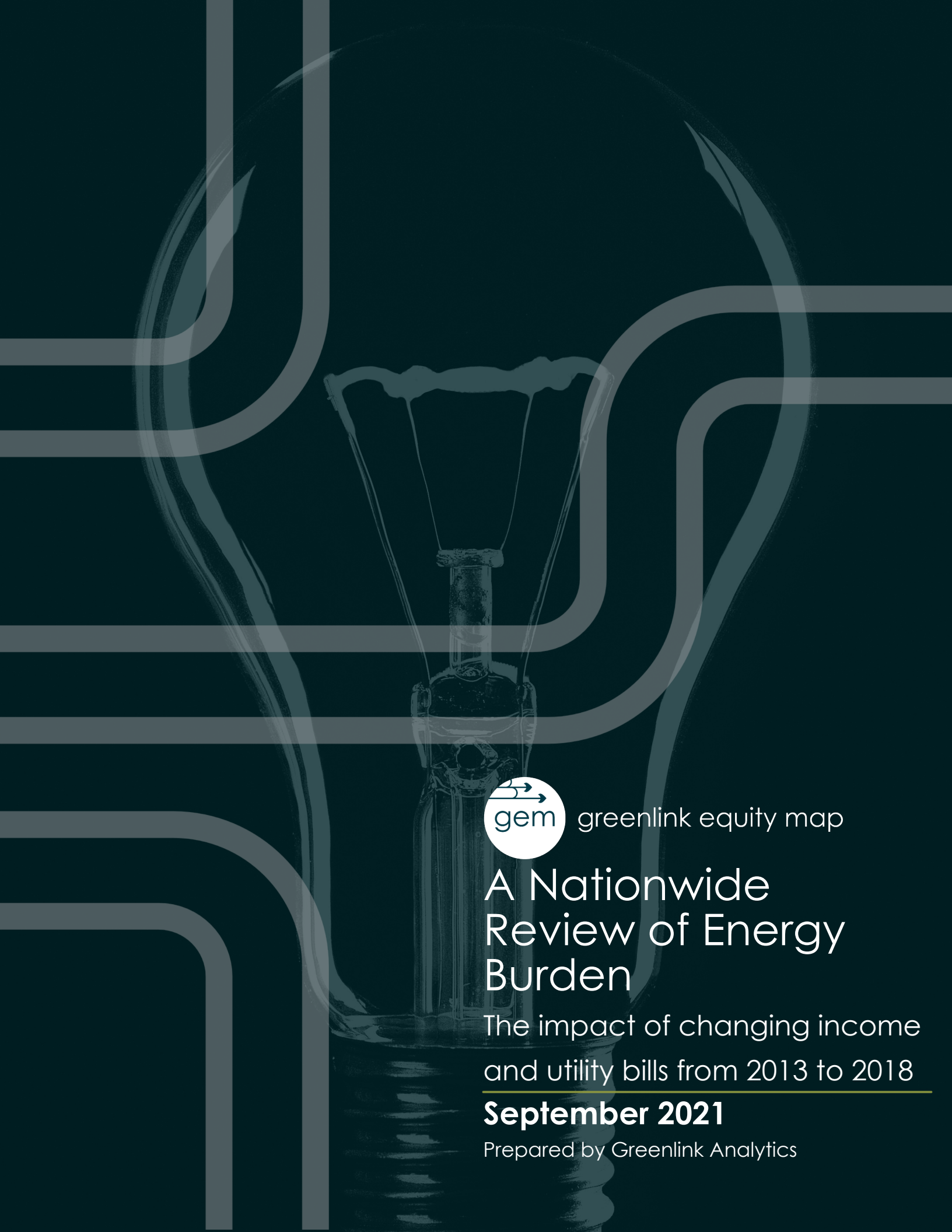

gem greenlink equity map

A Nationwide Review of Energy Burden

The impact of changing income and utility bills from 2013 to 2018

September 2021

Prepared by Greenlink Analytics

A Nationwide Review of Energy Burden

The impact of changing income and utility bills from 2013 to 2018

Energy burden continues to be a heavily discussed topic across leading sustainability and equity organizations, especially as the global COVID-19 pandemic continues to exacerbate economic inequality. High energy burden is defined as a household spending greater than 6% of their annual income on electricity and/ or natural gas bills. Severe energy burden is when a household is spending more than 10% of their annual income on energy bills.[1,2] For many households, energy bills are straining family budgets and can easily snowball into increased levels of financial and emotional stress, worse health outcomes, and an overall declining quality of life. Low-income households (defined in this analysis as those in the 25th percentile of income per metropolitan area) often face high or severe energy burden, which is frequently coupled with poor housing stock and sudden economic hardships. Energy efficiency initiatives, such as low-income weatherization and assistance programs, utility incentives, and a basic understanding of which neighborhoods face the highest energy injustices are key priorities in reducing low-income energy burden.

Many states require utilities to offer and administer energy efficiency programs; however these programs often suffer from high overhead and administrative costs, low budgets, and failing to reach the households that need them most.[3,4] To (partially) fill in this gap, federal, state, and local governments offer energy assistance and efficiency measures to struggling households. In Illinois, for example, the Illinois Commerce Commission (ICC) approved consumer protections for families struggling to pay utility bills during the pandemic. These protections were negotiated by a coalition of consumer advocates and major utility companies in their area. Illinois utilities have also set up a Bill Payment Assistance Program that offers debt forgiveness for eligible utility consumers.[5]

Federal initiatives, like the Department of Energy's (DOE) Weatherization Assistance Program (WAP), have provided billions in support since it was established in 1976. With an operating budget of $290 million in 2020, WAP aims to reduce energy burdens for low-income households through evaluating and improving household appliances and building performance.[6] The Low Income Home Energy Assistance Program (LIHEAP), administered by the Department of Health

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[1] Drehobl, A., & Ross, L. (2016). Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low-Income and Underserved Communities. Washington, DC: American Council for an Energy Efficient Economy. www.aceee.org/research-report/u1602.

[2] Colton R. D. (2011). Home Energy Affordability in New York: The Affordability Gap (2008–2010). Albany, NY: Sew York State Energy Research Development Authority (NYSERDA).

[3] Hirst, E., & Brown, M. (1990). Closing the efficiency gap: barriers to the efficient use of energy. Resources, Conservation and Recycling, 3(4), 267–281. doi: 10.1016/0921-3449(90)90023-w.

[4] Nadel, S., & Ungar, L. (2019). Halfway There: Energy Efficiency Can Cut Energy Use and Greenhouse Gas Emissions in Half by 2050. Washington, DC : American Council for an Energy-Efficient Economy. www.aceee.org/research-report/u1907.

[5] Ki, C. (2020). CUB alert: People struggling to pay utility bills should call their utilities to take advantage of landmark consumer protections. Citizens Utility Board. https://www.citizensutilityboard.org/blog/2020/10/14/cub-alerts-consumers-struggling-to-pay-their-bills-about-landmark-consumer-protections/.

[6] House FY 2020 Weatherization Appropriations. National Association for State Community Services Programs. https://nascsp.org/news/house-fy-2020-weatherization-appropriations/.

and Human Services (HHS), also targets high energy burdens by providing payment assistance for low-income residential heating and cooling costs.[7]

One of the reasons the Greenlink Equity Map (GEM) was created was to give community organizers and city staff the information and data needed to deploy resources and programs to the communities with the greatest need. GEM was designed to provide cities and local governments with high quality equity data and the demographics that lie behind it. This unique mapping tool can help cities and community organizations easily locate where high inequitable burdens exist. Indicators related to utilities, health, income, and broadband are available in the tool, helping government and community come together to make informed decisions regarding how to spend and prioritize their budgets and resources.

Currently, GEM offers a single year (2017) snapshot of this data. This is a helpful glimpse of a city's equity issues, but can be limiting when users want to know the answer to the rooted “why we are where we are”. Grants from our generous funders, The Kresge Foundation, Bloomberg Philanthropies, and The Energy Foundation will now allow the expansion of GEM to capture 6 years of data, from 2013 to 2018.

This report was created to highlight how energy burden has changed over time from 2013 to 2018, across the 50 most populated metropolitan statistical area (MSA) regions in the United States.

Findings from this report include:

- Metro areas with the highest energy burdens from 2013-2018 are found in the Southeast and Midwest regions including Birmingham, Memphis, Detroit, New Orleans, and Kansas City.
- Metro areas with the lowest energy burdens from 2013-2018 are found in the Western region of the United States, including San Jose, San Francisco, Seattle, and San Diego.
- Average energy burden decreased, and median income increased across all 50 metropolitan areas from 2013 to 2018.
- Although the median income increased across all income levels, median energy *bills for each neighborhood* **did not** decrease at the same rate across all levels of income; low-income household energy bills increased more than high-income households in over half of the metro areas studied.

Ranking and analyzing changing income and energy burden levels across some of the most populated metro areas in the United States helps community organizations and city governments understand their energy equity landscape. With this basic understanding of energy burden trends over time, policymakers can design energy efficiency programs and new strategies to reduce energy burden in the areas with a high need of resources. This type of

[7] Oliff, P., Thiess, R., & Samms, B. (2018). Federal Funding for Low-Income Energy Assistance Highest in New England, Upper Midwest. The Pew Charitable Trusts. https://www.pewtrusts.org/en/research-and-analysis/articles/2018/02/21/federal-funding-for-low-income-energy-assistance-highest-in-new-england-upper-midwest.

ranking report is also important in order to begin understanding the root causes found among communities experiencing energy burden. Some of these root causes include the impact of income disparities on changing energy burden, as well as disproportionate investments in energy programs in wealthier parts of the country.

Energy Burden Trends from 2013-2018

Using data from the American Housing Survey (AHS), the American Council for an Energy Efficient Economy (ACEEE) published two nationwide reviews of energy burden in the past decade. Both of these reports found that the Midwest and the Southeast regions of the US had the highest median energy burden across several groups (low-income families, renters, minority communities, etc.).[1,8] In the 2016 publication, the authors noted that households in the Southeast had some of the country's lowest median incomes—one of the contributors to high energy burden—in addition this region generally had lower investments in utility-run energy efficiency programs.[1] Several years later, in the 2020 report, ACEEE found the Southeastern region of the United States (Alabama, Kentucky, Mississippi, and Tennessee) with a median energy burden of 4.4%, the highest in the nation. A major contributor to this outcome is the region having the lowest median annual income in the nation ($39,400).[8]

We have also explored how energy burden changes in cities over time. Over the past year, we have leveraged our equity mapping capabilities with GEM to investigate the energy landscape of 25 participant cities in the American Cities Climate Challenge (ACCC).[9] Each city received a report on how its energy burden changed between 2013–2019. Philadelphia, St. Louis, and Indianapolis were found to have the highest median energy burden of the cities analyzed by 2019. A new metric, energy burden disparity was also quantified in these GEM reports, highlighting the gap in burdens between high burden and low burden communities. The disparity in Washington, DC was over 5, more than twice as large as the city with the lowest disparity (Orlando).

In this report, we explored energy burden each year from 2013 to 2018 across the 50 largest metro areas in the US. This allowed us to not only rank the metro areas by average energy burden, but also allowed us to see how that burden changed across different communities. In our next report, we will provide a deeper analysis of how some racial disparities intersect with energy burden, as well as how some of the cities with the lowest energy burdens, analyzed in this report, achieved their success. Population sizes within the group of 50 metro areas ranged from 1.1 million (Birmingham-Hoover, AL) to 19.3 million (New York-Newark-Jersey City, NY-NJ-PA) in 2018. Income data was sourced from the American Community Survey (ACS) and utility information was taken from the Integrated Public Use Microdata Series (IPUMS) database. Energy burden calculations took into account the different population densities of each MSA through a weighted process used in our Greenlink Equity Map analysis, based on a

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[8] Drehobl, A., Ross, L., & Ayala, R. (2020). How High Are Household Energy Burdens? An Assessment of National and Metropolitan Energy Burden across the United States. Washington, DC: ACEEE. www.aceee.org/research-report/u2006.

[9] American Cities Climate Challenge GEM Energy Burden Reports. Atlanta, GA: Greenlink Analytics. https://www.equitymap.org/accc-gem-reports.

peer-reviewed methodology that utilizes high-resolution data from the Census Bureau. Data from nearly 75,000 census tracts are processed and cleaned to calculate the utility burdens at a neighborhood level across the entirety of the US.

Energy burden rankings of the 50 largest metro areas

Figure 1 below shows the 2013 and 2018 energy burdens across all 50 metro areas as a snapshot of the analyzed data range we used for this report, with some areas encompassing two or more cities. Metropolitan statistical areas (MSAs) are delineated by the U.S. Office of Management and Budget (OMB) as having at least one urbanized area with a minimum population of 50,000.[10] The region consists of a city and surrounding communities that are linked by social and economic factors.

Energy burden decreased in every metro area analyzed, with the lowest energy burdens seen in the Salt Lake City, San Jose, and Seattle metro areas by 2018. These areas were found to have less than 4% energy burden in 2013 and in 2018. In the Pacific region, energy burdens are comparatively lower than the country's median energy burden (4.8% in 2013 and 4.3% in 2018). These energy trends are consistent with the American Cities Climate Challenge (ACCC) GEM Energy Burden reports we published regarding the energy burden landscape in 25 US cities. Our analysis showed that San Jose, Denver, and Seattle had the lowest median energy burden in 2019; these three cities also had relatively low energy burden disparities during the time period studied (2013–2019).[11] This report found that the cities in the Southeast and Midwest (the Birmingham, Memphis, and Detroit metro areas at the top of the list in Figure 2) had the highest median energy burdens by 2018; again this is in line with our prior ACCC GEM Energy Burden reports, which found three of the five most burdened cities were located in the Midwest region (St. Louis, Indianapolis, and Cincinnati).[12]

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[10] Metropolitan and Micropolitan: About. United States Census Bureau. https://www.census.gov/programs-surveys/metro-micro/about.html.

[11] American Cities Climate Challenge GEM Energy Burden Reports. Atlanta, GA: Greenlink Analytics. https://www.equitymap.org/accc-gem-reports.

[12] American Cities Climate Challenge GEM Energy Burden Reports. Atlanta, GA: Greenlink Analytics. https://www.equitymap.org/accc-gem-reports.

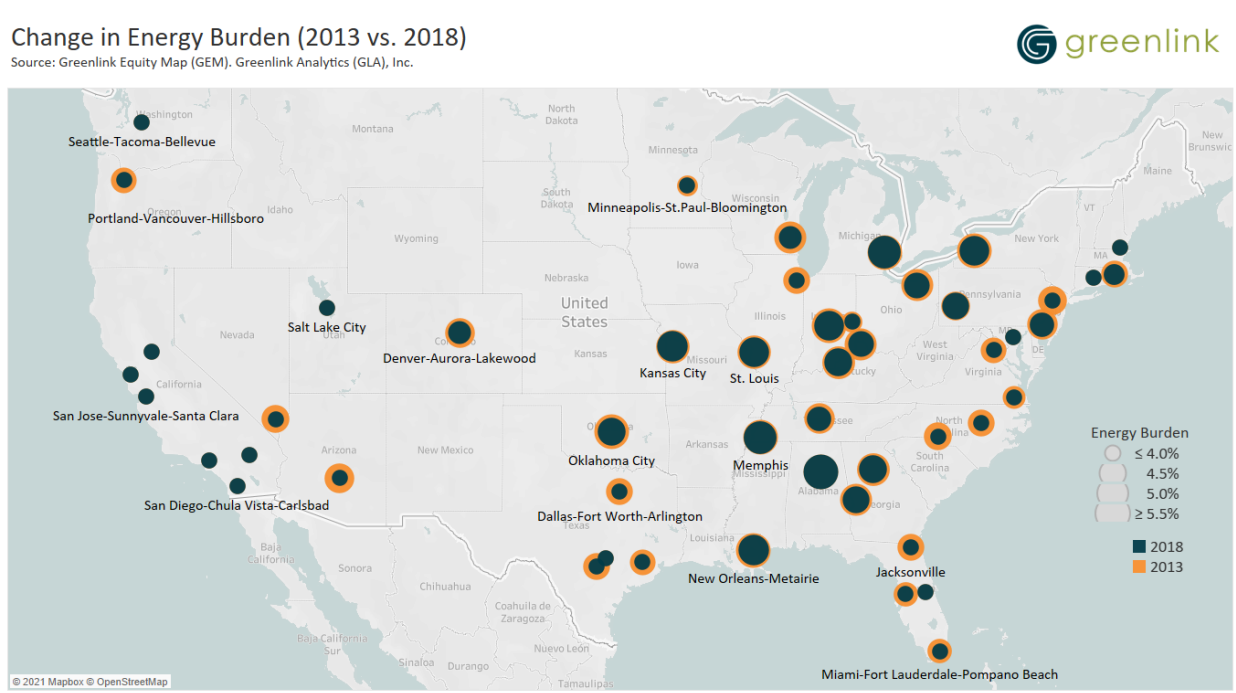

Figure 1: A snapshot of the change in energy burden between 2013–2018. This map shows the energy burden in 2013 in orange and in 2018 in blue.

Figure 2 below shows a more detailed view of the 50 metro areas ranked from highest to lowest in energy burden in 2018. Southeast and Midwest metro areas are at the top of the list: Birmingham, Memphis, Detroit, New Orleans, and Kansas City.

The metro areas with the lowest energy burdens throughout 2018 are in the Western region of the United States including, San Jose, San Francisco, Seattle, and San Diego.

While every metro area studied showed a reduced average energy burden by 2018, progress towards reduced burdens was not consistent in every year. For example, in 2014, nearly all (90%) of the metro areas experienced the same or higher average energy burdens as in 2013. Large reductions in energy burden were not observed until the 2016–2018 period.

Figure 3 below shows the 50 metro areas ranked by percentage of improved energy burden over time, from the most improved to the least improved over the 2013-2018 period.

Average Energy Burden (2013-2018)

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Source: Greenlink Equity Map (GEM). Greenlink Analytics (GLA), Inc.

	Year					
MSA	2013	2014	2015	2016	2017	2018
Birmingham-Hoover	5.9%	6.3%	6.1%	5.6%	5.2%	5.4%
Memphis	5.6%	6.0%	5.9%	5.4%	5.1%	5.2%
Detroit-Warren-Dearborn	6.4%	6.4%	6.2%	5.5%	5.2%	5.2%
New Orleans-Metairie	5.5%	5.9%	5.4%	5.2%	4.9%	4.9%
Kansas City	5.3%	5.7%	5.5%	5.0%	4.7%	4.9%
St. Louis	5.3%	5.7%	5.5%	4.9%	4.7%	4.8%
Indianapolis-Carmel-Anderson	5.5%	5.7%	5.6%	5.1%	4.8%	4.8%
Buffalo-Cheektowaga	5.7%	6.2%	5.3%	4.7%	4.6%	4.8%
Oklahoma City	5.5%	5.7%	5.4%	4.9%	4.6%	4.6%
Louisville/Jefferson County	5.2%	5.5%	5.3%	4.8%	4.6%	4.6%
Atlanta-Sandy Springs-Alpharetta	5.2%	5.6%	5.3%	5.0%	4.5%	4.6%
Pittsburgh	4.7%	5.1%	5.0%	4.5%	4.2%	4.5%
Columbus	5.0%	5.2%	5.2%	4.6%	4.4%	4.5%
Cleveland-Elyria	5.0%	5.4%	5.1%	4.5%	4.5%	4.4%
Cincinnati	5.0%	5.2%	5.2%	4.6%	4.3%	4.4%
Philadelphia-Camden-Wilmington	4.9%	5.2%	5.1%	4.6%	4.3%	4.3%
Nashville-Davidson-Murfreesboro-Franklin	4.9%	5.2%	5.0%	4.5%	4.2%	4.3%
Milwaukee-Waukesha	5.1%	5.0%	4.9%	4.5%	3.9%	4.2%
Denver-Aurora-Lakewood	4.8%	5.2%	4.9%	4.3%	4.2%	4.2%
Providence-Warwick	4.5%	4.9%	4.6%	4.3%	4.0%	4.1%
Virginia Beach-Norfolk-Newport News	4.2%	4.5%	4.5%	4.0%	3.8%	4.0%
Phoenix-Mesa-Chandler	4.8%	4.8%	4.7%	4.6%	4.2%	4.0%
New York-Newark-Jersey City	4.7%	4.7%	4.6%	4.2%	4.0%	4.0%
Las Vegas-Henderson-Paradise	4.6%	5.1%	4.6%	4.4%	4.4%	4.0%
Chicago-Naperville-Elgin	4.5%	5.0%	4.7%	4.2%	4.1%	4.0%
Charlotte-Concord-Gastonia	4.6%	4.8%	4.8%	4.2%	3.9%	4.0%
Washington-Arlington-Alexandria	4.4%	4.7%	4.6%	4.1%	3.9%	3.9%
San Antonio-New Braunfels	4.5%	4.8%	4.7%	4.3%	3.9%	3.9%
Raleigh-Cary	4.5%	4.8%	4.6%	4.1%	3.9%	3.9%
Miami-Fort Lauderdale-Pompano Beach	4.3%	4.6%	4.5%	4.2%	4.1%	3.9%
Dallas-Fort Worth-Arlington	4.5%	4.8%	4.7%	4.1%	3.7%	3.9%
Portland-Vancouver-Hillsboro	4.4%	4.6%	4.3%	4.1%	3.9%	3.8%
Jacksonville	4.5%	4.9%	4.6%	4.3%	3.9%	3.8%
Houston-The Woodlands-Sugar Land	4.4%	4.8%	4.5%	4.1%	3.7%	3.8%
Tampa-St. Petersburg-Clearwater	4.3%	4.5%	4.5%	4.2%	3.9%	3.7%
Minneapolis-St.Paul-Bloomington	4.1%	4.3%	4.0%	3.8%	3.6%	3.6%
Boston-Cambridge-Newton	3.9%	3.9%	4.1%	3.5%	3.6%	3.6%
Sacramento-Roseville-Folsom	3.6%	3.6%	3.7%	3.6%	4.0%	3.5%
Riverside-San Bernadino-Ontario	4.0%	3.8%	3.9%	3.9%	3.8%	3.5%
Richmond	4.1%	4.2%	4.3%	3.9%	3.6%	3.5%
Baltimore-Columbia-Towson	4.0%	4.2%	4.2%	3.8%	3.6%	3.5%
Orlando-Kissimmee-Sanford	3.8%	4.1%	3.9%	3.6%	3.5%	3.3%
Hartford-East Hartford-Middletown	3.5%	3.6%	3.7%	3.3%	3.2%	3.3%
Austin-Round Rock-Georgetown	4.0%	4.4%	4.1%	3.6%	3.3%	3.3%
Los Angeles-Long Beach-Anaheim	3.5%	3.6%	3.4%	3.5%	3.2%	3.2%
Salt Lake City	3.6%	3.8%	3.7%	3.4%	3.1%	2.8%
San Diego-Chula Vista-Carlsbad	2.8%	2.7%	2.8%	2.8%	2.6%	2.7%
Seattle-Tacoma-Bellevue	3.3%	3.3%	3.0%	2.9%	2.8%	2.6%
San Francisco-Oakland-Berkeley	2.6%	2.4%	2.3%	2.4%	2.5%	2.1%
San Jose-Sunnyvale-Santa Clara	2.3%	2.1%	2.0%	2.0%	2.2%	1.8%

Figure 2: Ranking of the top 50 US metro areas by average energy burden and its change over time. Colors of numbers are adjusted for legibility.

Top 50 U.S. Metro Areas Ranked by Most Improved Energy Burden (2013-2018)

Source: Greenlink Equity Map (GEM). Greenlink Analytics (GLA), Inc.

Ranking	MSA	Percentage of Improved Energy Burden 2013-2018	Ranking	MSA	Percentage of Improved Energy Burden 2013-2018
1	Detroit-Warren-Dearborn	1.14%	26	Richmond	0.54%
2	Milwaukee-Waukesha	0.91%	27	New Orleans-Metairie	0.54%
3	Buffalo-Cheektowaga	0.87%	28	Raleigh-Cary	0.52%
4	Oklahoma City	0.83%	29	St. Louis	0.52%
5	Salt Lake City	0.81%	30	Birmingham-Hoover	0.52%
6	Austin-Round Rock-Georgetown	0.76%	31	Cleveland-Elyria	0.50%
7	Phoenix-Mesa-Chandler	0.75%	32	Washington-Arlington-Alexandria	0.48%
8	Jacksonville	0.71%	33	Orlando-Kissimmee-Sanford	0.47%
9	Seattle-Tacoma-Bellevue	0.71%	34	Chicago-Naperville-Elgin	0.47%
10	Indianapolis-Carmel-Anderson	0.70%	35	Minneapolis-St.Paul-Bloomington	0.46%
11	New York-Newark-Jersey City	0.68%	36	Providence-Warwick	0.45%
12	Denver-Aurora-Lakewood	0.68%	37	San Francisco-Oakland-Berkeley	0.44%
13	Houston-The Woodlands-Sugar Land	0.66%	38	Baltimore-Columbia-Towson	0.44%
14	Las Vegas-Henderson-Paradise	0.66%	39	San Jose-Sunnyvale-Santa Clara	0.44%
15	Cincinnati	0.64%	40	Kansas City	0.43%
16	Philadelphia-Camden-Wilmington	0.63%	41	Riverside-San Bernadino-Ontario	0.42%
17	Tampa-St. Petersburg-Clearwater	0.62%	42	Memphis	0.42%
18	San Antonio-New Braunfels	0.62%	43	Los Angeles-Long Beach-Anaheim	0.38%
19	Atlanta-Sandy Springs-Alpharetta	0.62%	44	Miami-Fort Lauderdale-Pompano Beach	0.38%
20	Charlotte-Concord-Gastonia	0.61%	45	Boston-Cambridge-Newton	0.31%
21	Portland-Vancouver-Hillsboro	0.60%	46	Pittsburgh	0.29%
22	Dallas-Fort Worth-Arlington	0.60%	47	Hartford-East Hartford-Middletown	0.27%
23	Nashville-Davidson-Murfreesboro-Franklin	0.57%	48	Virginia Beach-Norfolk-Newport News	0.18%
24	Louisville/Jefferson County	0.56%	49	San Diego-Chula Vista-Carlsbad	0.13%
25	Columbus	0.55%	50	Sacramento-Roseville-Folsom	0.09%

Figure 3: Ranking of the top 50 US metro areas by percentage of improved energy burden from 2013-2018.

The Impact of Income on Changing Energy Burden

Understanding how household income patterns affect energy burden can help communities and policymakers design and implement effective energy assistance programs. In Figure 4, we explored how changes in income between 2013–2018 correlated with the changes in energy burden per metro area. At first glance, decreases in energy burden appear to have a close inverse correlation. MSA's such as Salt Lake City see a decrease of energy burden and an increase of income, both around 20% across 2013–2018. This may indicate that a change in energy burden was most likely caused by a change in income, rather than changes in energy

consumption or energy price. Other metro areas, such as Sacramento-Roseville-Folsom, experienced income increases of 17%, but energy burden reductions of as little as 2%. This may indicate that changes in energy consumption, equipment performance, and/or energy prices were primary causes of changes in energy burden.

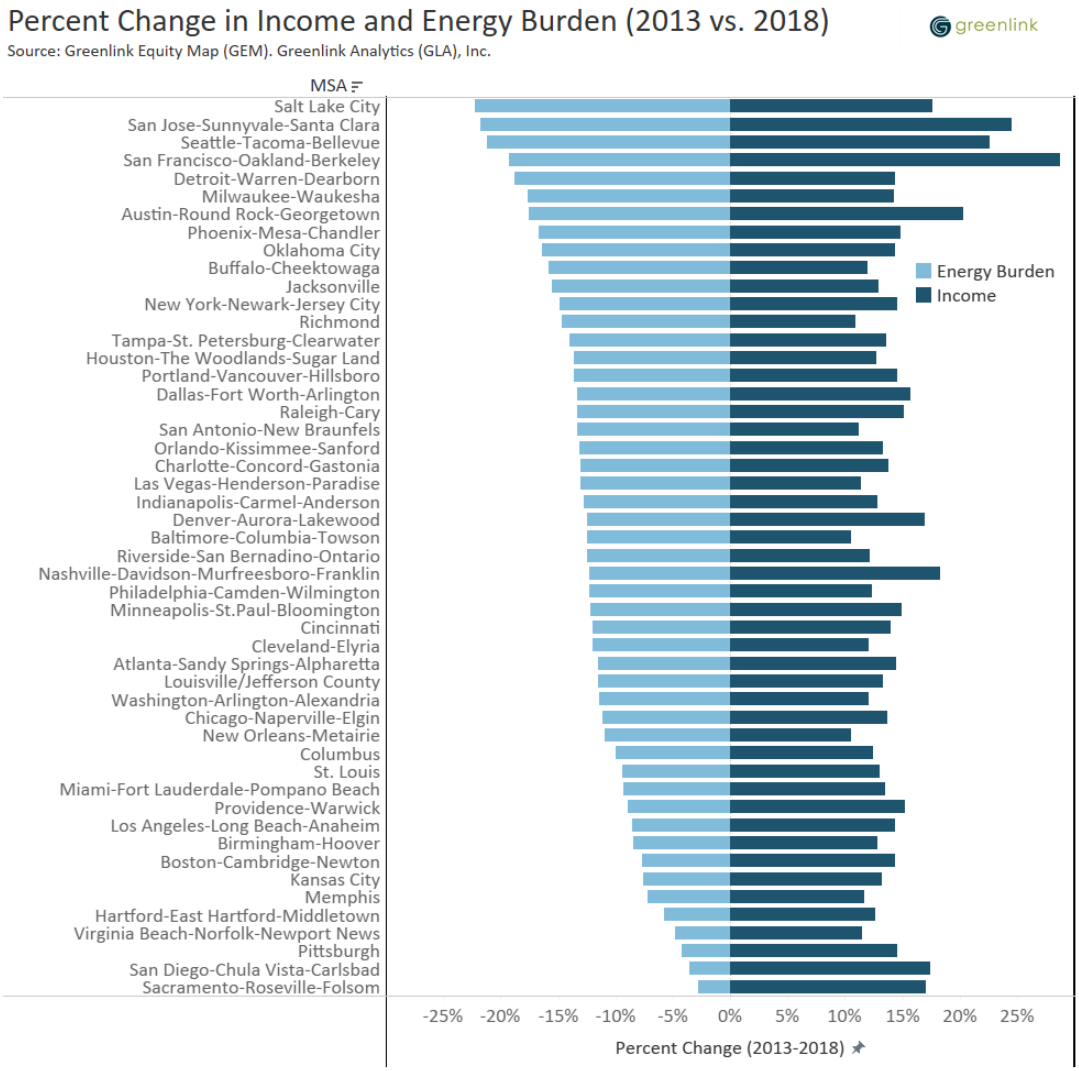

Figure 4: Percent Change in Income and Energy Burden (2013 vs. 2018). The light blue bars on the left-hand side represent percent change in energy burden over time, while the dark blue bars on the right-hand side represent percent change in income over time.

Breaking out changes across low and high income (25th percentile vs 75th percentile in income) provides insights into the recipients of benefits and burdens as these improvements in income and energy burden occurred. In Figure 4, we can see that in 28 metro areas (those highlighted in orange), low-income households did not experience the same rate of energy bill reduction as their high-income counterparts *or* experienced an increase in energy bills, while their high-income counterparts experienced a decrease. For example, low-income households in San

Diego suffered a 20% increase in energy bills, while high-income residents experienced a 7% increase.

We also found that minority communities (majority Black and/or Hispanic) consistently experienced disproportionately high energy burdens during the analyzed time period. This was the case in over 20% of the studied metro areas and is consistent with ACEEE reporting[4]. Further analysis on how disparities in energy burden impact minority and marginalized communities across specific cities and metro areas analyzed in this report will be addressed in a future report.

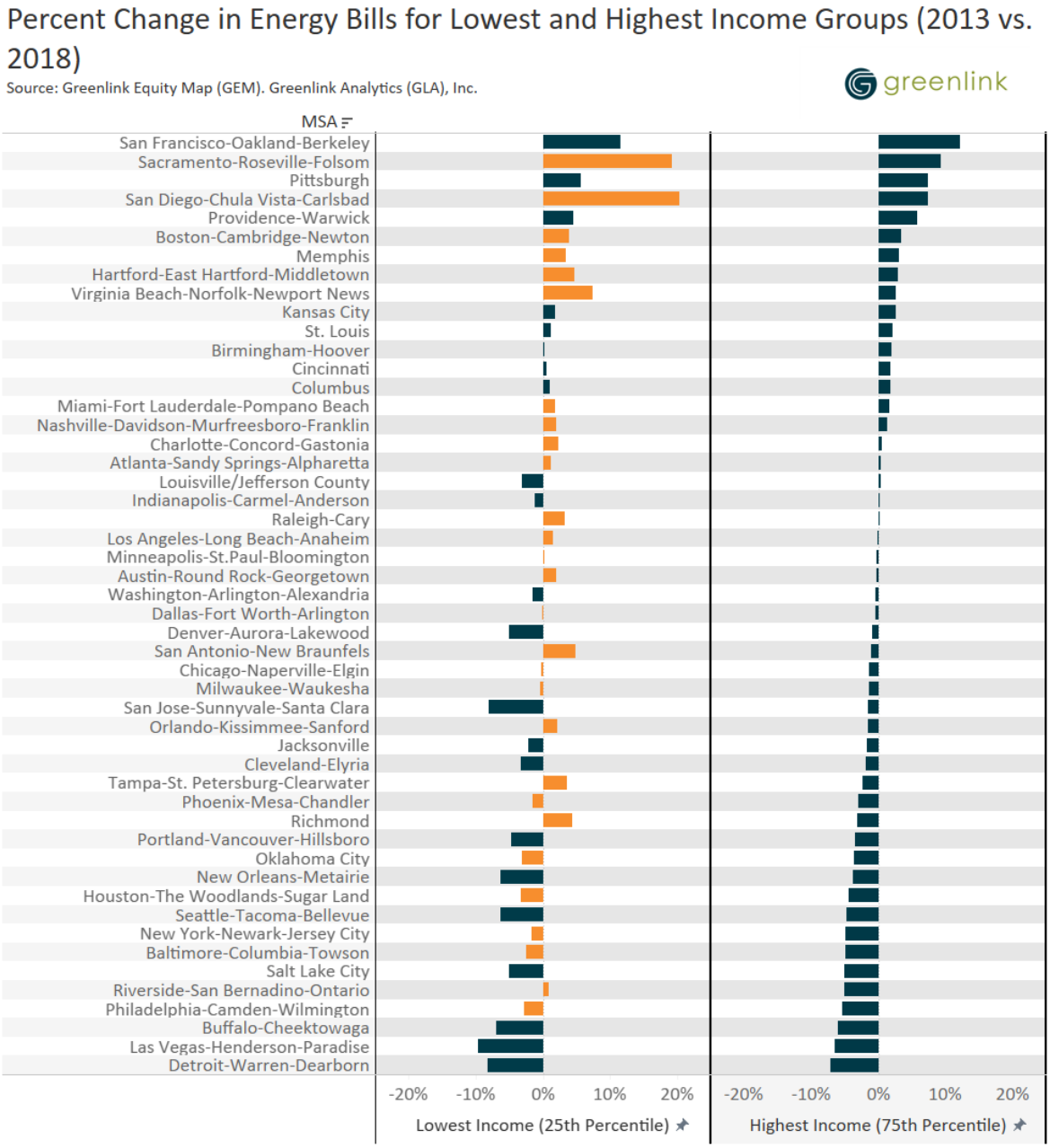

Figure 4: Changes in energy bills in lowest (left-hand column) and highest (right-hand column) income groups between 2013–2018. 28 MSAs that didn't experience the same rate of energy bill reduction as their high-income counterparts or experienced energy bill increase are depicted in orange.

Understanding the Energy Equity Landscape in the US

In order to improve clarity around the energy equity landscape across the US, this report ranked and reviewed energy burden across the country's 50 largest metropolitan statistical areas over the 2013–2018 time period. We found that the average energy burden decreased, and median income increased across all 50 metro areas during this time period. These changes were not consistent across all metro areas; the national average energy burden increased in 2014 (from 4.8% in 2013 to 5.1% in 2014) and then fell to 4.3% by 2018.

We analyzed data on median income and utility bills to understand which cities contributed more to the nationwide trend of decreasing energy burden. Although median income increased by around 14% on average, energy bills did not decrease at the same rate across all levels of income. Energy bills increased for low-income households more than high-income households in over half (28) of the metro areas studied. In metro areas such as San Diego-Chula Vista-Carlsbad and Sacramento-Roseville-Folsom, the lowest 25th percentile income per metro area saw energy bills increase by roughly 20%, whereas their high-income counterparts only saw increases around 8%. In Riverside-San Bernadino-Ontario and Baltimore-Columbia-Towson, a decrease in energy bills for high-income households reached 5%, and the low-income households only experienced a decrease of 1-2%. This caused a disproportionate increase in energy burden for low-income households, while overall energy burden decreased.

This report reinforces results from prior research on energy burden and energy efficiency programming and demonstrates that these trends have persisted over much of the course of the past decade. In order to take a deeper look at the root causes of these trends and how they impact racial demographics, more research will be needed.

Understanding disparities in energy burden within a specific metro area and how it compares to other similar-sized or regional metro areas is a first step in designing effective solutions. The findings in this report can help GEM users and policymakers construct better solutions, energy efficiency programming, bill assistance, or other initiatives to reduce high energy burden found within their communities. The availability of metro specific energy burden data can improve the dispersal of funding and opportunities such as the Weatherization Assistance Program (WAP), State Energy Program (SEP), and others such as the Low Income Home Energy Assistance Program (LIHEAP) funding and benefits.

With the data insights found in this report, cities and policymakers can identify where they rank in terms of energy burden and the percent change in energy bills between 2013–2018. Community organizations may also benefit from having new data to identify critical programs,

resources, and development opportunities, and for tracking progress in their community. The ability to visualize these trends over time will help leaders evaluate program effectiveness in specific areas over this period of time, visualize progress, and help identify where new levels of engagement should be prioritized. This type of analysis is also crucial in understanding the energy equity landscape across the US and how energy burden is impacting specific regions and metro areas across the US. In our next report, we will select several cities with large energy burden disparities and analyze their demographic composition, as well as highlight the metro areas that showed strong improvement over the 2013–2018 time period.

About this Report and GEM

To summarize, the findings from this report include:

- The metro areas with the highest energy burdens through 2018 are found in the Southeast and Midwest metro areas and include Birmingham, Memphis, Detroit, New Orleans, and Kansas City.
- The metro areas with the lowest energy burdens through 2018 are found in the Western region of the United States including, San Jose, San Francisco, Seattle, and San Diego.
- Average energy burden decreased, and median income increased across all 50 metropolitan areas from 2013 to 2018.
- Although the median income increased across all income levels, median energy *bills* for each tract did not decrease at the same rate across all levels of income; low-income household energy bills increased more than high-income households in over half of the metro areas studied.

As climates grow warmer, cities are increasingly acknowledging the importance of addressing energy equity and high energy burden. This complex issue must be tackled with community engagement, education, and intersectional collaboration to effect real change.

Our analysis provides a snapshot view of income and energy disparities in the 50 most populated cities across the United States and how these indicators have changed from 2013 to 2018. We have also presented data on how different income groups suffer disproportionately from energy burden and how certain regions of the United States are still experiencing high energy burdens in this timeframe. Prior studies have described energy efficiency programming and energy injustices between high and low income households as snapshots of a specific time and place. These studies also show how higher income households are more likely to take advantage of or have access to energy efficiency programs and opportunities.

The maps and data found in this report and in the Greenlink Equity Map may be most valuable for context setting in order to identify disparities and areas in need of the most resources. This information is also useful evidence in the creation of the appropriate policies and programs needed to dismantle these energy injustices.

The Greenlink Equity Map (GEM) platform was launched in October 2020 and is used by over 320 city, community, and non-profit leaders. The purpose of GEM is to guide individuals and organizations toward understanding how equity-related metrics are spread across communities in order to help them make informed, data driven decisions. The GEM platform offers detailed data insights into how different communities within a city may be more or less stressed than others along a variety of health, environmental, and demographic metrics. In order to get beyond anecdotal evidence, and create well targeted interventions, the GEM database can help illuminate the extent of these inequities and where they exist.

The creation of this tool and these reports would not have been possible without the support of our generous funders, the Kresge Foundation, Bloomberg Philanthropies, and the Energy Foundation. These reports serve to highlight different equity and energy issues found in cities across the United States using our GEM data in order for users to better understand how to conduct their own research in the platform and allowing for city and community energy and equity advancements. Addressing some of our nation's largest disparities is no easy feat, but with the correct data and information available to city staff, policymakers, and decision makers across the county, will be better prepared to achieve a cleaner, healthier, and more equitable future. For more information on how to access the Greenlink Equity Map, go here.

McDonald, S., Brankovic, S., Lacayo, C., Spratling, D., Gumerman, E., Madhavan, S., & Cox, M. (2021). A Nationwide Review of Energy Burden: The impact of changing income and utility bills from 2013 to 2018. Atlanta, GA: Greenlink Analytics. URL.