

Energy (In)Efficiency and Heat Resiliency in Boston's Income-Restricted Housing

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Introduction

• Clean energy is an environmental justice issue—with an influx of new technologies, it is important to **prioritize affordability and accessibility** in order for low-income residents to be able to afford efficient energy in their homes, reduce GHG emissions, and mitigate their impact on climate change. At the same time, low-income residents are often situated in **heat-vulnerable neighborhoods**, making it important to find low-cost, energy efficient ways to stay cool in extreme temperatures.

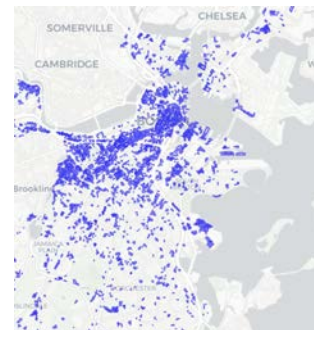
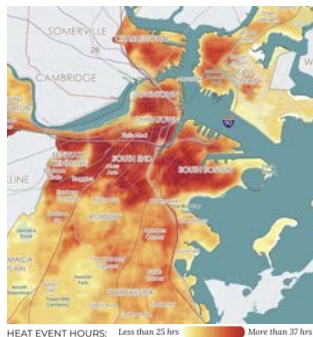


• Older income-restricted housing (left) is up to **16 times less efficient** than updated, non-income-restricted housing (right)

Methods

• Assessed energy usage in income-restricted and non-income restricted housing in the five Boston neighborhoods that have the highest urban heat island intensity index and social vulnerability factors—**Chinatown, Dorchester, East Boston, Roxbury, and South Boston**

• Compiled data for 50 public and private housing developments and compared each building's **Energy Star score** based on data reported through Boston's Building Emissions Reduction and Disclosure Ordinance (**BERDO**) from **2019 to 2021**

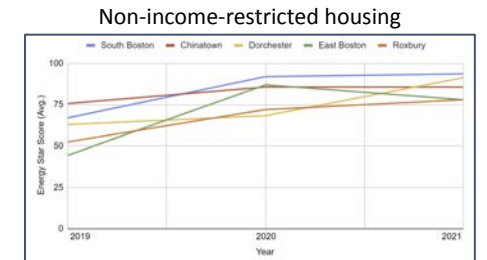
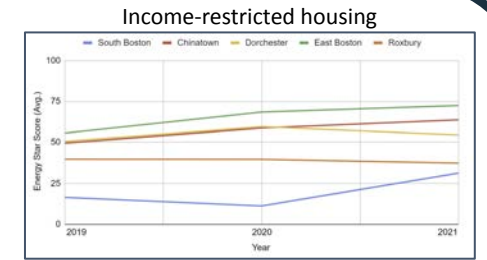


Results

• Income-restricted housing had an avg. Energy Star score **32.1 points lower** than non-income-restricted housing

• From 2019 to 2021, income-restricted housing had an avg. increase in its Energy Star score that was **17.4 points lower** than the avg. increase in non-income-restricted housing

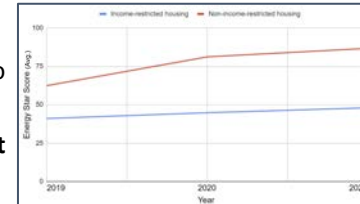
• Possible reasons for this discrepancy include **old, non-retrofitted buildings, disinvestment by the state, and lack of knowledge** about energy efficiency



Highlights

• Income-restricted housing is **less efficient** and is improving its efficiency at a **slower rate** than non-income-restricted housing

• Improvements to energy efficiency also help **build resilience against extreme heat events**



• Governments should **incentivize and prioritize** energy efficiency upgrades to its income-restricted housing portfolio

Discussion, Conclusion, and References

• Methods to improve energy efficiency: **weatherization** (insulation, caulking, moisture control), **retrofitting** (installing energy-efficient lighting and appliances, updating HVAC systems), and **decarbonizing** the local electric grid

• Benefits of improved energy efficiency: **lowering the cost of utilities, increasing a building's net operating income, reducing GHG emissions, and improving resident's health and comfort**

• Improving energy efficiency in affordable housing will, in turn, address both the causes and effects of the urban heat island effect. Reducing emissions can help to **mitigate increased temperatures** caused by global warming, while weatherization efforts can help **protect against extreme heat**

References: Municipal Building Energy Reporting (BERDO 2019, 2020, 2021), data.boston.gov/dataset/municipal-building-energy-reporting-berdo-2019
Income-Restricted Housing Inventory, 2022, data.boston.gov/dataset/income-restricted-housing
Heat Resilience Solutions for Boston Final Report, 2022, www.boston.gov/environment-and-energy/heat-resilience-solutions-boston