***Heat Islands and Equity***



Heat affects everyone. Due to the [heat island effect](https://www.epa.gov/heatislands), people who live in cities are more at risk than those in suburban or rural areas. What’s more, some areas within a city are often hotter than others. These neighborhood-level hotspots are called “intra-urban” heat islands. Intra-urban heat islands are caused by the uneven, inequitable spread of landcovers in the urban landscape, leading to more heat-absorbing buildings and pavements and fewer cool spaces with trees and greenery.

Residents of intra-urban heat islands are more likely to experience [heat-related illnesses and even death](https://www.epa.gov/heatislands/heat-island-impacts#health). Related negative effects include worse air quality and a higher cost burden of air conditioning bills.

This page explores the reasons behind these inequities, their trends and consequences, and solutions. On this page:

* [Why are heat islands inequitable?](https://www.epa.gov/heatislands/heat-islands-and-equity#inequitable)
* [What are the health consequences of heat islands and inequity?](https://www.epa.gov/heatislands/heat-islands-and-equity#health-consequences)
* [What are the financial inequities created by heat islands?](https://www.epa.gov/heatislands/heat-islands-and-equity#financial-inequities)
* [How can local governments effectively address heat inequity?](https://www.epa.gov/heatislands/heat-islands-and-equity#local-governments)
* [What are examples of city heat equity programs?](https://www.epa.gov/heatislands/heat-islands-and-equity#city-heat-equity-programs)



**Why are heat islands inequitable?**

Researchers have found that intra-urban heat islands are often linked to demographic factors such as income and race. [An EPA review of several studies](https://www.epa.gov/heatislands/heat-islands-and-equity#selected-bibliography) found that some communities in the United States, particularly those that are low-income and with higher populations of people of color, have neighborhoods with higher temperatures relative to adjacent neighborhoods in the same city. The studies identify historic redlining as a contributing factor. Specifically, people of color and community members with low incomes are more likely than other groups to live in historically redlined neighborhoods that are present-day intra-urban heat islands.

**Heat Islands and Redlining**

“Redlining” refers to a now-illegal practice from the 1930s when the federal government labeled non-White neighborhoods as undesirable for real estate investment. Public and private lenders often withheld loans and other services from people in those areas, depriving residents of opportunities to grow their wealth.

The current body of scientific evidence shows that community members with low incomes and communities of color are disproportionately exposed to heat islands. For example, one study analyzed almost 500 U.S. urban areas using 2017 data.[i](https://www.epa.gov/heatislands/heat-islands-and-equity#i) This study found that heat island effects were typically less severe in census tracts with higher median incomes and a higher proportions of White people. Neighborhoods with higher numbers of Black residents tended to have more intense heat island effects than other areas.

Research also shows that past redlining is correlated to present-day neighborhoods that are hotter and have a high percentage of individuals with low-incomes and people of color. For example, one study explored the link between historic redlining and present-day temperature, vegetative cover, and demographics in Baltimore, Maryland; Dallas, Texas; and Kansas City, Missouri.[ii](https://www.epa.gov/heatislands/heat-islands-and-equity#ii) The study found that in all three cities, past redlined areas have lower vegetative cover, higher temperatures, and greater proportions of residents with lower incomes than other areas of the cities. In addition, formerly redlined districts of all three cities had higher percentages of residents that were Hispanic, Black, or both.

**What are the health consequences of heat islands and inequity?**

The hotter conditions of heat islands and demographic inequities intersect with other risk factors. In particular, air quality worsens on hot, sunny days. A reaction between sunlight and air pollutants forms more [ground-level ozone](https://www.epa.gov/heatislands/heat-island-impacts#emissions), or smog. [Asthma is more common among some communities of color and low-income households than the general population](https://www.epa.gov/climate-change/climate-change-and-health-socially-vulnerable-people#respiratory), putting these populations at greater risk from hotter temperatures, air pollution, and the smog formed under these conditions.

**What are the financial inequities created by heat islands?**

Excessive heat is a financial burden for many people, especially low-income households. For instance, about 30% of all U.S. households report that they have difficulty paying energy bills or that they are unable to cool their homes due to cost concerns.[iii](https://www.epa.gov/heatislands/heat-islands-and-equity#iii) Low-income households also tend to live in less energy-efficient homes that are more expensive to cool.[iv](https://www.epa.gov/heatislands/heat-islands-and-equity#iv) The inability to afford household energy needs, or “energy insecurity,” makes it harder to stay cool, comfortable, and healthy during periods of extreme heat.

**Heat Dome in Portland, OR**

In the summer of 2021, areas of the Pacific Northwest reached record high temperatures over a series of several days. Portland, OR, reached a record-high temperature of 116°F, which is 42°F above normal.[v](https://www.epa.gov/heatislands/heat-islands-and-equity#v) That week, Portland area health clinics and hospitals reported heat-related visits more than three times above average.[vi](https://www.epa.gov/heatislands/heat-islands-and-equity#vi) The “heat dome,” as the event became known, killed dozens of people in Portland alone—and hundreds across the region. Before that year, heat-related deaths were virtually unheard of in the area.

According to the county’s official [report on the impacts of the heat dome](https://www.opb.org/pdf/multco-heat-report-final-06262022_1656296951051.pdf), 61% of the people who died lived in intra-urban heat islands. The majority of the people who lost their lives did not have working air conditioning.

**How can local governments effectively address heat inequity?**

Heat inequities can be resolved through programs and policies designed to target historically underserved and overburdened people to reduce their relative heat risk. Below are successful approaches that local governments have used to protect residents who are most at risk from extreme heat. Click on each approach to learn more.

**[Incorporate principles of environmental justice](https://www.epa.gov/environmentaljustice/learn-about-environmental-justice)**: Increasing public investment in underserved neighborhoods is an important way to resolve heat inequity. This includes targeted heat island reduction activities in neighborhoods where people of color and people with low incomes live—such as tree planting campaigns and financial incentives for green roofs.

**What are examples of city heat equity programs?**

In recent years, many cities have launched initiatives to reduce heat inequities and assist residents with the fewest resources. By incorporating equity into heat island policies and planning, these governments help create more livable cities for everyone.

Newark and Camden, NJ and Baltimore, MDBoston, MASan Antonio, TXLos Angeles, CACincinnati, OHCity and county agencies

**Newark and Camden, NJ and Baltimore, MD**: These three cities have prioritized community engagement and nonprofit partnerships to increase trees on private property and cool heat islands in an equitable way. For example, Newark’s Office of Sustainability uses the [i-Tree tool](https://www.itreetools.org/)to prioritize underserved neighborhoods for planting. Similarly, TreeBaltimore, a community-based organization, created a street tree inventory that informed the city’s planting map. Leaders of the three cities cite the importance of community outreach for reaching their goals.

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