



gem greenlink equity map

# Boston, MA

## 6 Years of Energy Burden Impacts

---

**February 2021**

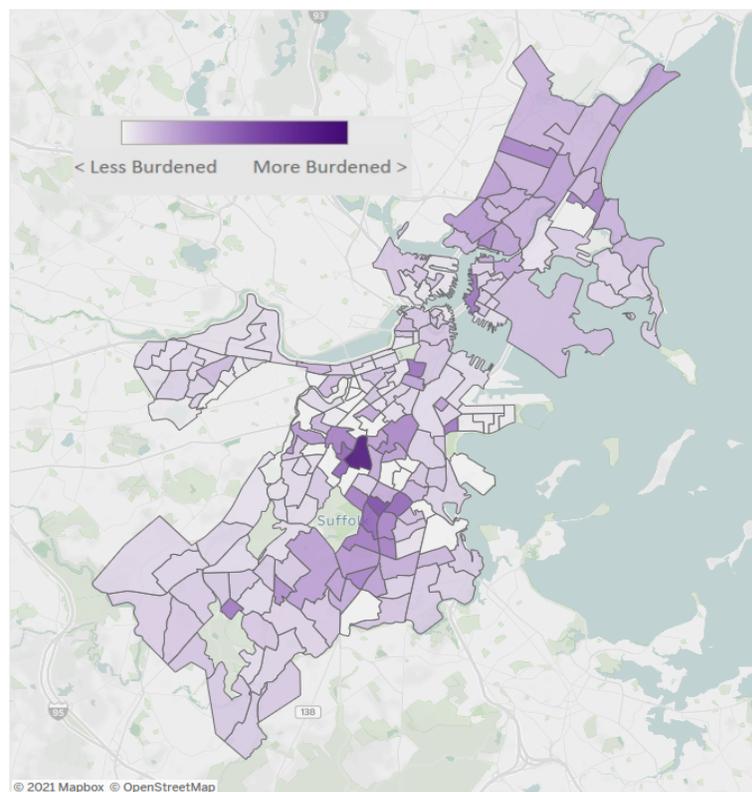
Prepared by Greenlink Analytics



# 6 Years of Energy Burden Impacts:

## Boston in Focus

February 2021



**Figure 1. 2019 Boston Energy Burden ranges from 1% to 28%<sup>1</sup>**

Thanks to generous support from the Energy Foundation in partnership with Bloomberg Philanthropies, the 25 cities of the Bloomberg Philanthropies American Cities Climate Challenge (“ACCC”) are receiving a 6 Years of Energy Burden Impact report with information on the current energy burdens that residents of their city face, how that burden has changed over time, and how other equity indicators are related to energy burden.

---

<sup>1</sup> Clear tracts have insufficient data. Energy burden is the percent of income that a household spends on electricity and gas bills; an energy burden over 6% is considered “high” or “unaffordable” while a burden over 10% is considered “severe”. Boston and Suffolk County are used interchangeably in this report.



## Energy Burden in Boston at a Glance

On average, households nationally pay about 3.6% of their income on energy (gas and electricity) bills. Boston is currently the **9th** most energy burdened city out of the Climate Challenge cities. Across the city, Boston's average energy burden is 4.3% as of 2019, 1.19 times the national average. When energy burden is mapped across the city by neighborhood (Figure 1), the data shows that energy burden disproportionately impacts residents in the inner portions of the city. For 2019, the 20% least burdened tracts in the city have an average energy burden of 2.3%, below the national average, whereas the 20% most burdened tracts have an average energy burden of 10.6%, demonstrating severe energy burdens in these neighborhoods. The table below shows how Boston compares on energy burden and how it's changed over time.

**Table 1. Median Energy Burdens Over Time<sup>2</sup>**

	2013 Overall	2019 Overall	Change
<b>Boston (Suffolk County)</b>	4.4%	4.3%	-0.1%
<b>Massachusetts</b>	3.7%	4.2%	0.5%
<b>25 ACCC Leadership Cities</b>	4.4%	4.0%	-0.4%
<b>National<sup>3</sup></b>	3.8%	3.6%	-0.2%

## Boston's Energy Burden: Change Over Time and City Disparities

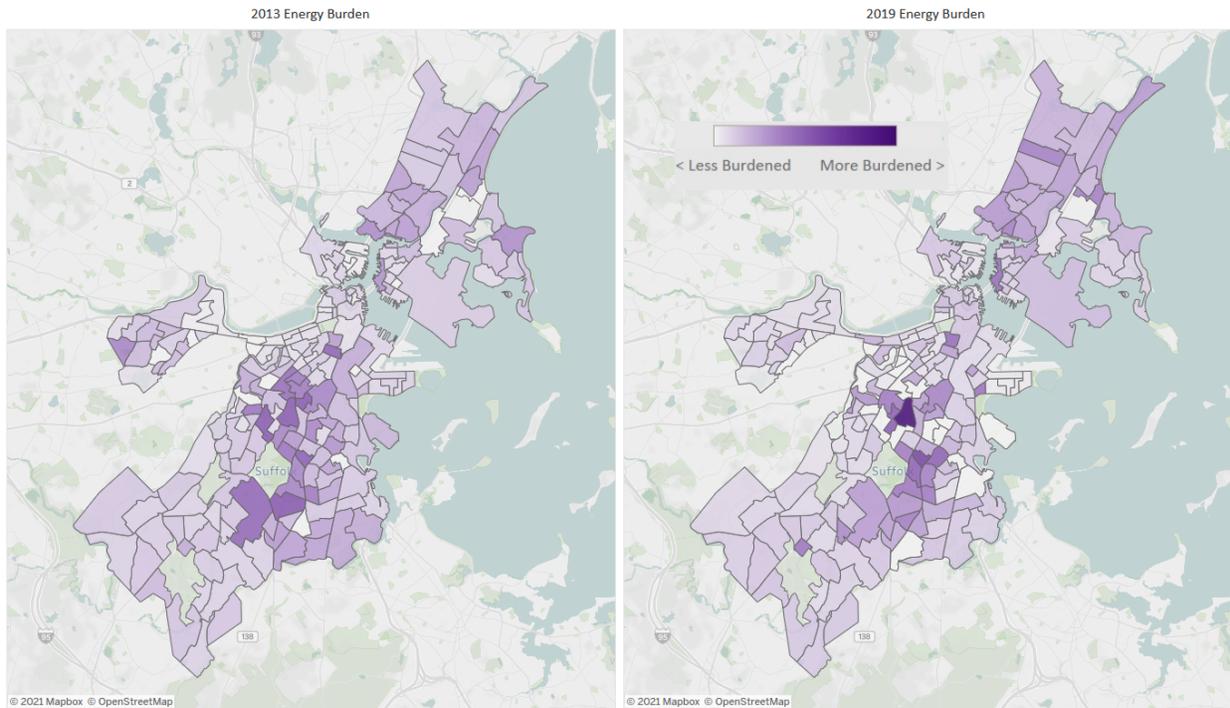
In 2013, Boston's median energy burden of 4.4% was above the national average but below the unaffordable energy burden threshold of 6% (Table 1). It was also above the Massachusetts median of 3.7%. Energy burden in Boston decreased by 0.1% by 2019 while remaining well above the national average. This improvement was driven primarily by an increase in incomes - energy costs increased, but at a slower rate than incomes grew. Figure 2 shows how energy burden has changed over time tract-by-tract in Suffolk County. Even though burden is decreasing city wide, neighborhood by neighborhood the story is varied. Many of the highest burdened neighborhoods

<sup>2</sup> City by city energy burden for Climate Challenge cities found at the end of this document. Data from the Greenlink Equity Map (GEM) except where otherwise noted.

<sup>3</sup> National data from the US Energy Information Administration (Forms 861 and 176) and the US Census.



are seeing worsening conditions at the same time as the city and country's energy burdens are improving. There are many reasons why energy burdens may fluctuate year-to-year in an area including displacement, resident turnover, changing incomes, or rapid changes in energy usage behavior.



**Figure 2. Boston's (Suffolk County) Change in Burden Between 2013 and 2019**

The data shows wide disparities between the top 20% most burdened and 20% least burdened census tracts in the city.<sup>4</sup> The 20% least energy burdened tracts had a median burden of 2.5% in 2013 and 2.3% in 2019, below the national average in both years. By comparison, the 20% most burdened tracts in the city had an energy burden of 9% in 2013 and 10.6% in 2019, indicating continuing levels of severe energy burdens in these neighborhoods across time. To look further at how burden is impacting Boston's most heavily burdened communities, Figure 3 illustrates Boston's top 20% most burdened tracts in 2013 and in 2019.

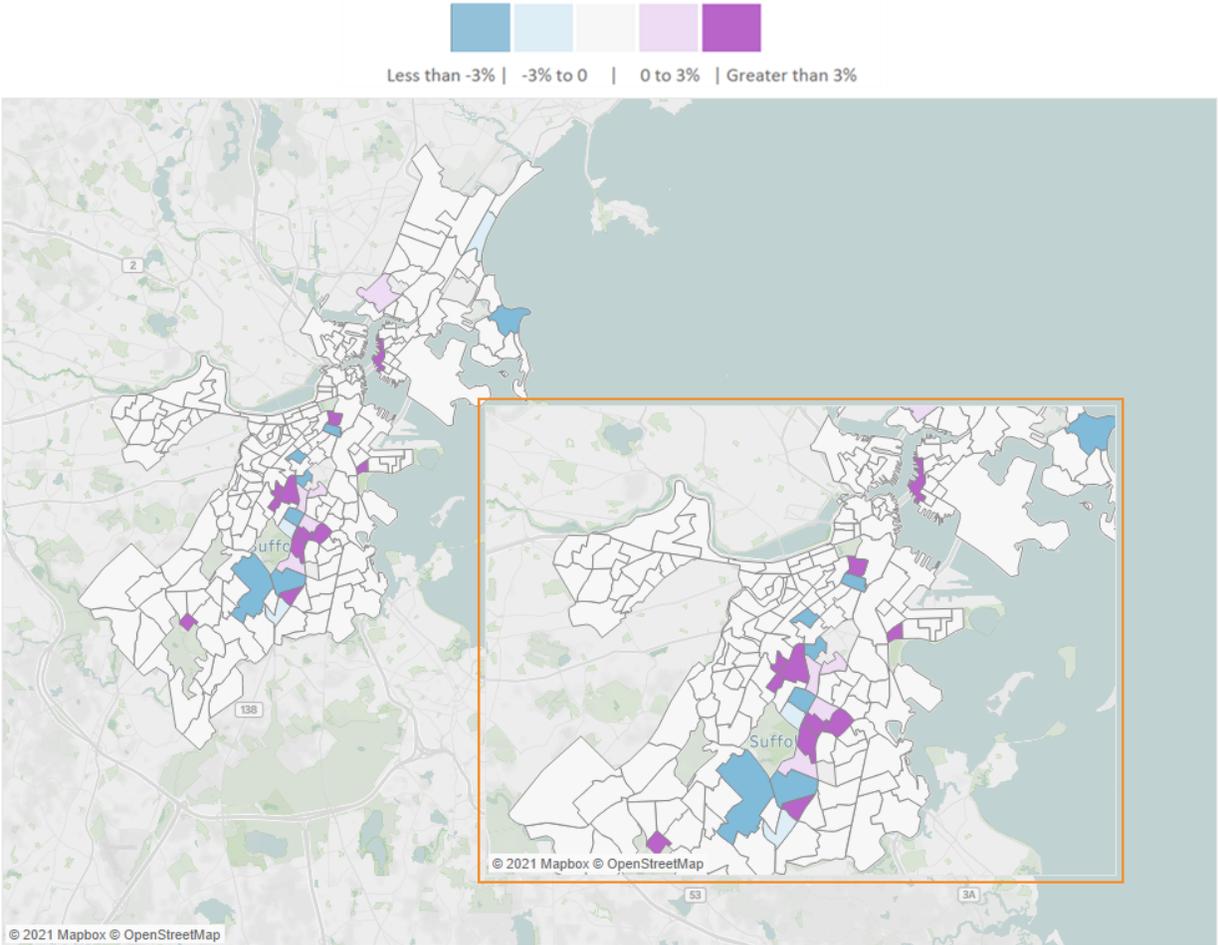
<sup>4</sup> Most and least burdened tracts are defined by the household-weighted average census tract energy burden from 2013-2019 and represent the top and bottom quintiles.



**Figure 3. Boston's Top 20% Most Burdened Tracts in 2013 and 2019**

Figure 4 shows the highest burdened areas in the city that have seen their energy burdens markedly increase or decrease between 2013 and 2019.<sup>5</sup> This demonstrates that while the average burden has been improving across the city, some of the most burdened areas are not sharing in these benefits.

<sup>5</sup> Top quintile (20%) is shown, averaged across all years.



**Figure 4. Change in Energy Burden in Highly Burdened Tracts Since 2013**

Table 2, below, shows how the number of households living in the most energy burdened parts of the city have changed between 2013 and 2019. Boston saw its total number of households decrease from 274,000 in 2013 to 220,000 in 2019.

**Table 2. Households in High and Severe Energy Burden**

	High Energy Burden (> 6%)	Severe Energy Burden (> 10%)
<b>2013</b>	65,000	23,000
<b>2019</b>	42,000	16,000



## Connective Issues: Equity Indicators Correlated with Boston’s Energy Burden

Energy burden is concerning not only because of the financial strains it produces on its own, but also because it ties into and may deepen other equity issues. Many communities are simultaneously facing multiple equity challenges at once. Across these years of data, Boston’s energy burdens are moderately correlated with poor health outcomes and predominantly African American neighborhoods (and negatively correlated with predominantly white neighborhoods).<sup>6</sup> Given these relationships, there may be opportunities to improve outcomes by increasing efforts that emphasize equity, health, and sustainability. Identifying these relationships may open doors for collaboration with other groups inside and outside of City Hall, ultimately advancing strong equity improvements across the city.<sup>7</sup>

### Summary

- Boston experiences energy burdens 19% higher than the national average.
- Since 2013, energy burden has decreased by 0.1% across the city but increased by 1.6% across the most burdened communities. The number of households with unaffordable energy costs has declined by 23,000, although 42,000 continue to face high energy burdens.
- Over this time period, a 4.6x disparity exists in Boston’s average energy burdens between the 20% least burdened and 20% most burdened communities, which highlights the need for additional resources to address energy burden in top burdened neighborhoods. This is the **third greatest disparity** among ACCC cities.
- Energy burden in Boston is connected to other equity issues like race, asthma rates, and access to healthcare. Cities, counties, and other organizations may be able to work together across departments and agencies to share resources and come up with solutions that multisolve to address several issues simultaneously.

---

<sup>6</sup> Energy burden is strongly correlated ( $R^2 > 0.6$ ) with poor health outcomes, including high asthma, poor mental health, high stroke incidence, lack of access to healthcare, sleep deprivation, pulmonary disease, and diabetes. It is also moderately more common in ( $R^2 > 0.4$ ) predominantly African American neighborhoods (and negatively correlated with predominantly white neighborhoods), and moderately renter heavy neighborhoods, and coronary heart disease.

<sup>7</sup> Boston’s efforts to improve racial and health equity may also improve energy equity and vice versa. Partnering with community and other stakeholders to “multisolve” on these issues may yield positive synergies when combined with strong processes. See <https://www.equitymap.org/process-guide> for assistance.



## Energy Burden Across Climate Challenge Cities

	Median Burden 2019	Highest Quintile 2019	Lowest Quintile 2019	Disparity <sup>8</sup>
Philadelphia	6.7%	13.1%	3.0%	4.4
St. Louis	6.7%	12.0%	4.0%	3.0
Indianapolis	5.9%	11.5%	3.4%	3.4
Cincinnati	4.9%	9.7%	2.8%	3.5
St. Petersburg	4.7%	7.4%	3.1%	2.4
Pittsburgh	4.6%	9.4%	2.7%	3.5
Atlanta	4.5%	9.7%	2.2%	4.4
San Antonio	4.5%	8.0%	2.6%	3.1
<b>Boston</b>	<b>4.3%</b>	<b>10.6%</b>	<b>2.3%</b>	<b>4.6</b>
Orlando	4.3%	6.7%	3.2%	2.1
Chicago	4.1%	9.5%	1.9%	5.0
Charlotte	3.9%	7.9%	2.1%	3.8
Saint Paul	3.7%	6.8%	2.3%	3.0
Columbus	3.6%	7.1%	2.1%	3.4
Albuquerque	3.5%	6.3%	2.0%	3.2
Los Angeles	3.5%	6.4%	2.0%	3.2
Honolulu	3.3%	6.0%	2.0%	3.0
Austin	3.2%	5.8%	1.9%	3.1
Minneapolis	3.1%	5.6%	1.9%	2.9
Washington DC	3.1%	7.6%	1.5%	5.1
Portland	2.7%	4.6%	1.9%	2.4
San Diego	2.7%	4.0%	1.8%	2.2
Seattle	2.6%	4.4%	1.8%	2.4
Denver	2.4%	3.8%	1.3%	2.9
San Jose	2.1%	3.7%	1.3%	2.8

<sup>8</sup> The factor difference between the least burdened quintile and the most burdened quintile.