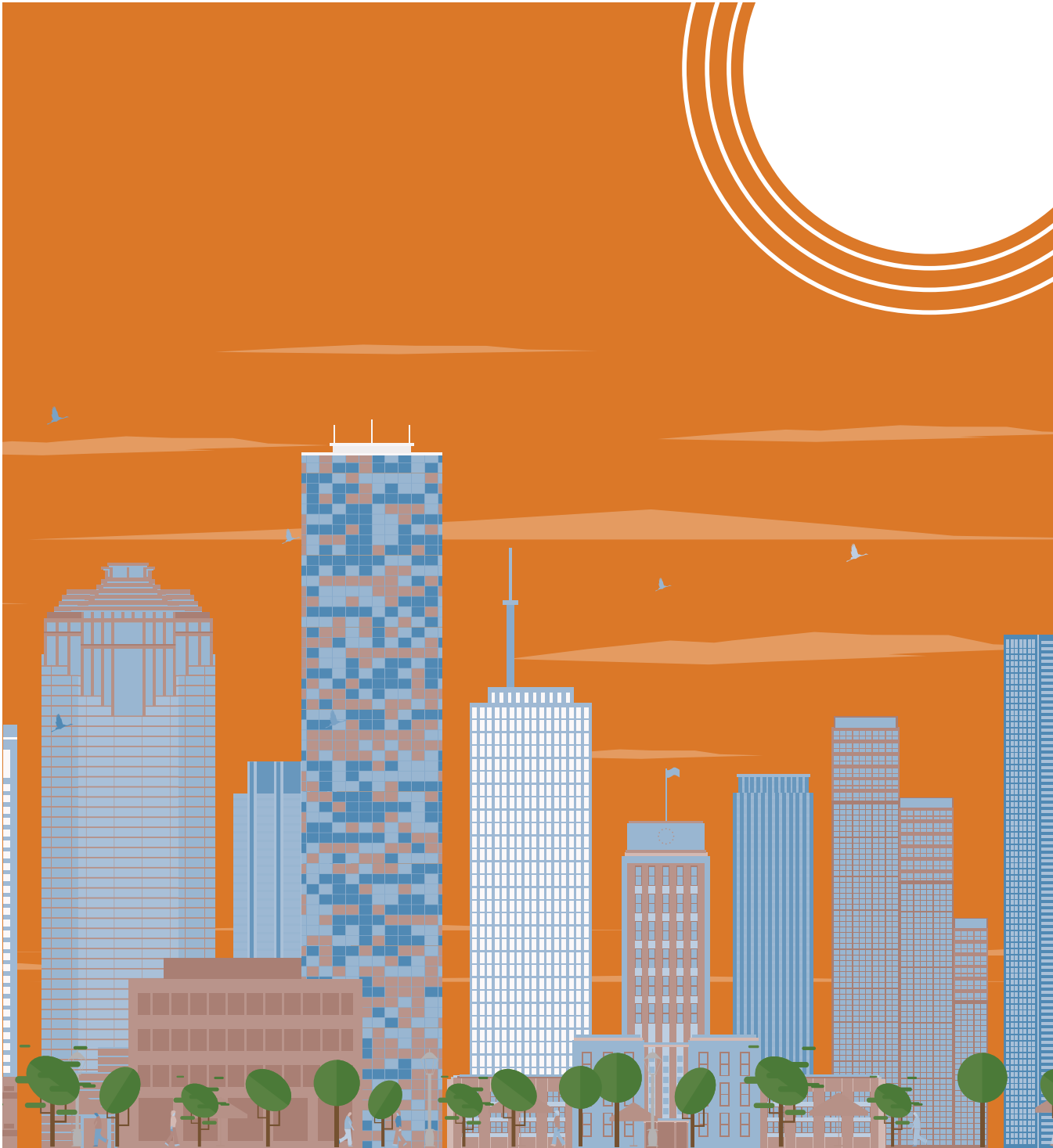


# 2023 Heat Stress Report: Creating a Heat Resilient Houston

Created by the Coalition for  
Environment, Equity, and Resilience

MAY 2023



# THE STATE OF HEAT STRESS IN 2023

Heat Stress Awareness Day falls on May 26<sup>th</sup>, marking the beginning of the hottest months of the year. Heat-related illnesses such as heat stroke, heat exhaustion, heat cramps, and heat rashes are most prevalent from late May until mid-September.

Heat-related deaths have recently declined in the United States thanks to better forecasting, heat-health warning systems, and wider access to home air conditioning. However, the State of Texas has recently seen an uptick in heat related deaths; in 2022, Texas experienced the highest number of heat-related deaths since 1999.

Because of climate change, dangerous extreme heat is becoming more frequent, with 2022 being the second-hottest summer on record for the state of Texas. In order to protect the lives of fellow Texans and Houstonians, actions must be taken on the state, city, and community levels.

## The Challenges of Heat in Houston

Extreme heat can creep up on unsuspecting Houstonians, causing heat stress. Heat stress is a condition that occurs when the body cannot rid itself of excess heat, leading to an increase in heart rate and core body temperature.

Heat stress can be dangerous; knowing its signs and symptoms can save lives.

**The Recent Impact of Heat Stress in the United States**

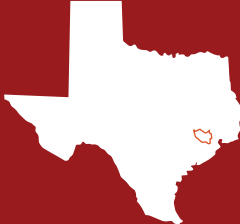


Each year, there are an average of

<b>702</b> heat-related deaths across the U.S.
<b>9,235</b> people hospitalized due to heat stress in the U.S.
<b>67,512</b> emergency department visits due to heat stress in the U.S.

*Source: CDC Heat & Health Tracker*

**The Impact of Heat Stress in Texas & Harris County**

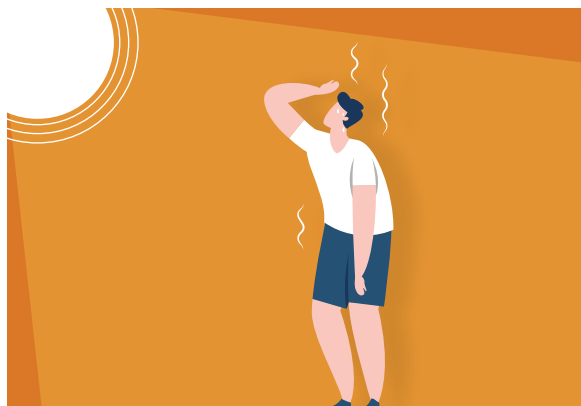


There were at least <b>154</b> heat-related deaths in Harris County from 1999-2022
In 2022, there were at least <b>279</b> heat-related deaths in the state of Texas
Over the past 23 years, Harris County had <b>the 3<sup>rd</sup> highest number</b> of heat-related deaths of all Texas counties

*Source: Texas Tribune, Yuriko Schumaker, and the Texas Department of State Health Services*

## How Does Heat Stress Affect Us?

Heat stress impacts us all differently depending on our age, our bodies, and our access to vital heat-safety resources such as water and air conditioning. As people get older, certain complications can become worsened by increased exposure to heat.



### The Signs & Symptoms of Heat Stress

- Confusion
- Slurred speech
- Headache
- Loss of consciousness
- Nausea
- Hot, dry skin
- Dizziness
- Profuse sweating
- Weakness
- Increased heart rate
- Irritability
- Elevated body temperature (over 100°F)
- Thirst
- Decreased urine output
- Seizures

The early symptoms of heat stress include confusion and nausea, making it extremely difficult for people to even realize that they're undergoing heat stress. **In order to create a heat resilient Houston, we have to look out for each other.** During the summer months, make it a point to check in on your community, and ask your community to check in on you.

You should also take breaks and drink plenty of water, even if you don't feel dehydrated.

### If you suspect that you or someone else has heat exhaustion, immediately take these steps:

1. Move the person out of the heat and into a shady or air-conditioned place. Houstonians can dial 311 to request a free ride from METRO (Transportation is only available to and from any cooling center).
2. Give them water to drink, ideally cold water.
3. Lay the person down and slightly elevate their legs and feet.

### Some of the dangerous effects of heat stress include:

- **Heat cramps:** when your body experiences painful, involuntary muscle spasms during heavy exercise in hot environments.
- **Heat rashes:** when sweat becomes trapped under the skin, causing small blisters or deep, inflamed lumps.
- **Heat exhaustion:** a condition where your body overheats, causing symptoms like heavy sweating and a rapid pulse.
- **Heat stroke:** a life-threatening condition that occurs when heat exhaustion goes unaddressed and the body reaches an internal temperature of 104°F.

## Who's at the Highest Risk of Heat Stress?

Heat stress affects us all differently, but people at the highest risk of heat stress include:



- People under the age of 10
- People over the age of 65
- People who are pregnant
- People in menopause
- People with perspiration issues
- People who take antipsychotic medications
- People who just had surgery or other operations
- People who are houseless
- Athletes
- Diabetics
- Outdoor workers
- Anyone with prior heat stress complications

Furthermore, [current research](#) indicates that disadvantaged groups—particularly low income communities and communities of color—suffer more from heat exposure than whiter, wealthier communities.

## Heat Stress Research in Houston: The Current State of Affairs

If you've ever spent any amount of time in Houston during the summer, you know how hot and humid the Bayou City can get.

**“In the summer, it gets so hot, I feel like I’m going to pass out. My mind isn’t right, and I feel like I’d put myself in harm’s way just to cool off. It takes a toll on you. You can’t even talk right.”**

*-Sandra Edwards, Climate Ambassador & Fifth Ward Resident*

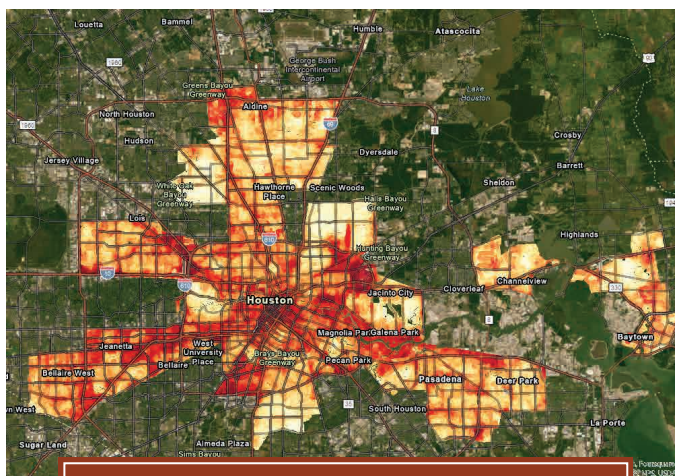
Climate change and the urban heat island effect only intensify how unbearable the air temperature feels. Because of Houston’s urban heat islands, humidity, and heat index, Houstonians have a high risk of getting heat stroke in temperatures above 90°F.

**Heat index:** the level of discomfort the average person experiences as a result of the combined effects of the temperature and the humidity in the air.

**Urban heat island:** an area where natural land cover has been replaced with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat, leading to a higher heat index and intensified effects of heat stress.

## Urban Heat Islands in Houston

In 2020, the [Houston Harris Heat Action Team](#) (H3AT) conducted a heat mapping campaign in partnership with a national initiative known as [Heat Watch](#), led by CAPA Strategies. Their heat map of Houston shows where urban heat islands exist within the City of Houston.



**The dark red areas on the map correspond to the areas of Houston with the highest concentration of traffic, buildings, parking lots, railyards, and other industrial activities. These areas include Pasadena, Downtown, Gulfton, Gulfgate, and Fifth Ward.**

Green spaces—such as parks with trees and native plants—are known to lower the heat and air temperature. The majority of green spaces in Houston are concentrated on the west side, where there are large outdoor parks such as Memorial Park and Terry-Hershey Park. Conversely, low and medium-income neighborhoods around Houston, especially downtown and on the east side, only have smaller pocket parks and greenspaces that do not provide nearly as much shade or cooling.

### The cooling power of trees and plants

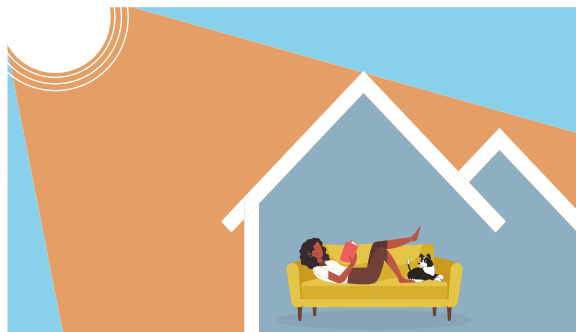
Research has shown that trees and vegetation can lower surface and air temperatures by 20°F to 45°F through shade, and by moving water from the earth's surface into the atmosphere.

## What Houston Can Do to Beat the Heat

Citywide efforts are needed to prepare for the impacts of climate change and protect Houstonians against heat stress. Creating a heat resilient Houston requires a multifaceted approach. CEER suggests focusing on improvements in three areas that will make the greatest impact for people most vulnerable to heat stress:

1. Home retrofitting and weatherization
2. Implementing safety practices to improve worker safety
3. Providing solutions for transit riders to protect them from heat

## REDUCING HEAT STRESS IN HOUSTON HOMES



### Home Retrofitting & Weatherization

Thousands of Houston homes and apartments are not equipped to handle the Houston heat, especially in areas of the city where the most vulnerable Houstonians live. For example, many older residences have gaps in their roofs and siding, lack insulation, and do not have sufficient cooling systems installed. To protect all Houstonians from heat stress, it's critical that programs weatherize and retrofit any and all Houston homes that cannot keep the internal temperature below 80°F.

#### The differences between retrofitting & weatherization

**Retrofitting:** installing energy efficient air conditioning systems inside of buildings that have low-efficiency systems or entirely lack air conditioning. Retrofitting can also include other energy efficiency improvements, such as LED light bulbs and upgraded appliances.

**Weatherization:** Sealing, patching, and repairing a home so that it can sufficiently keep out the elements; weatherization may include roof repair, siding repair, and installing attic insulation.

In addition to keeping residents safe, weatherization projects also help people save money. For every dollar spent on home weatherization, there is an average of \$1.72 in energy savings, and \$2.78 in non-energy benefits such as better indoor air quality and less damaged property. For many people, that money saved could be going to necessary living expenses, such as food, bus fares, and doctor visits.

Unfortunately, many Houston residents in vulnerable communities are caught in a cycle where they cannot afford to retrofit or weatherize their homes due to their already high energy costs. To make matters worse, low-income communities are at a higher risk of brownouts, an electrical outage that occurs when there is an excessive energy demand throughout the power grid. A brownout or a single missed electric bill could leave residents stranded in hot homes when Houston's heat is at its worst.

### What the City of Houston Can Do to Reduce Heat Stress in Houston Homes

The United States Department of Energy's [Weatherization Assistance Program](#) (WAP) helps low-income homeowners and renters increase the energy efficiency of their homes at a reduced cost. The City of Houston has partnered with [Baker Ripley](#) to provide weatherization assistance to low-to-medium-income Houstonians.

While these efforts have helped some local homeowners, there are still thousands of residents who could greatly benefit from weatherization and home retrofit programs. Renters are often functionally excluded from the program; although landlords can apply for weatherization assistance for the properties they lease, many do not.

For people who meet the income requirements, the home weatherization application process can be tedious and time-consuming. When people apply and get accepted into the weatherization program, their house will receive an energy audit, which might reveal that the home requires too much additional work before it can be weatherized. The homeowner must fix maintenance issues standing in the way before they can receive weatherization assistance.

**The City of Houston has an opportunity to help vulnerable Houston residents overcome these challenges by establishing a fund that:**

1. Assists vulnerable residents in the weatherization application process
2. Provides financial assistance for residents that need additional repair work so that they can move forward with weatherization assistance
3. Incentivizes landlords to weatherize their properties

## How Local Organizations are Making Home Weatherization More Accessible

Currently, the Coalition for Environment, Equity, and Resilience and our partners are working on a pilot program to make the process of applying for and receiving home maintenance and weatherization more accessible for low-income Houstonians. We believe that these programs are a great way to both reduce heat stress and create more jobs in our communities.

If you are interested in helping us research, fund, and implement weatherization projects for low-income Houstonians, we'd love to hear from you!

Email us at  
[hello@ceerhouston.org](mailto:hello@ceerhouston.org)

Donate to CEER  
<https://tinyurl.com/DonateToCEER>

## Immediate Actions that Houston Residents can Take to Cool Their Homes

If your home cannot keep out the heat, the best place to start is an energy audit that identifies all of the ways in which you can improve your home's energy efficiency.

Energy.gov's Energy Saver page has several links that can help you find an energy audit.

If your home needs to be weatherized or retrofitted, we encourage you to visit the following links:

- [Baker Ripley's Weatherization Assistance Program for Low-Income Houstonians](#)
- [CenterPoint Energy's Residential Standard Offer Program](#)

In an effort to stay Houston Strong against the heat, we also encourage community members to help out their friends, family, and neighbors who are at risk of heat stress in their homes—especially elderly and disabled community members.

#### Three low-cost ways you can reduce heat in your home:

1. Install weather strips
2. Install blinds and shutters
3. Patch and cover holes

## REDUCING HEAT STRESS FOR HOUSTON WORKERS



### Following Heat-Safety Guidelines Can Save Worker Lives

Workers are among the most impacted by heat stress in the summertime, especially those that work outdoors such as delivery drivers, landscapers, and construction workers. Even indoor workers are at-risk of heat stress if they work in buildings, warehouses, and facilities that lack proper cooling systems.

## What Businesses Should Do for Worker Heat-Safety

Every employer should be aware of and follow OSHA's Heat-Safety Guidelines.

#### As the heat index moves above 90°F, employers should encourage workers to:

1. Consume adequate fluids by providing access to water and sport drinks
2. Work shorter shifts
3. Take frequent breaks
4. Quickly identify any heat illness symptoms

As previously mentioned, confusion is a common symptom of heat stress. Employers should train managers to keep a keen eye on heat-stress symptoms and implement a buddy system so that workers are looking out for each other.

Employers must remain vigilant against heat stress to protect the lives of their workers. Employers should also recognize that heat stress and heat-related illnesses can have a major cost to businesses. While it may be tempting to forgo OSHA's guidance, productivity, performance, and morale will suffer if employees become overheated and require hospitalization.

## What the State of Texas & the City of Houston Can Do for Worker Heat-Safety



The most significant roadblock to occupational heat safety is that standards and regulations are optional on the state level. Texas can and should follow the example of states like California, Minnesota, and Washington that have passed specific laws governing occupational heat exposure. In these states, employers must provide a place of employment that is “free from recognized hazards that are likely to cause death or serious physical harm to employees.”

Because the City of Houston is one of the largest cities in the south, it has a unique opportunity to create a progressive heat-safety program for city workers. As part of this heat-safety program, The City of Houston could contract a health agency to survey workers in the spring (before the onset of high temperatures) in order to determine which employees are at the highest risk of heat stress. From there, the city can work to provide accommodations and ensure widespread adherence to OSHA’s heat-safety guidelines.

Depending on the outcomes and results of the city-led heat-safety program, it could serve as a model for businesses and other cities to follow, potentially lowering the amount of heat-related emergencies, not only in Houston but also nationwide.

## What Houstonians can Do to Combat Worker Heat Stress

If you’re an employer in Houston, look out for your employees by following OSHA’s heat-safety guidelines.

If you’re an employee that works outdoors or in a high temperature environment, make sure to drink plenty of water, wear loose-fitting clothing, take plenty of breaks, and look out for your team members. You can also advocate for

better heat-safety policies and initiatives at work by sharing this report with your managers and co-workers, and organizing to make your workplace safer.

Remember that delivery drivers and mail people are at a very high risk of heat stress and heat exhaustion. Check in with the people delivering your mail and packages, offer them water, and if they seem to be overheated, provide them with shade or AC so that they can cool off.

### Three things to do as soon as you notice a worker has heat stress or heat exhaustion:

1. If the worker is not alert or seems confused, immediately call 911
2. Have them drink cold ice water to cool their internal body temperature
3. Move them to a shaded or cooled area to lower their external body temperature. You can also fan them, mist them, or apply ice bags or wet towels to their forehead and/or chest.

## REDUCING HEAT STRESS FOR METRO RIDERS



## Nature & Technology Can Create a Safer Transit Experience

Over one million transit riders rely on Houston's METRO system. Most of these riders wait at METRO stops without shade or a bench for as long as an hour, and some make multiple transfers in a single trip, which can mean spending hours in the dangerous Houston heat.

## What the City of Houston Can Do to Reduce Heat Stress for METRO Riders

While Houston has some heat-safety infrastructure—like community cooling centers, often found in libraries, schools, and other community-based multi-service spaces—METRO stops are in severe need of upgrading to adapt to climate change.

**METRO and the City of Houston can provide better heat protection for METRO riders by doing the following:**

- Ensuring more reliable bus service (15-minute frequency)
- Creating more single-trip routes to reduce the amount of transfers that METRO riders must take to reach their destinations
- Installing solar-powered fans at METRO stops
- Installing misting devices at METRO stops
- Ensuring that air cooling systems are operating properly on all buses
- Planting trees that provide natural shade at all METRO stops
- Planting native plants at METRO stops to counteract the urban heat island effect

Since greenery is often removed to create METRO stops, adding to the urban heat island effect, transit organizations and cities have a responsibility to maintain and replace that greenery.

## What Local Organizations are Doing to Reduce Heat Stress for METRO Riders

[LINKHouston](#) is a local organization at the intersection of equity and transit. LINKHouston's mission is to help Houston transit riders feel like first-class residents without having to own a vehicle. They leverage their diligent research to create [equity and transit reports](#) that provide recommendations for elected officials and agencies such as METRO. Many of the METRO actions included in this report are informed by LINKHouston's research.

## What METRO Riders can do to Protect themselves from Heat Stress

### **METRO Riders can do these three things to protect themselves from heat stress:**

1. Stay hydrated by having a water bottle with ice cold water as you wait for the METRO bus
2. Wear sunscreen to protect your skin
3. Wear a visor or hat to shade your face
4. Wear loose-fitting, light-colored clothing for better breathability and heat reflection
5. Bring a battery-powered fan or a paper fan that you can use to cool yourself off

If you see someone struggling with heat stress, try to help by moving them to a cooling center or shaded area. If they are confused or non-responsive, call 911 or Metro PD at 713-224-2677. Houstonians can dial 311 to request a free ride from METRO. Transportation is only available to and from any cooling center.

During the middle of summer, METRO buses are used as cooling centers, especially outside of large, outdoor events. If you see a stationary METRO bus or cooling center, you or someone suffering from heat stress should be able to use it to cool off.

Finally, we encourage Houston drivers to carpool or take public transportation. Gas-powered vehicles account for a significant amount of the carbon dioxide emissions that contribute to climate change, especially in driving cities like Houston.

## Play Your Part in Creating a Heat Resilient Houston

As Houston enters this year's hottest months, our elected officials—and those vying for public office—should take the necessary actions to protect Houstonians from heat, reduce the harmful impacts of climate change, and support resilience for everyone, especially communities that are often left behind.

Houston's next mayor should ensure that the City implements both the [Resilient Houston plan](#) and [Houston's Climate Action Plan](#). Furthermore, the City of Houston should consider the implementation of a policy for its workforce to protect employees from heat. Lastly, the City and METRO should invest in programs that mitigate heat within vulnerable communities and apply for federal funds through the [Infrastructure Investment and Jobs Act](#) and the [Inflation Reduction Act](#) to support efforts outlined in this report.

## Houstonians,

**Call upon your elected officials to take action and protect people from heat and climate change. Look out for your neighbors and friends, and take good care of yourself and your loved ones this summer.**

To learn more about the Coalition for Environment, Equity, and Resilience, visit [ceerhouston.org](https://ceerhouston.org).

Find out who represent you at City Council.  
<https://www.houstontx.gov/council/whoismycm.html>