E and Louisville Water/MSD should consider focusing utility assistance programs on the most cost-burdened households and developing program procedures for increasing the uptake of existing programs, rather than widening program eligibility requirements to expand programs.

[63] See https://www.seealliance.org/initiatives/regional-investment/the-southeast-energy-efficiency-fund/.

- **Increasing marketing and targeting of at-risk customers for program participation:** Proactive outreach can ensure that those most in need, particularly the households in the city eligible for LIHEAP, are aware of and utilize available resources. Partnership between service providers is critical to developing coordinated outreach and criteria. The city's success with implementing PromisePay during the COVID-19 pandemic and proactively reaching customers who might face high costs, arrearages, and possible disconnection could be a model expanded to other utility and city programs.[64]
- **Utilities should consider adopting new program models, such as PIPP (Percentage of Income Payment Plans):** PIPP programs cap customer charges at a certain percentage of their income, ensuring that even very low-income households have a pathway to secure affordable utility bills. For instance, utilities in Ohio are mandated by the Public Utilities Commission of Ohio (PUCO) to provide monthly bill discounts and fixed costs for income-qualified customers through programs like PIPP Plus, and the Virginia legislature mandated the implementation of a PIPP program with VCEA.
- **Low-Income Affordability Collaborative:** The PSC can require the formation of an affordability collaborative made up of utilities, consumer advocates, and others to review the low-income program offerings from all investor-owned utilities in Kentucky for robustness and effectiveness, and where needed, to develop and implement new programs. This effort was recently carried out in North Carolina, where the North Carolina Utilities Commission (NCUC) required Duke Energy to engage in a Low-Income Affordability Collaborative that brought together stakeholders to examine regulatory programs, evaluate new opportunities to address affordability, and propose new low-income programs for the NCUC to consider.[65]

Demand-Side Management and Outside Infrastructure Funding

To reduce overall energy and water consumption and costs, especially considering the unprecedented demands projected from new commercial and industrial customers, we recommend:

- **Encourage the PSC and LG&E to invest in demand-side management (DSM) as a cost-efficient alternative to building new generation:** DSM initiatives, which focus on reducing energy demand, have proven effective in other states. For example, Pennsylvania passed Act 129, which requires electric utilities with over 100,000 customers to reduce energy use across all customer classes, including low-income residential, with the PSC crucial in setting targets and overseeing program implementation. Additionally, Pennsylvania has a Low-Income Usage Reduction Program (LIURP) providing energy-saving measures to low-income households.

[64] US Water Alliance, *Modern, Effective, and Compassionate Billing*, 2-7.
[65] Duke Energy, Joint North Carolina Low-Income Affordability Collaborative Quarterly Progress Report, Docket Nos. E-7, Subs 1213, 1214 and 1187 and E-2, Subs 1219 and 1193, August 12, 2022.

- **Offset infrastructure costs on customers through outside investment:** Revolving loan funds, the federal government, and programs like KY WWaters provide critical capital to water and wastewater utilities to upgrade their aging infrastructure and ensure that they can comply with consent decrees. This funding is crucial to offsetting some of the infrastructure costs that are carried by customers on their bills and mitigating rate increases.

Better Rate Design

To ensure fair and equitable utility pricing and mitigate the regressive impact of current structures, we recommend:

- **Moving capital costs off fixed fees to prevent regressive charges:** Louisville MSD relies on significant fixed charges to fund infrastructure upgrades. These fixed fees account for 63% of a typical bill at 4,000 gpm, placing a disproportionate burden on low-usage and often low-income households. This rate structure removes much of the incentive for water conservation. In comparison, other cities, even those under consent decrees, have significantly lower fixed fees. Reducing fixed fees through higher volumetric charges is one strategy to avoid regressive rates that fall most heavily on low income households, while establishing tiered programs based on usage can provide further relief for cost burdened households.
- **Implement rate protections for residential customer classes to ensure that they do not underwrite commercial and industrial rate discounts:** In some states, regulators are adopting specialized tariffs, supported by cost-of-service studies, to ensure that data centers and other large users directly pay for the new generation and transmission infrastructure they require, preventing residential ratepayers from subsidizing these costs. The Public Utility Commission of Ohio is beginning to require upfront fees and long-term contracts from large-load customers to mitigate the financial risks of speculative projects and provide greater certainty for utility system planning and investment. Finally, a growing number of jurisdictions are requiring that large-load customers meet specific energy and water efficiency benchmarks as a condition of their connection to the grid, ensuring new facilities take steps to reduce their energy and water impact and mitigate the impact on other ratepayers.

CONCLUSION

This report underscores that energy and water affordability are critical to addressing Louisville's overall affordable housing needs. For housing to remain truly affordable in the long-term, efforts to support residents with rent or mortgage costs must be explicitly linked with strategies to alleviate utility burdens, which increasingly dictate the true cost of a home. Tens of thousands of households across the Louisville metropolitan region struggle with unaffordable energy and water bills, jeopardizing their ability to secure and maintain safe, healthy, and affordable housing.

Addressing utility burdens is essential to alleviate financial strain, improve resident well-being, and foster wealth building across the city. Affordable housing, and affordable utilities, are key steps needed to ensure that the city can realize its Plan 2040 goal to become a "a vibrant and diverse community that is connected, healthy, authentic, sustainable and equitable, with compassionate citizens and memorable places among its greatest assets, and where all people are able to achieve their full potential."[66]

[66] *Plan 2040: A Comprehensive Plan for Louisville Metro* (Louisville, KY: Louisville Metro Government, 2019).

Photo Credit: Adobe Stock

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OFFICE OF SUSTAINABILITY

APPENDIX A: KEY DEFINITIONS

Energy Burden: The percentage of annual income that a household pays to cover all energy bills. The U.S. Department of Housing and Urban Development considers spending more than 6% of income on energy bills unaffordable. Energy burden is an important indicator of energy insecurity but is not a stand in for energy insecurity.

Income dedicated to water service (IDWS): For the purposes of this analysis, we have modified this metric to be "income dedicated to water and wastewater service (IDWWS)," so that we capture the affordability of both water and wastewater service.

Area Median Income (AMI): Median income for a specific geography

Median Household Income (MHI): Median household income

Low- and moderate income (LMI): Anyone or any household making less than 80% of the area median income (AMI)

Lowest Quintile Income (LQI): Lowest quintile income. For this project, we estimated LQI by randomly generating discrete incomes to meet the income distribution provided in the American Community Survey (ACS) and then estimating the threshold in which 20% of incomes fall below that threshold based on this distribution.

Residential Indicator (RI): A measure of the affordability of water and wastewater service for households making the median household income for a particular area. The RI is calculated by dividing total water costs by MHI for a specific geography.

APPENDIX B: METHODOLOGY

Energy Affordability

Microdata from the U.S. Department of Energy's Low Income Energy Affordability Data (LEAD) Tool was used to calculate the average household energy costs and burdens for all residents and for low-to-moderate income (LMI) residents of Louisville. This data, which is largely derived from the U.S. Census Bureau's American Community Survey 5-year estimates (2017-2022), was analyzed using a weighted average method across multiple cohorts in each census tract and was disaggregated by key housing and household characteristics. For the average, we used a weighting approach based on the number of units per cohort who experience each energy burden level to ensure that low or high energy burdens that apply only to a few units do not skew the overall calculation.

We also estimated the energy affordability gap for each census tract in Louisville to understand how far above or below the affordability threshold (typically 6% of income on home energy expenses) the average household is, as well as the EAG for all households in aggregate. To estimate household energy affordability gaps, we will used the approach developed by Fisher, Sheehan, and Colton (2023). We used DOE's LEAD microdata to compare average energy costs for each housing cohort to the expected energy costs if the average household met the affordability threshold exactly (actual cohort energy costs – (actual cohort income*0.06)). Using a weighted average, weighted by number of units experiencing each EAG, we estimated the average household energy affordability gap for each census tract in the city – both for all households and for LMI households (less than or equal to 80% of AMI). We disaggregated the EAG by different income brackets as well.

Energy Use Intensity

The energy consumption model was developed using a multiple linear regression framework to analyze the factors influencing a home's heating energy use intensity (EUI) at the state level, and then predict EUI at more granular scales. The dependent variable was the natural logarithm of heating EUI, calculated by dividing the total energy consumed for heating purposes by the total heated square footage of the home. This logarithmic transformation was applied to normalize the data. The model was trained on a comprehensive dataset of household-level energy consumption and characteristic data from the 2020 Residential Energy Consumption Survey (RECS) microdata, provided by the U.S. Energy Information Administration (EIA). Key independent variables included in the model were a combination of predictors representing housing characteristics (e.g., housing type, decade of construction, number of rooms), household demographics (e.g., income, race, ethnicity, household size), and primary heating fuel type. The final model was estimated using Ordinary Least Squares (OLS) regression to quantify the statistical relationship and measure the effect of each variable on a home's heating energy intensity.

Water Affordability

We used Patterson and Doyle's (2021) "Income Dedicated to Water Service" approach (IDWS) to estimate water affordability at the census block group level, and in aggregate for the city. IDWS provides the proportion of households who spend certain income percentages on their water bills and provides a distribution of how many households face what level of bills. Using water and wastewater rate schedules from Louisville Water and MSD for 2025, we calculated the annual income needed for water service to account for a certain proportion of income (1-20%) at typical residential volumes. To estimate the typical water volume used across the city, we used Louisville Water's own estimate along with typical volumes used in other similar studies.[67]

Using the U.S. Census Bureau's American Community Survey (ACS) income distribution dataset, we calculated the number and proportion of households in each census block group who have an income that falls below what is required for water service to make up each proportion of income (1-20%). This method provides an estimate of the number of households who face each level of water service burden.

APPENDIX C: STAKEHOLDER MAPPING

To identify stakeholders working to improve water and energy affordability in Louisville/Jefferson County, SEEA developed a stakeholder map using the PICK framework, a framework developed by the Strelo Group. The PICK framework provides a structured approach to stakeholder mapping by categorizing stakeholders into four types. It is designed to ensure thorough identification across internal and external groups involved in change processes.

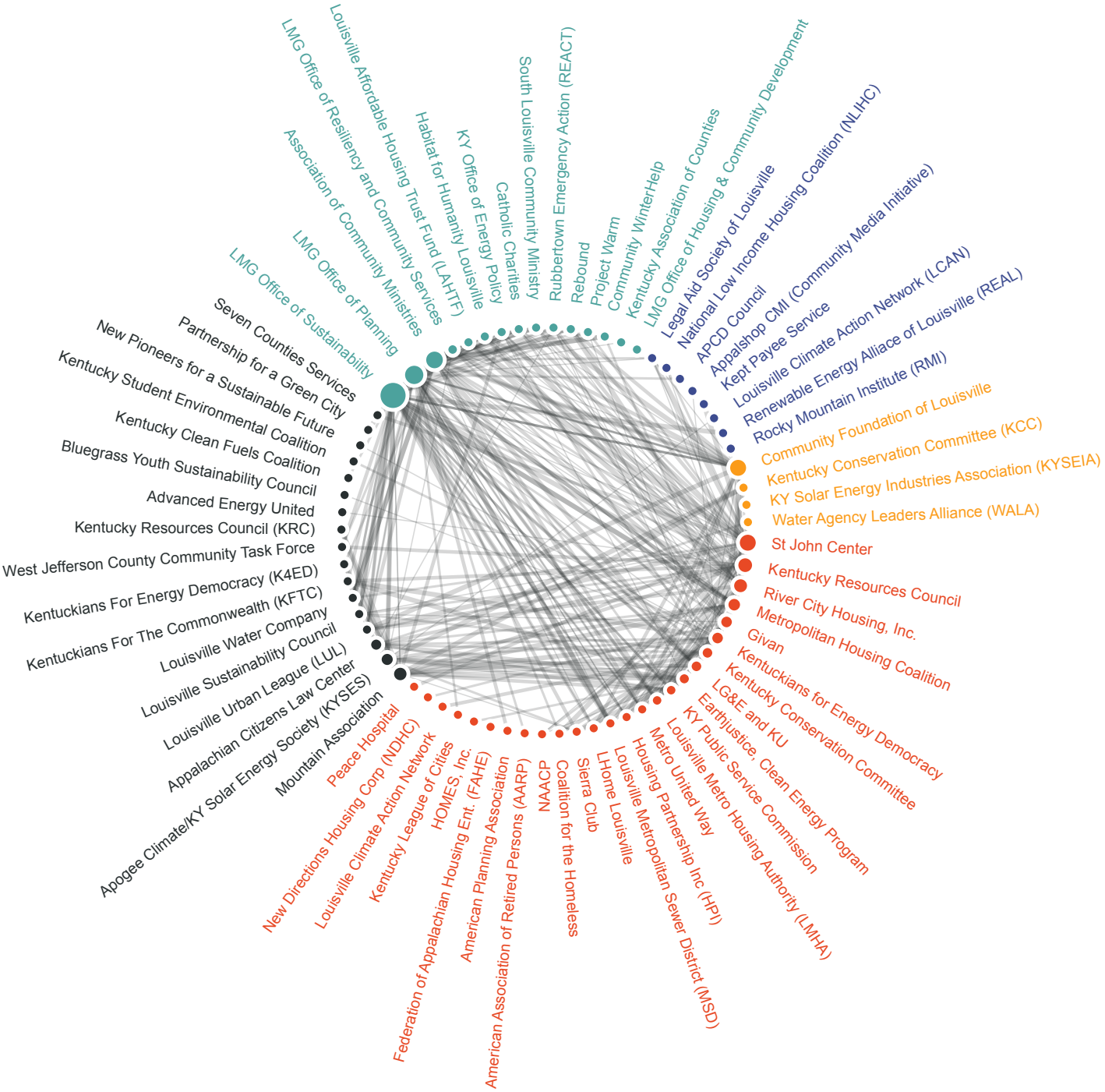
- **P = Power:** Those who have the authority to make decisions, provide resources, change the scope, or halt a process.
- **I = Influence:** Those who can informally impede or advance progress due to personality and/or politics.
- **C = Consideration:** Anyone affected by your work, who may need to act on/execute the solution, or who you want to influence.
- **K = Knowledge:** Those who have context, expertise, or insight relevant to your change effort.

[67] "New Year, New Rates," Louisville Water, January 21, 2022. Available at: https://louisvillewater.com/news/new-year-new-rates/. See also Patterson and Doyle, "Measuring Water Affordability and the Financial Capability of Utilities," e1260.

PICK Method

MHC Stakeholder Network

P = Power, I = Influence, C = Consideration, K = Knowledge, CK = Consideration & Knowledge



APPENDIX D: MODEL RESULTS

Results of analysis for independent variables and water and wastewater burdens.

Predictor	Estimate	Standard Error	t-value	p-value
Intercept	0.02707	0.007005	3.865	***
Median Home Value	7.02E-09	4.47E-09	1.568	
Median Rent	-6.28E-07	1.36E-06	-0.461	
Renter Rate	5.10E-05	2.65E-05	1.923	×
Vacancy Rate	-1.15E-04	4.62E-05	-2.478	*
Proportion of the population below 18 or over 65 years old	1.25E-04	4.23E-05	2.955	**
Proportion of the population who identify as people of color	1.82E-05	1.68E-05	1.081	
Poverty Rate	4.52E-04	3.73E-05	12.1	***
Income Inequality – Gini Index	2.56E-03	4.77E-03	0.537	
Average amount spent on housing annually	-9.34E-07	2.28E-07	-4.095	***
Average proportion of household income that housing costs take up for homeowners	-2.06E-04	1.32E-04	-1.557	
Proportion of household income that housing costs take up for renters	2.80E-05	7.21E-05	0.388	
Proportion of renters who pay more than 30% of their income for rent	-3.66E-05	3.10E-05	-1.182	
Proportion of owners who pay more than 30% of their income for mortgage	8.49E-05	4.06E-05	2.093	*
Proportion of housing units built before 1980	1.90E-04	1.29E-03	0.147	

R-squared = 0.864, Adjusted R-squared = 0.854

F(14, 187) = 84.78, p<0.001

Residential Standard Error = 0.003789 on 187 df

N = 201 (14 observations deleted due to missing data)

***p < 0.001, **p < 0.01, *p < 0.05, xp < 0.1

Heating EUI Model

Coefficient	Estimate	Standard Error	t value	p-value
(Intercept)	3.169943	0.184555	17.176	< 2e-16
Proportion of mobile homes	1.89E-01	1.24E-01	1.526	0.127947
Proportion of single-family attached homes	-3.86E-01	1.61E-01	-2.404	0.016677
Proportion of multifamily buildings with 2-4 units	-7.95E-01	1.18E-01	-6.719	6.69E-11
Proportion of multifamily buildings with 5 or more units	NA	NA	NA	NA
Proportion of renters	1.81E-01	9.92E-02	1.826	0.068587
Proportion of households with an annual income less than $10,000	4.38E-01	1.47E-01	2.977	0.003102
Proportion of households with an annual income between $10,000 and $15,000	2.35E-01	2.06E-01	1.144	0.253326
Proportion of households with an annual income between $15,000 and $20,000	-1.18E-01	2.17E-01	-0.543	0.587615
Proportion of households with an annual income between $20,000 and $25,000	-1.14E-01	1.61E-01	-0.71	0.47812
Proportion of households with an annual income between $25,000 and $30,000	2.59E-01	1.62E-01	1.603	0.109761
Proportion of households with an annual income between $30,000 and $35,000	5.32E-02	1.46E-01	0.365	0.715453
Proportion of households with an annual income between $35,000 and $40,000	1.84E-01	1.45E-01	1.267	0.205937
Proportion of households with an annual income between $40,000 and $50,000	1.56E-01	1.46E-01	1.068	0.28605
Proportion of households with an annual income between $50,000 and $60,000	4.19E-02	1.34E-01	0.313	0.754669
Proportion of households with an annual income between $60,000 and $75,000	0.109412	0.113406	0.965	0.335269
Proportion of households with an annual income between $75,000 and $100,000	0.303232	0.113411	2.674	0.007825
Proportion of households with an annual income between $100,000 and $150,000	0.001615	0.101125	0.016	0.987265
Proportion of housing units built before 1950	0.603628	0.13652	4.422	1.28E-05
Proportion of housing units built in the 1950s	0.619424	0.141325	4.383	1.52E-05
Proportion of housing units built in the 1960s	0.440474	0.129486	3.402	0.000741

Coefficient	Estimate	Standard Error	t value	p-value
Proportion of housing units built in the 1970s	0.426764	0.121318	3.518	0.000488
Proportion of housing units built in the 1980s	0.206078	0.128167	1.608	0.10869
Proportion of housing units built in the 1990s	0.125073	0.121394	1.03	0.30352
Proportion of housing units built in the 2000s	0.107043	0.12801	0.836	0.403562
Proportion of housing units using natural gas as primary heating fuel	-0.25758	0.157069	-1.64	0.101855
Proportion of housing units using propane as primary heating fuel	-0.32036	0.263507	-1.216	0.224836
Proportion of housing units using fuel oil as primary heating fuel	NA	NA	NA	NA
Proportion of housing units using wood as primary heating fuel	-0.71575	0.065111	-10.993	< 2e-16
Proportion of householders identifying as Black	-0.37727	0.119953	-3.145	0.001791
Proportion of householders identifying as American Indian	NA	NA	NA	NA
Proportion of householders identifying as Asian	-0.01695	0.232735	-0.073	0.941974
Proportion of householders identifying as two or more racial categories	-0.02295	0.31937	-0.072	0.942743
Proportion of householders identifying as Hispanic	-0.19212	0.169494	-1.133	0.257736
Number of rooms	-0.05565	0.019105	-2.913	0.003794
Average household size	-0.00871	0.024252	-0.359	0.719718
Residual standard error	0.5759 on 380 degrees of freedom			
Multiple R-squared	0.5059			
Adjusted R-squared	0.4643			
F-statistic	12.16 on 32 and 380 DF		p-value: < 2.2e-16	

MHC strengthens, unites, and mobilizes private and public resources to provide fair, accessible, and affordable housing for everyone in our Louisville community.

Metropolitan Housing Coalition

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