



EXTREME HEAT QUICK GUIDE



**U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT**

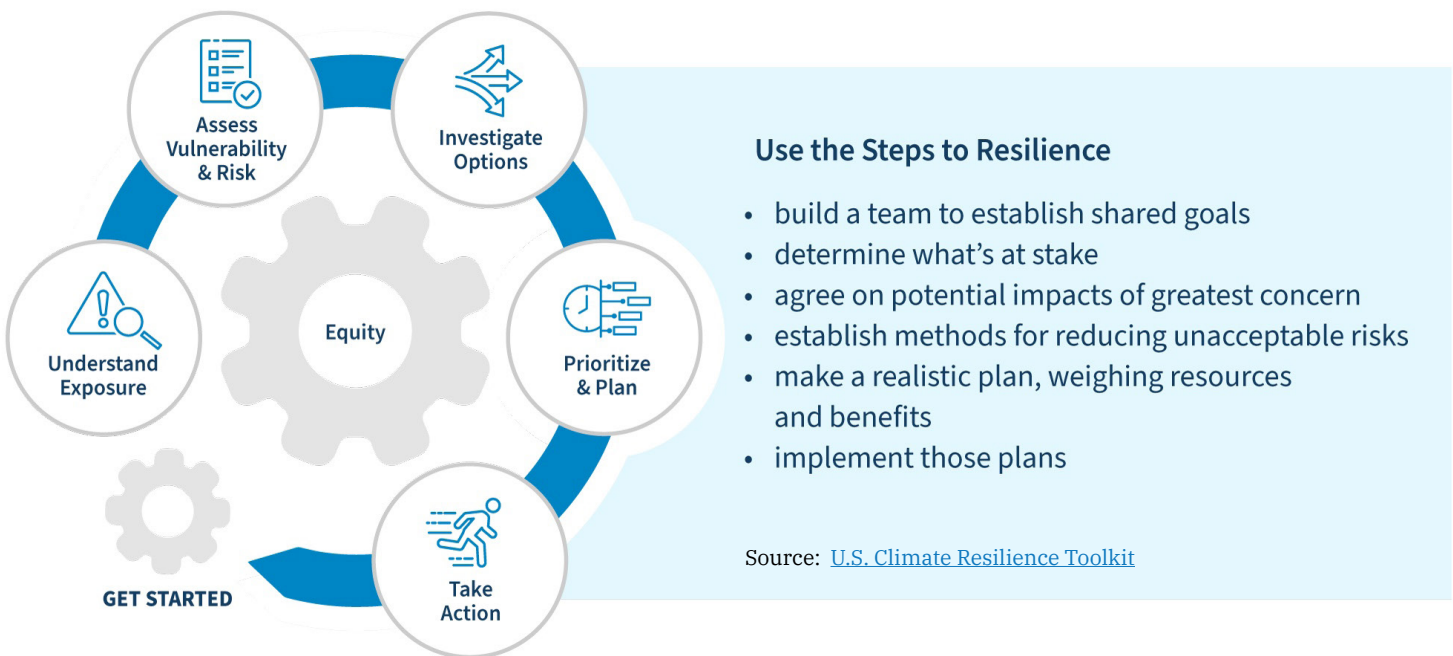
How HUD Grantees Can Use this Quick Guide

The U.S. Department of Housing and Urban Development (HUD) has developed this Quick Guide as a critical resource to support communities in increasing resilience to the climate hazard of extreme heat. This Quick Guide provides HUD grantees with the necessary steps to evaluate their community's vulnerability, plan for extreme heat events, and implement local mitigation strategies to enhance resilience. Additionally, it includes links to resources and funding avenues to empower HUD grantees for resilience against extreme heat. The guide is based on the climate risk management framework shown below, and the associated steps towards resilience, stressing continuous evaluation and centered on equity, to systematically mitigate risks and build community resilience. **The framework below and its associated steps should be tailored to address the specific challenges posed by extreme heat in your community.**

RESILIENCE

A community's ability to minimize damage and recover quickly from extreme events and changing conditions.

CLIMATE RISK MANAGEMENT FRAMEWORK



EXTREME HEAT

A period of high heat and humidity with temperatures above 90°F for at least two to three days.

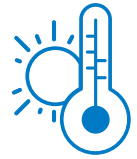
Extreme heat is the deadliest climate-related hazard. Beyond human health, its widespread adverse effects include impacts to community safety, the economy and social activities, critical community infrastructure and utilities. Frequent extreme heat events lead to substantial costs for taxpayers, businesses, property owners, and local governments.

How Does Extreme Heat Impact Communities?

EXTREME HEAT

Each year, extreme heat kills more people in the U.S. than hurricanes, floods, and tornados combined.

Rising greenhouse gas levels heat the global atmosphere, increasing frequency and likelihood of extreme heat.



Extreme heat affects everyone and impacts all communities. However, some populations are more exposed or vulnerable such as communities...

...with a history of limited resources and inadequate investment, often leading to widespread health conditions.



...in cities, where urban heat islands absorb and re-emit the sun's heat, making them warmer than outlying areas.

Direct and Indirect Impact on Communities



Infrastructure

- Degradation of concrete foundations
- Buckling railways, melted roads
- Data center malfunctions



Water

- Unsafe drinking water
- Reduced supply, increased demand
- Increase in drought and wildfire



Households

- Higher prices for energy, food, water
- Lost earnings & access to benefits
- Education, childcare disruptions



Power

- Less efficient power lines
- Power outages, loss of cooling abilities
- Increased demand and cost



Health Services

- Increased emergency call-outs
- Slower response times
- Increase cost of healthcare



Human Health

- Heat-related death & illness
- Deterioration of air quality
- Increased hospitalizations

Human productivity declines with the extreme rise in temperatures. The cost to the U.S. economy is \$100 billion annually and is expected to reach \$500 billion by 2050.

By 2040, extreme heat may cost **\$26 billion** in repairs to U.S. roads, and up to **\$60 billion** for rail networks by 2100.



Heat-related deaths are up **95%** since 2010, and could increase six-fold with healthcare costs expected to rise to **\$1 billion** annually by 2050.



Insurance payments to U.S. farmers due to extreme heat rose more than **400%** between 1995 and 2020 to **\$1.65 billion** annually.

URBAN HEAT ISLAND

Structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and water bodies. Urban areas, where these structures are highly concentrated and greenery is limited, become "islands" of higher temperatures relative to outlying areas.



Why a Quick Guide to Extreme Heat Now?

Part of what makes extreme heat so deadly and costly is its lack of a visible threat compared to other natural disasters like hurricanes, floods, and tornados. This lack of visibility leads to less public awareness and preparedness, and a lack of focus on mitigation and resilience to extreme heat by decision makers. There is a critical need for increased awareness and preparedness for extreme heat events.



HUD plays a critical role in fostering climate resilience within communities, particularly for low- and moderate-income residents who can be disproportionately impacted by extreme events and natural hazards like extreme heat. The growing severity and frequency of extreme heat events, as described in the following pages, represents a real and urgent threat to the public, and especially to vulnerable communities.



Changing regulations require increased attention to climate-related hazards. The 2016 HUD federal regulation, [24 CFR Part 91](#), requires state and local jurisdictions that submit Consolidated Plans to HUD to consider incorporating resilience to natural hazard risks into their housing and community development strategies. This guide aligns with the regulation and supports all HUD grantees in considering how to enhance resilience in their programs, supporting the goal of HUD, to equip communities with the ability to withstand and rebound from disasters and extreme weather effectively.



How to Identify Vulnerability and Risk

A critical step for building resilience to extreme heat is to assess your community's vulnerability to and risks from extreme temperatures. This section overviews how to identify at-risk groups and infrastructure significantly affected by extreme heat across multiple scales, from a municipal-scale or regional risk and vulnerability assessment to neighborhood- or community-led review. While low-income urban communities face disproportionate impacts from extreme heat, this section also details other vulnerability and risk factors, underscoring the urgent need for targeted strategies to build climate-resilient communities.

ASSESSING RISKS AND VULNERABILITIES



Review existing Hazard Mitigation Plans or [HUD CPD's Consolidated Plans](#) to identify gaps in extreme heat planning.



Access extreme heat tools and information on the [Heat.gov webpage](#), such as the [National Risk Index](#).



Identify current and future exposure, using tools such as the [Climate Mapping for Resilience and Adaptation](#).

VULNERABILITY AND RISK FACTORS

Demographics



Some groups are more vulnerable to the health impacts of extreme heat than others. These groups may be more vulnerable due to their health conditions – including children, older adults, pregnant women, people with disabilities, and people with chronic health conditions – or because of their increased exposure to extreme heat – including athletes, emergency responders, outdoor workers, and indoor workers without sufficient access to cooling, and people experiencing homelessness.

Infrastructure and Housing Conditions



High performing, updated and energy efficient HVAC systems play a critical role in maintaining cool environments affordably. The effectiveness of cooling methods, such as air conditioning and heat pumps, becomes vital as electric fans and open windows are inadequate to prevent heat-related illness and death above 95°F. Neighborhood density, lack of green spaces, and extensive impervious surfaces exacerbate heat retention, while energy insecurity and grid instability further increase vulnerability and risk.

Access to Resources



The availability of healthcare, emergency services, and accessible cooling centers for residents lacking home air conditioning all factor into risk and vulnerability to extreme heat. The risk escalates without accessible and affordable transportation to cooling resources, when hospitals and emergency services are unprepared for heat-related illnesses, and when staff at resource centers are untrained in identifying and responding to signs of heat-related illness.

Awareness and Preparedness



Existing levels of community awareness of climate-related hazards and any prior preparation factor into vulnerability, whereby low awareness and lack of preparation increase risks. The development of public awareness campaigns, climate resilience plans, and emergency response strategies are crucial, especially among vulnerable populations.

How to Implement Mitigation Strategies Locally

After identifying the greatest risks and vulnerabilities specific to a community, begin investigating mitigation options, prioritizing and planning action. This section presents mitigation strategies for emergency response and preparedness, outreach, education, and capacity building, such as implementing community scale mitigations, policies, and program opportunities. These strategies represent a small sample of promising practices and readers are encouraged to consult the resources section at the end of this Quick Guide for links to additional planning and mitigation opportunities.

BUILDINGS AND INFRASTRUCTURE

- Conduct energy audits and retrofit older buildings to reduce energy use and install cooling systems such as passive ventilation design, heat pump systems, and supplemental cooling.
- Ensure that all buildings have screened windows.
- Use “heat-smart” building practices including using materials more resilient to high temperatures, passive solar design, and conductive and internal heat gain mitigation for building and rehabilitating structures.
- Refer to the adapted [Healthy Homes Maintenance Checklist for Extreme Heat](#) to prepare homes for extremely high temperatures.

NATURE-BASED SOLUTIONS

- Map and invest in areas that would benefit most from green space and green infrastructure.
- Ensure landscapes feature heat-tolerant and low-water species to enhance resilience and minimize maintenance.
- Plan for maintenance costs to preserve the effectiveness of nature-based solutions and green spaces over time.
- Refer to the HUD Resilience Implementation Guide for step-by-step instructions to assist communities in implementing nature-based solutions

PAVEMENTS AND SHADE

- Implement lighter colored pavements and cool roofs; pair with adequate shade to prevent localized temperature increases for pedestrians and residents.
- Utilize permeable surfaces to help reduce heat reflection and urban heat island effects while also supporting stormwater management and vegetation.
- Integrate shade canopies of various sizes into urban design for outdoor comfort during activities like walking, playing, shopping, and commuting.
- Combine shade with splash pads for enhanced cooling, especially for children.
- Employ parking lot shade canopies to cover asphalt and cars.



REDUCING INDOOR AIR TEMPERATURE WITH COOL ROOFS

New York, NY

Cool roofs have been proven to lower indoor air temperatures 2–3°F and to equalize the temperatures between the first and second floors during weather extremes.

Since 2009, New York City has combated extreme heat by implementing strategies like green roofs and cool pavements. To date, over 11 million square feet of rooftops have been treated to create “cool roofs,” with 70% of new installations since 2017 located in high-risk areas. In 2022, these efforts were further supported by a \$320,500 [FEMA BRIC](#) grant.

HUD Eligible Activity: Cool roofs could be eligible components of a rehabilitation program for your community.

POLICY AND PROGRAM DEVELOPMENT

- Offer incentives for clean energy adoption and building retrofits to improve energy efficiency and reduce indoor heat, and for installing green or cool roofs.
- Provide assistance programs to help with the cost of energy bills, particularly during peak heat periods.
- Implement programs for distributing air conditioners to vulnerable populations to ensure access to cooling.
- Adopt building codes and public property regulations to mandate heat mitigation measures.
- Advocate for and implement higher labor standards to protect workers from the risks associated with extreme heat.



ENERGY AUDIT OVERVIEW

An energy audit is a comprehensive review of your home or building's energy use. It helps identify efficient ways to reduce energy consumption, particularly crucial in combating extreme heat.

Types of Audits

- **Walk-Through:** Offers quick identification of savings with minimal cost.
- **Standard:** Provides a thorough examination of energy bills and equipment for efficiency improvement.
- **Detailed:** Employs advanced techniques to precisely identify energy losses and opportunities.

Benefits and Incentives

- Enhances cooling efficiency, lowers costs, and improves indoor air quality.
- Offers potential rebates for implementing recommendations.
- Provides a roadmap for immediate and long-term energy savings and climate resilience.

More Information

- [HUD Exchange Energy Efficiency Resources](#)
- [HUD Office of Public Housing Programs Energy Branch](#)
- [EPA Guide to Energy Efficiency in Low-Income Communities](#)

EMERGENCY RESPONSE AND PREPAREDNESS

- Collaborate with Emergency Management Offices (EMOs) to implement community warning systems or public notification systems for extreme heat.
- Create an emergency response plan tailored specifically to extreme heat scenarios.
- Identify high-priority areas for emergency, short-term cooling centers in public buildings like schools, libraries, and community centers, and work with cooling spaces in public housing.
- Raise awareness among public and resource center staff about the signs and dangers of heat-related illnesses.
- Ensure coordination with service providers to offer adequate support and resources during periods of extreme heat.

OUTREACH, EDUCATION, AND CAPACITY BUILDING

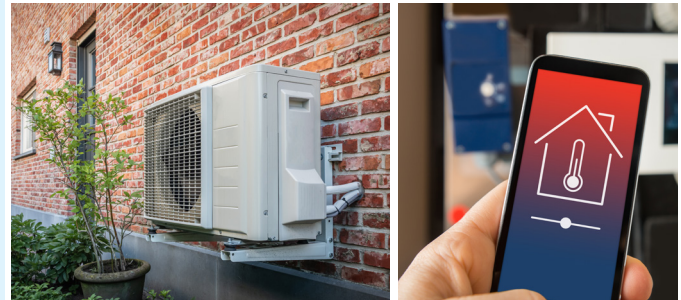
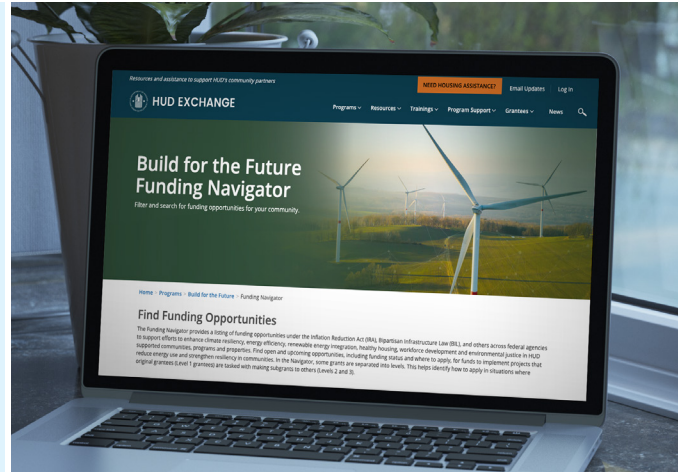
- Launch campaigns to raise awareness about the risks of extreme heat and how to stay safe.
 - » Increase awareness of extreme heat support programs among at-risk residents and businesses.
 - » Provide education on the dangers of extreme heat and protective measures, such as education on effectively using cooling systems.
- Establish a hotline to provide information and support during extreme heat events.
- Collaborate with key stakeholders and community actors such as the Health Department, Area Agency on Aging, Continuum of Care providers, or faith-based groups, etc., to ensure adequate support services are available, especially to vulnerable groups.

Where Can I Find Additional Resources Related to Extreme Heat?

This section identifies additional resources for combating extreme heat. These resources aim to support HUD grantees in enhancing climate resilience, with a focus on addressing the challenges posed by increasing temperatures and extreme heat events.

HUD Exchange Resources

- [Build for the Future](#): Provides critical access to funding opportunities, offering guidance materials, and fostering peer-to-peer knowledge sharing for local communities. It includes:
 - » [Funding Navigator](#): A crosscutting listing of funding opportunities under the Inflation Reduction Act of 2022 (IRA), Bipartisan Infrastructure Law of 2021 (BIL), and others across federal agencies to support efforts to enhance climate resiliency and other efforts in HUD-supported communities, programs, and properties.
- [HUDx Extreme Heat](#): A hub site for HUD grantees to locate existing and new technical assistance related to extreme heat including guidance, resources, and tools. It includes a link to the:
 - » [Community Resilience Toolkit](#): Designed to assist communities in enhancing their resilience to climate-related natural hazard risks, including information on HUD funding streams available that can support many of the resilience actions.



Heat.gov National Integrated Heat Health Information System Resources



[Tools and Information](#): An extensive collection of heat health tools from across partner agencies to help individuals and communities prepare for heat events and understand risks and vulnerabilities.

[Planning and Preparing](#): A resource library for planning and preparing at all levels.

Ready.gov Extreme Heat Resources



[Extreme Heat](#): A national public service campaign designed to educate and empower the American people to prepare for, respond to and mitigate extreme heat. Includes specific measures to help with individual preparedness for and safety during extreme heat events.

