CLIMATE CORNER

Addressing urban heat through design is an equity issue as much as it is a health issue.

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Designing for Urban Heat

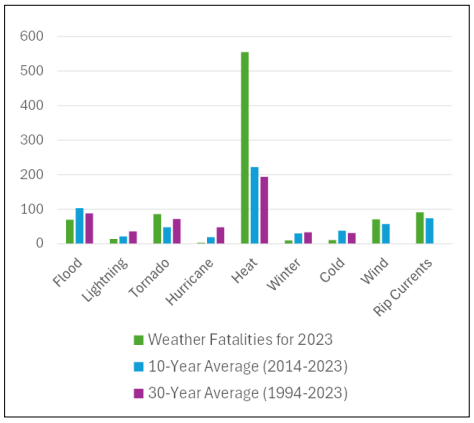
Heat waves are on the rise, posing a risk to nearly everyone

Incidences of heat waves are on the rise around the world, posing a risk to nearly everyone. This invisible extreme weather event does not have the dramatic imagery of hurricanes or floods, but the impact is far more deadly.

More weather-related fatalities are caused by extreme heat than to all other events combined.

In 2022, Europe experienced more than 70,000 excess deaths[1] over that hot summer and in 2023, the United States attributed more fatalities to heat than to all other extreme weather events combined.[2]

The impact of extreme heat is more pronounced in urban areas where the heat island effect of hard surfaces further increases the temperature and holds onto heat through the night, limiting the ability of our bodies to recover before the next hot day. Like other extreme weather impacts, vulnerable populations are most at risk, including older adults, those who live alone or in unstable housing, and people who live in the hotter (typically lower income) parts of a city. For this reason, addressing and mitigating urban heat through design is an equity issue as much as it is a health issue.[3]



Luckily, the design strategies that effectively address urban heat are simple and easy to deploy at both the site and building scales. It's essential that architects understand and leverage these strategies to project the health, safety, and welfare of the public, especially those who are most vulnerable.

[1] https://www.nature.com/articles/s41591-023-02419-z

[2] https://www.weather.gov/hazstat/

[3] https://multco.us/file/final_report%3A_health_impacts_from_excessive_heat_events_in_multnomah_county%2C_oregon%2C_2021/download

Holgate Library, Portland OR

BORA Architecture & Interiors

Heat reduction strategies include a tight, well insulated enclosure, 0.29 WWR, and minimal glazing on the East and West facades.

AIA

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Site & Community Strategies

- Plant trees! Trees will cool the air through evapotranspiration, shade windows to decrease cooling load, and shade hardscape to decrease heat island events. Choose native species that will provide a shade canopy. The more and larger trees, the better.
- Minimize onsite hardscape in favor of planted areas and provide shading where hardscape is necessary.
- Significantly minimize paved surface parking, which is especially problematic when dark and unshaded, as is the current norm. Use light surface colors and shade necessary parking, but first find ways to cut down on parking area.
- Avoid artificial turf which can get as hot as asphalt in sunny conditions and contribute to heat island effect.
- Incorporate new green spaces into the urban fabric, particularly in low-income or minority neighborhoods, and provide park amenities to encourage their use.[4]

4 https://link.springer.com/article/10.1007/s11524-024-00834-2

Building Strategies

- Select windows with solar heat gain coefficient (SHGC) and reflectivity matched to the local climate and keep window-to-wall ratios in check, particularly on west-facing facades.
- Provide and locate operable windows to maximize night-time natural ventilation potential during cool night hours.
- Choose a massing design that minimizes envelope area or provides self-shading.
- Provide exterior and/or interior shading for glazed openings.
- Choose exterior roof finishes and colors with a high solar reflective index (SRI).
- Provide continuous insulation and air barrier around the thermal envelope and properly air seal.

Additionally, in multifamily projects:

- Provide occupant education on how to operate housing units during an extreme heat event and on the resources that are available to occupants during a black out.
- Provide a community resilience hub with back up cooling, supplies, and refrigeration in case of a blackout during a heat wave.[5]

5 https://www.aia.org/aia-architect/article/home-where-resiliency

How to Track Progress

The AIA Framework For Design Excellence[6] already offers several measurable criteria to help designers assess the heat implications of their work. While it may seem counterintuitive, Measure Three, Design For Ecosystems holds the key to leveraging many beneficial site strategies. Keep in mind, humans are also part of the ecosystem, and many of the same interventions that benefit other species benefit us as well! Paying attention to the percentage of paved area, particularly asphalt; vegetated area is paramount.

Additionally, many of the strategies which effectively yield positive-impact results in Measure Six, Design For Energy, help combat urban heat. Architects should pay close attention to the quantity of windows and the type of glass used, along continuity of the thermal envelope and shading of the building itself. If well-orchestrated, a design tuned to reduce energy use will also reduce urban heat.

OPAL, Waring School, Beverly, Massachusetts

Those looking to go further should be careful to select the type of vegetation used, not just the quantity, to select for height and shading, and seek to go beyond simple thermal resistance glazing specifications and cater fenestration to the local climate and immediate site conditions.

6 https://www.aia.org/design-excellence/aia-framework-design-excellence

Designing for Urban Heat

Conclusion

None of the strategies that protect the public from extreme heat is novel, complicated, or expensive. Most are just a rehashing of what we already know to be the foundation of good design, but this should not detract from their importance. Over the previous half century, architects have often disregarded these best practices, resulting in hot cities and dangerous buildings.

As temperatures continue to rise over the life of the buildings that we're designing today, it's up to architects to respond and anticipate accordingly. Protecting the public from the risks that we know are coming is one of the primary responsibilities of design today.