EXTREME HEAT

ACTION PLAN

MIAMI-DADE COUNTY

OFFICE OF **RESILIENCE**

TABLE OF CONTENTS

LETTER FROM MAYOR

DANIELLA LEVINE CAVA

When I became your mayor, I made a commitment to face and address the increasing shocks and stresses associated with climate change and growing inequities in our county. These challenges are formidable, but they also push us to innovate and build better, more inclusive ways to live, work, move, and play in Greater Miami. Miami-Dade County is known internationally for its risk of sea level rise and hurricanes and has established itself as a leader in addressing these threats through policies and investments in critical infrastructure. However, it wasn't until recently that we prioritized the increasing health and economic risks and concerns related to rising temperatures.

We began this journey by joining the international Extreme Heat Resilience Alliance of the Adrienne Arsht Rockefeller Foundation Resilience Center (Arsht-Rock) together with the cities of Miami and Miami Beach. Then a local community coalition presented us with their findings from a series of focus groups and surveys that demonstrated – in lower-income and historically marginalized communities – extreme heat was the top climate change-related concern. Clearly, we needed to invest more in addressing this issue, and that required leadership. That's why I appointed the world's first Chief Heat Officer, to improve coordination and accelerate action to reduce the rising health risks and economic burdens of extreme heat in our community.

Shortly thereafter, I invited two dozen mayors from key U.S. municipalities to join me in the launch of Arsht-Rocks' City Champions for Heat Action, so that together we could start saving lives and livelihoods from extreme heat. In November 2021, I spoke about extreme heat at COP26, the U.N. Climate Change Conference in Glasgow. There are now eight local and regional governments with a Chief Heat Officer.

While developing this action plan, we have also been urgently moving forward locally, launching the first-ever Heat Season campaign to reach residents through multiple channels and languages, providing enhanced heat health training for disaster volunteers and healthcare practitioners, and expanding our funding for tree planting, weatherization, and multifamily housing retrofits.

This Extreme Heat Action Plan is a Resilient305 community-wide plan, developed by the Climate and Heat Health Task Force hosted by The Miami Foundation and includes input and recommendations from hundreds of residents and stakeholders. The goals and actions in this plan are designed to address my four priorities – Environment, Economy, Equity, and Engagement – and directly support the goals set forth in the community-driven Thrive305 Plan. They are also aligned with and complement the work already underway with our Climate Action Plan and Sea Level Rise Strategy.

With this Extreme Heat Action Plan, Miami-Dade County is stepping up our commitment and raising the bar for other communities to do the same. Fortunately, Miami-Dade's strength lies in our ability to thrive in the face of challenges by tapping into our greatest resource, our diverse and resilient residents. I am grateful to the many organizations, local government employees, and residents who collaborated to create this plan.

I thank everyone who reads this Extreme Heat Action Plan, and takes action to protect themselves, their loved ones, and their neighbors. Whether you are already engaged in this critical work, or new to the conversation, we depend on your continuing interest and dedication to meet the challenges ahead.

Miami-Dade County
Mayor
DANIELLA LEVINE CAVA

LAND ACKNOWLEDGEMENT

Miami-Dade County acknowledges that our community is located on land that is the ancestral and traditional territory of the Tequesta, the Miccosukee Tribe of Florida, and the Seminole Tribe of Florida. We pay respect to their Elders past and present and extend that respect to their descendants and to all Indigenous people. We recognize the ongoing relationships of care that these Indigenous Nations maintain with this land and extend our gratitude.

SUMMARY

Miami-Dade County has always enjoyed a warm subtropical climate, but our summers are getting hotter and longer due to climate change and urban development. On average, the Miami area has 51 more days per year with temperatures over 90 degrees Fahrenheit than it did 50 years ago[1] and we're expected to have the highest increase of dangerously high heat days with a heat index over 100 degrees Fahrenheit of any county in the United States by mid-century[2]. The economic and health risks associated with extreme heat are also increasing and disproportionately impacting our most vulnerable populations, including outdoor workers who are up to 35 times more likely to die of extreme heat than the general population.

The good news is that heat-related illnesses (HRI) and deaths are highly preventable and solutions to mitigate and manage heat can also be designed to achieve other economic and environmental benefits. This is a community-wide plan, developed by the Climate and Heat Health Task Force hosted by The Miami Foundation and with input from hundreds of residents, stakeholders, and experts. It serves as an addendum to the Resilient305 Strategy which set forth collective goals and actions that would move us toward a more equitable, inclusive, resilient, and sustainable future. This is a short-term plan for work that will be evolving and ongoing. Therefore, this plan will be updated in 3 years or around the end of 2025. This Extreme Heat Action Plan is also designed to advance Miami-Dade County's community-driven Thrive 305 Action Plan and complement the County's Sea Level Rise Strategy and Climate Action Strategy.

The mission of the Extreme Heat Action Plan is to reduce the health and economic impacts of increasing extreme heat and create a baseline for further research and new partnerships around this issue. The plan is organized around three main goals and 19 actions:

GOAL 1: Inform, prepare and protect people - Foster healthy and resilient communities by bolstering outreach and education efforts, improving extreme heat warning systems and emergency protocols, protecting outdoor workers, and building the capacity of healthcare practitioners to identify and respond to heat vulnerability and illness in their patients.

1. **BUILD ON THE SUCCESS OF THE HEAT SEASON CAMPAIGN.**
2. **ENHANCE MESSAGING AND PROTOCOLS.**
3. **ENGAGE AND SUPPORT EMPLOYERS OF OUTDOOR WORKERS.**
4. **SEEK WORKER PROTECTIONS AT ALL LEVELS OF GOVERNMENT.**
5. **ENGAGE AND PREPARE HEALTHCARE PRACTITIONERS.**
6. **LEVERAGE URBAN HEAT RESEARCH GROUP FOR CONTINUED LEARNING.**

[1] *"How much hotter is your hometown than when you were born?",* New York Times, 2018

[2] *6th National Risk Assessment: Hazardous Heat,* First Street Foundation, 2022

GOAL 2: Cool our homes and emergency facilities - Improve access to efficient and reliable cooling in homes and to a place to cool off in the event of a power outage.

7. SEEK INCREASED SUPPORT FOR EFFICIENCY AND COOLING UPGRADES.

8. ADVOCATE FOR HEAT SAFE AND AFFORDABLE HOUSING POLICIES.

9. IMPROVE COORDINATION AND EXPAND OUTREACH ON ENERGY EFFICIENCY.

10. INVEST IN ENERGY RESILIENCE AT EVACUATION SHELTERS.

11. ENSURE COMPLIANCE WITH ASSISTED LIVING/NURSING HOME GENERATOR RULE.

12. INCORPORATE EXTREME HEAT IN COUNTYWIDE RESILIENCE HUB PLAN.

GOAL 3: Cool our neighborhoods - Reduce the excessive heat burden in urban areas by expanding the tree canopy and vegetation, improving access to water features and shade structures, and cooling our surfaces.

13. CREATE A BOLD TREE PLAN.

14. COOL OUR COMMUTES.

15. COOL OUR SCHOOLS.

16. EXPAND ACCESS TO WATER AND SHADE.

17. PLANT AND PROTECT TREES ON COUNTY LAND.

18. PILOT AND SCALE COOL PAVEMENTS.

19. RAMP UP ENGAGEMENT AND CITIZEN SCIENCE.

GUIDING **PRINCIPLES**

Using the Miami-Dade County Sea Level Rise Strategy and Climate Action Strategy as models, we identified key principles to help guide County decisions, investments, and programs to increase extreme heat resilience in its community.

Guiding principles:

- **Be equitable** by recognizing that historic discriminatory policies have led some residents to have fewer resources to adapt to climate change. Actions should be driven by inclusive engagement, fair policies, and direct investments to target these disparities.
- **Make us safer** by helping the community adapt to extreme heat now while implementing long-term solutions to help mitigate future impacts. Actions should not increase vulnerability to other hazards.
- **Reduce environmental pollution** by decreasing greenhouse gas emissions or other pollutants to our air and waterways. Actions should not be implemented at the expense of the environment and human health.
- **Be flexible** and able to respond to changing conditions. Actions should be adaptable to future conditions.
- **Build with nature** by working with natural processes and natural materials to address extreme heat. Actions should implement green nature-based solutions when feasible.
- **Align with other community and County initiatives and plans** such as Resilient305[3], Thrive305[4] and County Strategic Plan[5], Sea Level Rise Strategy[6], Climate Action Strategy[7], Comprehensive Development Master Plan[8], Comprehensive Emergency Management Plan[9], Long-Range Transportation Plan[10], Parks and Open Space Master Plan[11] and others. Actions will complement other long-term planning initiatives.

The actions in this plan were designed to address the health and economic burdens of extreme heat while also advancing co-benefits, such as promoting local jobs or reducing greenhouse gas emissions, in line with the County's strategies, plans, and priorities, noted above. Whenever possible, the connections to these strategies and the intended co-benefits of each action are indicated. The plan prioritizes the people who are most at risk and addresses inequities in areas of the County that have been underserved in the past and are burdened today. This is a community-driven plan, and its success depends on our collective engagement and action.

[3] *Resilient305 Strategy,* 2020
[4] *Thrive305 Action Plan,* 2021
[5] *Miami-Dade County Strategic Plan,* 2020
[6] *Miami-Dade County Sea Level Rise Strategy,* 2021
[7] *Miami-Dade Climate Action Strategy,* 2021
[8] *Comprehensive Development Master Plan*
[9] *Miami-Dade County, Florida Comprehensive Emergency Management Plan,* 2022
[10] *Miami-Dade County Long-Range Transportation Plan*
[11] *Miami-Dade County Parks and Open Space System Master Plan,* 2007

EXTREME HEAT IN
SOUTH FLORIDA

South Florida has always experienced a sub-tropical climate with many days of hot and humid weather. However, we are experiencing an overall rise in temperatures and more dangerously high heat days. This region has had a rise in the average minimum temperature of about 3 degrees Fahrenheit since the 1960s and an increase from 85 days over 90 degrees in 1960 to an average of 133 days today. While South Florida does not experience extreme heat waves, we have many more dangerously high heat days now and often for many days at a time. In 2020, Miami experienced 31 consecutive days where the Heat Index reached at least 100°F. The recent 6th National Climate Risk Assessment report on heat estimates that Miami-Dade County should expect about 50 days with a heat index at or above 100 degrees in 2023 and that will rise to 91 days with a heat index of 100 degrees or more by 2053.

This increase in dangerous heat has detrimental effects on human health and safety as we see rising hospitalizations and heat-related deaths, circa 34 every year in Miami-Dade County[12]. This affects disproportionately outdoor workers. Additionally, extreme heat is also increasing economic burdens as outdoor workers and their employers lose productive work time and the costs to cool homes are rising. The recently published Hot Cities Chilled Economics Report on Miami estimates that extreme heat is causing more than $10 billion in annual losses due to reduced labor productivity alone. By 2050, without action to reduce emissions or adapt to increased heat, annual losses could double to more than $[13].

Miami-Dade County is getting hotter not only due to global climate change, but also because of local development resulting in a loss of vegetation and tree canopy, increases in impervious and darker surfaces, and excess heat from buildings and vehicles. While it has gotten steadily hotter throughout developed areas of the County, some areas have been more impacted than others. The Miami-Dade County Heat Vulnerability Assessment[14] found that lower-income neighborhoods with higher land surface temperatures were the most affected. This includes areas such as Florida City, Homestead, Hialeah, Brownsville, and the areas surrounding Miami International Airport such as Fontainebleau and Allapattah. The Urban Heat Island effect, which implies urban or metropolitan areas that are significantly warmer than their surrounding rural areas, due to human activities, also contributes to a reduced cooling overnight and in the mornings as the heat absorbed during the day radiates at night. For those without or with inadequate cooling in the home this results in chronic heat exposure.

Research by Dr. Chris Uejio, a Florida State University professor contracted by the County, and his team found that numerous studies confirmed the relationship between poverty and heat-associated mortality[15-16]. People with fewer financial resources are less likely to have access to adequate cooling, more likely to struggle to pay for air conditioning, and are also more prone to not having health insurance. Lower-income people are also more likely to be renters and, therefore, have very limited control over the efficiency and effectiveness of their home cooling systems. Moreover, Dr. Uejio's heat vulnerability assessment found a correlation

[12] *Miami-Dade Extreme Heat and Mortality Report,* Uejio and Ahn, 2022

[13] *Hot Cities, Chilled Economics: Miami, United States,* 2022

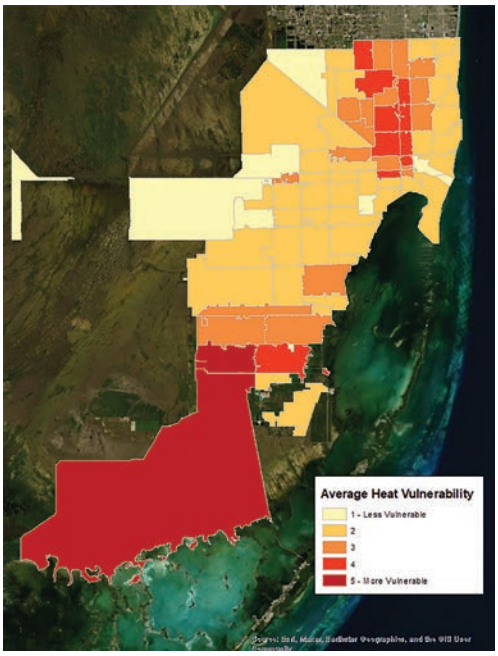
[14] *Understanding Heat Exposure in Miami-Dade County,* 2022

[15] *"Racial and Socioeconomic Disparities in Heat-Related Health Effects and Their Mechanisms: A Review",* Carina Gronlund, 2014

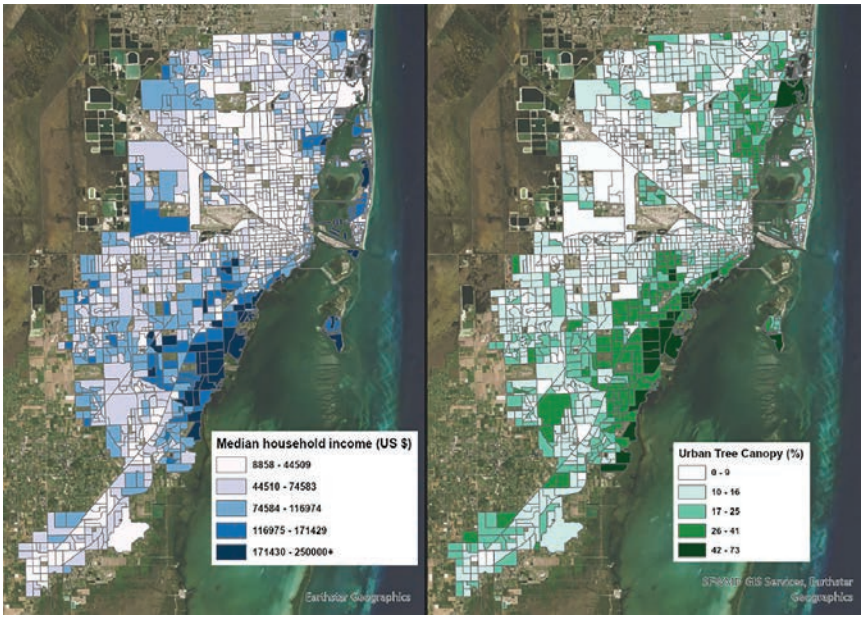
[16] *"Risk Factors for Direct Heat-Related Hospitalization During the 2009 Adelaide Heatwave: A Case Crossover Study",* Zhnag et al., 2013

between areas with high rates of severe heat illnesses and higher poverty rates, and average land surface temperatures. For instance, in areas with the lowest percentage of urban tree canopies, such as North Miami and Hialeah, mean daytime land temperatures exceed 113.4 degrees Fahrenheit. For context, each one-degree (°C) increase in land surface temperature translates into a 0.75 HRI ED (Heat-Related Illness Emergency) call increase per 100,000 people[17].

To learn more about heat vulnerability in Miami-Dade go to **miamidade.gov/heat** and click on: *"Learn more about heat risks".*



Vulnerability to heat-health risks is not the same everywhere in Miami-Dade County. Due to various exposure and sensitivity factors, some neighborhoods experience increased risk to heat-related illness hospitalizations or emergency room department visits.



Areas with higher median income coincide with areas with higher percentages of the urban tree canopy.

[17] *Miami-Dade Extreme Heat Vulnerability Mapping Report,* Uejio and Ahn, 2022

OUR PROCESS:

HOW THIS PLAN WAS DEVELOPED

In April 2021, Miami-Dade County received a challenge grant offer from the Adrienne Arsht-Rockefeller Foundation Resilience Center to fast-track an extreme heat initiative under the Resilient305 Strategy[18]. This grant led to the creation of the world's first Chief Heat Officer (CHO) position. Jane Gilbert was appointed to fill this role. She and her team are responsible for improving coordination, accelerating existing heat protection efforts, and initiating new work that reduces the risks and impacts of heat stress and extreme heat for vulnerable communities in Miami-Dade County.

The first step was to understand existing programs, policies, individuals and organizations that were already advancing urban heat mitigation or heat risk management. This was achieved with the support of two interns who identified best practices and interviewed a wide range of experts and stakeholders in the South Florida region. The first intern, now Extreme Heat Program Coordinator, Ludovica Martella, spearheaded the process by conducting desk research and stakeholder interviews on extreme heat in South Florida with a focus on Miami-Dade County. She summarized her findings in a report "Extreme Heat and Equity: Best Practices, Challenges, and Potential Next Steps in Miami-Dade County, Florida."[19] The second intern, Kelly Soluri, was a fellow from the Urban Sustainability Directors Network. Ms. Soluri, together with Office of Resilience staff and Jane Gilbert, conducted additional research and this work culminated in the development of the Extreme Heat Toolkit[20].

In November 2021, the CHO launched the Climate and Heat Health Task Force in partnership with The Miami Foundation to guide the development of this Extreme Heat Action Plan. The 15-member task force was co-chaired by Jane Gilbert, Chief Heat Officer, and Dr. Cheryl Holder, physician, professor, and community advocate. The task force included two community members with lived experience of extreme heat who were selected out of 53 applications. The community representatives were provided a modest stipend to compensate for their time. Ms. Gilbert and Dr. Holder then appointed key stakeholders from the National Weather Service, State Health Department, municipal partners, County, private sector, and community-based organizations. For a full list of the Task Members refer to the acknowledgment section.

The Task Force promoted and participated in six virtual public workshops that were created and led by the CHO and her team and supported with additional facilitation by Office of Resilience staff members. The workshops engaged 298 individual community members and covered the following topics: Outreach & Education, Data & Research, Emergency Preparedness & Response, and Workers Exposed to Heat, Housing, and Streets & Trees. The presentations, recordings and minutes of these meetings can be found on The Miami Foundation's Heat Page[21]. At the end of the workshop series, a survey was sent out to the Task Force members to prioritize actions recommended through these public forums. In addition, the surveys helped rank the action items within each category by level of impact feasibility and cost-effectiveness. The findings of the survey were shared, further discussed, and refined by all members of the full Task Force. Protecting outdoor workers was the number one theme ranked by Task Force members across the entire survey process and attracted significant community engagement. All priority action items were then more extensively developed by County staff, integrated, and organized under the following three resilience-building goals:

1. Inform, prepare and protect people.

2. Cool our homes and emergency facilities.

3. Cool our neighborhoods.

These three goals aim to move our people, places, and organizations toward a more resilient, healthy, inclusive, and equitable future.

Mayor Daniella Levine Cava and her team welcome the Chief Heat Officer, Jane Gilbert, and Dr. Cheryl Holder, Task Force co-leader, to the County.

[18] *Resilient305 initiative*

[19] *Extreme Heat and Equity: Best Practices, Challenges, and Potential Next Steps in Miami-Dade County, Florida,* Ludovica Martella, 2021

[20] *Miami-Dade County Extreme Heat Toolkit,* 2021

[21] *The Miami Foundation Extreme Heat Page*

GOAL 1

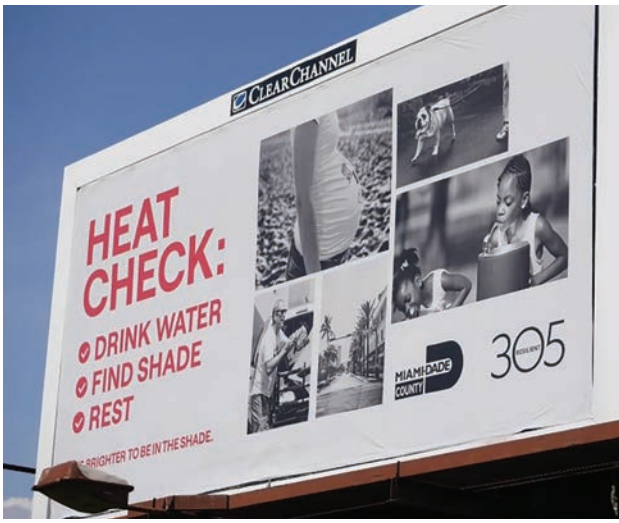
INFORM, PREPARE AND PROTECT PEOPLE

Because heat-related illnesses and deaths are preventable, successfully communicating heat risk can be a highly effective way to save lives and reduce economic impacts. The first goal is to inform, prepare and protect people from the increasing health and economic risks of extreme heat. While we're all at risk, certain populations are more vulnerable, either because they are more exposed to heat in the workplace, at home, in transit, and during recreation, or they are more sensitive due to age, health conditions, or medications taken. Outreach and education are the first steps in executing change. Residents, workers, and visitors may not be aware of their own risk to extreme heat exposure and prevention methods that can make them safer. Employers of outdoor workers and those working without air conditioning need to be made aware of, incentivized, and/or required to provide adequate protection. Finally, nurses and doctors are trusted messengers especially as it relates to encouraging health-protective behaviors. The following actions are designed to protect workers, improve the warning system to alert individuals most impacted by extreme heat, as well as prepare and empower trusted neighbors, first responders, and healthcare practitioners.

ACTION 1: Build on the success of the Heat Season Campaign

In November 2021, Mayor Daniella Levine Cava declared May 1 through October 31 as the official Heat Season in Miami-Dade County and committed to raising public awareness to the level that the County does for hurricane preparedness. The 2022 Heat Season Campaign was designed to prioritize reaching populations and neighborhoods most vulnerable to extreme heat with simple, actionable messages. The goal is to raise public awareness about the risks associated with extreme heat, who is more vulnerable, and what they can do to protect themselves and their loved ones. Through multiple channels including radio, television, outdoor ads and billboards, and social media, the multilingual campaign reached over 3.5 million people through multiple touchpoints. The Miami-Dade Office of Emergency Management, with content input from the Chief Heat Officer, developed and delivered heat health enhancement training to our Citizen Emergency Response Team (CERT) volunteers. These trainings provide more in-depth information about how to recognize heat-related illnesses and how to treat them.

Miami-Dade County will gather feedback through its community-based partners and residents, using collected input to adapt the Heat Season Campaign with the goal of continued and increasing awareness and protective behaviors by our residents and visitors. The use of the train-the-trainer outreach model will be used to build more in-person messaging by trusted messengers, including the CERT volunteers. Our public libraries and park facilities not only can serve as cooling centers but also as trusted educational community centers. The Offices of Resilience and Emergency Management will provide training for parks and library employees to care for those that may need additional cooling relief when they enter their facility. These trainings can also be extended to other community-serving organizations.



Timeline: Annual and on-going.

Partner agencies: Miami-Dade Communications and Customer Experience Department (CCED), Miami-Dade Office of Emergency Management (OEM), Miami-Dade County Public Libraries, Miami-Dade Parks and Recreation, Miami-Dade County Public Schools (M-DCPS), The Miami Foundation, WeCount!, The Women's Fund of Miami Dade, Florida Clinicians for Climate Action, Catalyst Miami, CLEO Institute, municipal, university, and other community-based and private sector partners.

ACTION 2: Enhance messaging and protocols

Miami-Dade County Office of Emergency Management, with guidance from the National Weather Service and Chief Heat Officer, will update the extreme heat emergency response thresholds, protocols, and procedures. The National Weather Service (NWS) issues an official heat advisory and warning when the heat index is projected to reach 108°F and 112°F for at least 2 hours respectively. However, these conditions are highly unlikely, and most heat-related deaths occur during conditions below those thresholds[22].

Miami-Dade County has shared the findings from Dr. Uejio's studies and from the heat wave modeling conducted by Dr. Larry Kalkstein on behalf of the Adrienne Arsht Rockefeller Foundation Resilience Center with the NWS and is committed to continue to refine and adapt its approach to extreme heat. The National Oceanic and Atmospheric Administration (NOAA), the parent federal agency of NWS, is conducting a pilot in partnership with Miami-Dade County, Florida International University, University of Miami, and the local weather forecast office to better understand microclimatic conditions at transit stops, residential neighborhoods, and schools, working with our local stakeholders on a tabletop exercise to consider interventions, including updating forecast messaging and emergency protocols and procedures. The emergency protocols would lower the threshold at which extreme heat is communicated to County departments, partners, and the public, and include messaging about the availability of cooling shelters. Procedures would also include updated recommendations for partnering with community-based organizations and networks to assist with conducting health checks and providing protective assistance to unhoused individuals and other vulnerable populations.

Timeline: 0-3 years.

Partner agencies: South Florida Weather Forecast Office, National Weather Service (NWS), Miami-Dade Office of Emergency Management (OEM), Florida International University, University of Miami, National Oceanic and Atmospheric Administration (NOAA), Adrienne Arsht-Rockefeller Foundation Resilience Center, Municipal, University and Community-Based Partners.

[22] *Miami-Dade Extreme Heat and Mortality Report,* Uejio and Ahn, 2022

ACTION 3: Engage and support outdoor workers and employers of outdoor workers

Outdoor workers are disproportionately impacted by prolonged heat exposure and are often low-income and members of marginalized communities, increasing their overall risk. Many employers are aware of and observe recommended protocols to provide adequate water and rest in shaded or cooled areas during times of elevated heat. However, there are many employers who are either unaware of or ignore the risks and potential liabilities. As part of the 2022 Heat Season Campaign, the County promoted a video PSA focused on the risks of extreme heat on outdoor workers and how they can protect themselves from extreme heat. The PSA and associated social media campaign were both run in English and in Spanish and provided a link to the Occupational Safety and Health Administration (OSHA) hotline to report violations.

In order to reach employers, the Miami-Dade County Office of Resilience, together with partner organizations like WeCount!, will hold group meetings with leaders from agricultural and construction industries to exchange information and learn from employers how they protect their workers, barriers they face, and what information and tools would be most helpful. The Office will then design information and tools informed by this input.

Timeline: 0-3 years.

Partner agencies: Occupational Safety and Health Administration (OSHA), Miami-Dade Agricultural Manager, WeCount!, Miami-Dade Internal Services Department (ISD), Miami-Dade Strategic Procurement Department (SPD), Miami-Dade Regulatory and Economic Resources, builders' associations, construction unions.

ACTION 4: Seek workplace protections for outdoor workers

Considering the increasing and disproportionate health and economic risks to outdoor workers in South Florida, it is essential that outdoor workers are protected by a heat standard policy. In September 2021, the Biden Administration directed OSHA to begin the rulemaking process on a federal workplace standard that would force employers to protect workers from extreme heat. However, the process could take several years to a decade to pass through the regulatory and congressional processes.

In early 2022, bipartisan leaders from Miami-Dade's state legislators introduced a proposed heat standard for Florida. This standard suggested paid shade and water breaks when the heat index reaches or exceeds 90°F, as well as health emergency trainings for employers of outdoor workers, and workshops for employees. While it passed unanimously through the

Senate Agricultural Committee, it did not make it out of other committees to be heard by the legislature. At the moment, the only states that have worker protections related to heat exposure are California, Oregon, and Washington State. If OSHA adopted a similar heat standard nationally, 50,000 injuries and illnesses related to heat could potentially be avoided nationwide. In the absence of federal and state action, Miami-Dade County will pursue a countywide heat standard for outdoor workers – the first in the United States – to address this public health and economic crisis.[23] The Climate and Heat Health Task Force voted this action as the most impactful action to reduce the health and economic impacts of extreme heat. These include people working in property maintenance, landscaping, construction, and agriculture. Creating such heat standard would also prevent a significant economic loss as related to labor productivity, currently estimated at $10 billion a year in heat-induced lost labor productivity in Greater Miami and up to $20 billion by 2050, according to the Adrienne Arsht Rockefeller Foundation Resilience Center[24].

Timeline: 0-2 years.

Partner agencies: WeCount![25], Miami-Dade Office of Resilience (OOR), and other community-based organizations.

ACTION 5: Engage and prepare healthcare practitioners

Healthcare practitioners are trusted messengers in the community and therefore can play a critical role in heat illness prevention. By training healthcare professionals with up-to-date information on how to identify and prepare patients who may be more at risk of heat-related illnesses due to higher exposures and/or sensitivities, we can significantly reduce the number of heat-related deaths and illnesses communitywide.

In September 2022 the Florida Clinicians for Climate Action (FCCA), in partnership with the Office of Resilience, Baptist Health, and with additional funding from the Health Foundation of South Florida, launched an ongoing medical education series for doctors

[23] *"Too Hot to Work",* Union of Concerned Scientists, 2021

[24] *Extreme Heat: The Economic and Social Consequences for the United States,* Arsht Rockefeller Foundation Resilience Center, 2021

[25] *¡Que Calor!,* WeCount

and nurses on climate change and health, with a focus on the effects of increasing temperatures. Going forward, this program will include outreach by medical students to health clinics in areas with higher incidents of heat-related illnesses. Students share information on training opportunities for clinicians and provide educational materials such as posters and brochures.

Timeline: 0-2 years.

Partner agencies: Florida Clinicians for Climate Action, Baptist Health South Florida (BHSF), Health Foundation of South Florida, Extreme Heat Resilience Alliance of Arsht-Rock Resilience Center.

ACTION 6: Leverage urban heat research group for continued learning

The Urban Heat Research Group (UHRG) grew out of the Resilient305 collaborative and comprises local faculty and student researchers primarily from Florida International University and University of Miami, local non-profits, government staff, and community leaders. Through monthly meetings, the group comes together to share updates on data and studies centered around the growing risks associated with extreme heat and initiatives that push towards tackling the issue. Research shared and currently underway has and will continue to support the development and implementation of interventions or actions described in this plan. For instance, Florida International University's Shading Dade initiative will inform investments in trees planting along pedestrian corridors and bus stops. The University of Miami's Climate and Equity Mapping Platform (CAMP) will help us prioritize and design housing efficiency and cooling upgrade initiatives. The UHRG can also support the evaluation of the efficacy of interventions such as infrastructure investments or a public outreach and engagement initiatives. These evaluations could particularly focus on the distribution of impacts such as on human health, economic burdens, environment, equity, and engagement.

Timeline: Ongoing.

Partner agencies: Urban Heat Research Group - Resilient305 Collaborative, Extreme Heat Resilience Alliance at Arsht-Rock Resilience Center, additional nonprofit and private sector data and research partners.

GOAL 1 - Proposed Metrics:

- Number of people reached.
- Number of municipalities and community-based organizations involved in outreach and training.
- Passage of County legislation to protect outdoor workers.
- Number of professionals and volunteers trained.
- Reduction in heat-related illnesses and deaths.

GOAL 2

COOL OUR HOMES AND EMERGENCY FACILITIES

Extreme heat can affect people indoors just as much, if not more so, than outdoors. Poorly insulated buildings increase temperatures and energy usage, ultimately leading to higher electricity bills. Without air conditioning, people are at increased risk for heat-related illnesses and death and respiratory illnesses from mold. Implementing energy-efficient methods like cooling retrofits has been proven essential in alleviating high energy burdens, improving health, and housing affordability, and lifting people out of poverty. Energy burden is the percentage of household income spent on home energy costs and serves as an indicator of the affordability of a household's energy costs. According to the American Council for an Energy-Efficient Economy, a household is considered to have an excessive energy burden when the home energy costs are 6% or more of the household income and a severe energy burden when home energy costs exceed 10% of household income[26]. In the Miami metropolitan area, a quarter of low-income households have an energy burden above 11% which is more than 3.5 times higher than the median energy burden[27].

Mayor Daniella Levine Cava is deeply committed to addressing the issues of housing affordability, health, and safety. In 2021, Miami-Dade County's Community Action and Human Services Department (CAHSD) provided financial assistance to help cover the energy bills of almost 30,000 low-income households. In August 2022, Mayor Daniella Levine Cava announced an investment to tackle the housing affordability crisis – the HOMES plan. The HOMES plan will provide financial assistance to help Miami-Dade County residents afford their housing, increase the availability of affordable and workforce housing by creating 32,000 new units, and enhance and preserve existing affordable housing. The plan will also provide over seven million in additional funding for weatherization of single-family homes and resilient retrofits of naturally occurring affordable housing[28]. Additionally, newly constructed affordable and workforce housing funded by the County will be constructed using cool roofs as well as meet higher code standards related to energy efficiency. Miami-Dade County's Climate Action Strategy set a target of retrofitting 167,500 homes to reduce energy costs by 28%, prioritizing LMI homes by 2030. Actions 7-9 are designed to leverage and support these historic investments and commitments to improve access to affordable and safe housing for all.

The compound risks of a widespread and extended power outage, most likely due to a tropical storm or hurricane during a time of excessive heat, are severe and increasing with both storm severity and rising temperatures. In 2017, Hurricane Irma deprived over 7 million customers of electricity, with 2.1 million customers lacking access to electricity after four days[29]. With investments in energy resilience such as undergrounding distribution networks and distributed energy sources, these risks can be significantly reduced. Actions 11-13 focus on energy resilience and redundancy.

[26] *How High are Household Energy Burdens,* ACEEE, 2020

[27] *Energy Burdens in Miami,* American Council for an Energy Efficient Economy (ACEEE), 2020

[28] *Preserve Naturally Occurring Affordable Housing,* Miami Housing Solutions Lab

[29] *"In Florida, 2.1 Million Customers Still Powerless Four Days After Hurricane Irma",* Tampa Bay Times, 2017

ACTION 7: Seek increased support for efficiency and cooling upgrades

Seek to expand opportunities for efficiency and cooling upgrades supported through public and private funding, financing, and partnerships. The Office of Resilience will work with Miami-Dade Community Action and Human Services Department (CAHSD), Miami-Dade Public Housing and Development (PHCD), and nonprofit, and private sector partners to identify resources to further expand outreach to and funding for housing retrofits to serve low-income and health-vulnerable homeowners and renters. Miami-Dade County's Community Action and Human Services Department (CAHSD) has long managed both the Department of Energy Weatherization Assistance Program (WAP) and the Low-Income Energy Assistance Program (LIHEAP) to relieve the energy burden confronting low-income homeowners and renters.

For the last two years, CAHSD and Miami-Dade Public Housing and Community Development (PHCD) have dramatically expanded their offerings for energy efficiency upgrades through a series of programs aimed at relieving the energy burden and strengthening the building envelope for low-income homeowners and renters[30].

Timeline: 0-3 years.

Partner agencies: Miami-Dade Community Action and Human Services Department (CAHSD), Miami-Dade Public Housing and Community Development (PHCD), Florida Power & Light, municipalities and community-based partners.

ACTION 8: Advocate for heat safety housing policies

Advocate for heat safety and affordable housing policies throughout all levels of government. While many states and local governments have minimum heating requirements for residential rentals, there are few local government requirements and zero statewide policies for minimum cooling, even though it should be considered critical for health and safety. Without relief from the heat and humidity at night, heat stress can continue to build and increase the risk of heat illnesses and death. In fact, there are indications that nights can be more deadly than the daytime if in-home bedroom temperatures are higher than 80 degrees Fahrenheit[31]. In Miami-Dade County, the average nighttime heat index during the summer is about 85° F[32]. Early findings from a University of Miami research initiative on housing indicate that some people are living under conditions that are hotter than the external temperatures.

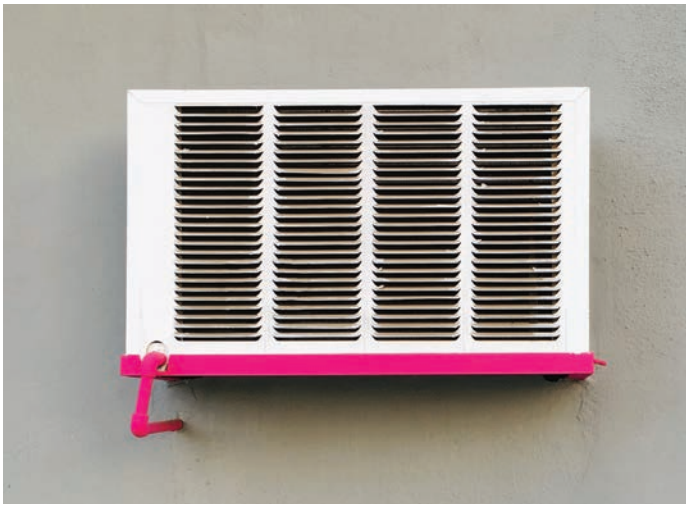
[30] *Miami-Dade County HOMES Plan,* 2022

[31] *"Nights Can Be More Deadly than Daytime during a Heatwave",* The Weather Channel, 2019

[32] *"A Novel 75-Year Database and Climatology on Heat Index Values in Miami",* McNoldy and Molleda, 2022

The City of Phoenix set cooling requirements for all rental units - to at least 86 degrees inside if using evaporative cooling, and 82 degrees if there is an air conditioning unit. The Chief Heat Officer will work with the Regulatory and Economic Resources Department's (RER) building division, Community Action, and Human Services Department's (CAHSD) Office of Tenant Advocacy, and our university and community-based partners to improve our understanding of current dangerously high heat conditions in rental units and explore the possibility of establishing a minimum cooling requirement for sleeping areas within the unit.

A cool roof can reduce the air conditioning load on a building by as much as 55% and it can limit the urban heat island effect in the surrounding area[33]. While Miami-Dade County already requires cool or green roofs for all new construction of County-owned or County-funded buildings, this is not currently required across all new construction in the County. Communitywide building design is regulated by the Florida Building Code. Miami-Dade's RER Building Code Officials, with support from the Office of Resilience, have proposed an amendment to the Florida Building Code to require low-pitched cool roofs on all new commercial buildings and multifamily residential housing. Miami-Dade County will continue to pursue the passage of this Building Code amendment and support others to enhance the design, construction, and energy efficiency of buildings, in turn reducing the urban heat island effect.



Timeline: 0-2 years.

Partner agencies: Miami-Dade Regulatory and Economic Resources (RER), Miami-Dade Community Action and Human Services Department (CAHSD) - Office of Tenant Advocacy, universities, and community-based organizations.

ACTION 9: Improve coordination and expand outreach on energy efficiency

Pursue recommendations described in the Southeast Florida Climate Change Compact's recent Energy Efficiency Action Plan, which includes establishing a regional resource center intended to improve access to funding and financing for energy efficiency upgrades and portable air conditioner replacement program for renters and others looking to upgrade window units with higher-efficiency models. In addition to the weatherization and housing rehabilitation funding offered by Miami-Dade County to retrofit and install efficient and reliable cooling systems in homes and multifamily housing, there are long-standing federal tax rebate incentives for home upgrades that improve energy efficiency, including new rebates that will be offered through the passage of the Inflation Reduction Act. Nonprofit financing partners such as Solar and Energy Loan Fund (SELF)[34] and Neighborhood Housing Services of

[33] *Energy Saver: Cool Roofs*

[34] *Solar and Energy Loan Fund*

South Florida[35] and private financing programs are also available. These programs can be hard to navigate for low-income homeowners and impractical for renters who have limited control of the efficiency of their homes. The Office of Resilience will work with internal and external partners to improve community outreach efforts for services provided to property owners and renters, with an emphasis on programs serving households below the Area Median Income for Miami-Dade County.

Timeline: 0-3 years.

Partner agencies: Southeast Florida Climate Change Compact (SEFLCCC), Miami-Dade Community Action and Human Services Department (CAHSD), Miami-Dade Department of Public Housing and Community Development (PHCD), Florida Power & Light, municipalities, and community-based organizations.

ACTION 10: Invest in energy resilience at evacuation shelters

Seek energy resilient systems with the capacity to cool critical facilities such as evacuation shelters. In the event of widespread and extended power outages during a time of extreme heat, like in the aftermath of a major tropical storm or hurricane, our primary evacuation shelters have backup power, although many of these generators do not have the capacity to power an air conditioning system. The majority of designated evacuation shelters are Miami-Dade County Public Schools (M-DCPS) facilities; of which four are dedicated medical evacuation shelters with the backup power needed to provide cooling to evacuees. First, the County OEM and OOR, and M-DCPS will work with electric utilities to identify which schools currently have resilient power grids (e.g., underground distribution networks) and which should be prioritized for a resilient utility power source and/or for redundant on-site energy sources (e.g. solar with battery backup to maximize co-benefits of clean energy, reduced utility costs, and sustainability education). Once the approaches are prioritized, the County will engage all partners listed below in advocating for the necessary investments to ensure our evacuation shelters can keep people thermally safe during a disaster event.

Timeline: 0-3 years.

[35] *Neighborhood Housing Services of South Florida*

Partner agencies: Miami-Dade County Public Schools (M-DCPS), Miami-Dade Office of Emergency Management (OEM), Florida Power and Light (FPL), Homestead Public Services (HPS Energy) and community-based organizations.

ACTION 11: Ensure compliance with assisted living/nursing home generator rule

Following the lives lost in the aftermath of Hurricane Irma in 2017, the Governor of Florida issued administrative orders requiring all assisted living and nursing home facilities to have generators and fuel on site with enough capacity to keep a common area cool for 72 hours. Specifically, Florida Rules 58A-5.036 *Emergency Environmental Control for Assisted Living Facilities* and 59A-4.1265 *Emergency Environmental Control for Nursing Homes* require that a Residential Healthcare Facility (RHCF) identify a "cooling area" within the facility to be maintained at an ambient temperature of 81˚Fahrenheit or cooler, as dictated by the clinical needs of residents, for an extended period of 96-hours. The Florida Agency for Healthcare Administration (AHCA) is responsible for verifying compliance to the law at the time of a facility's inspection. Facility owners and/or administrators must properly maintain all equipment, including a generator and fuel, to ensure that ambient temperatures are maintained in the selected cooling areas.

The Office of Resilience will work with the Office of Emergency Management to follow up with AHCA to learn more about the inspection and compliance process, especially within unincorporated Miami-Dade County to ensure that on-site inspections are sufficient to ensure the back-up power systems are functional, safe and with adequate fuel supply.

Timeline: 1-3 years.

Partner agencies: Miami-Dade Office of Emergency Management (OEM), Miami-Dade Fire Rescue (MDFR), Miami-Dade Regulatory and Economic Resources (RER), Miami-Dade Code Enforcement, Florida Agency for Health Care Administration (AHCA).

ACTION 12: Incorporate extreme heat in countywide resilience hub plan

With funding from Rebuild Florida, Arsht-Rock Resilience Center in partnership with Resilient305 and Miami-Dade County will develop a plan and design for a network of resilience hubs, an interconnected system of community-serving facilities designed to support residents, educate the public, distribute resources, coordinate communications, and state government services. Resilience Hubs, designed in partnership with Resilient305 and Miami-Dade County, aim to build awareness and knowledge of individual and community risks and disaster preparedness for neighborhoods in Miami-Dade County. Visitors to the Hubs will find through physical and digital displays, location-specific risks and guidance, resources, and tools to be prepared, get connected and take action. The goal of this planning program is to develop a plan that identifies criteria

for a suitable resilience hub location in each of the 13 Miami-Dade County commission districts as well as full design schematics for three of those locations. The aim is to increase disaster preparedness for neighborhoods in Miami-Dade County and to spread awareness of extreme heat events which may place individuals and the community at risk. The Chief Heat Officer will ensure that considerations of vulnerabilities to extreme heat, including during times of widespread power outages, will be incorporated into the building design criteria and on-going educational programming of the resilience hub system.

Timeline: 0-3 years.

Partner agencies: Adrienne Arsht-Rockefeller Foundation Resilience Center, Miami-Dade Office of Emergency Management (OEM), Miami-Dade Parks, Recreation and Open Spaces (PROS), Miami-Dade Information Technology Department (ITD), Miami-Dade Public Library System (MDPLS).

GOAL 2 - Proposed Metrics:

- Number of single and multifamily housing unit retrofits.
- Number of efficient AC systems installed.
- Heat safe policies passed.
- Number site visits to inspect energy backup systems at nursing homes and assisted living facilities.
- Number of energy redundant or resilient emergency facilities.
- Completion of a countywide resilience hub plan.

GOAL 3

COOL OUR NEIGHBORHOODS

Heat exposure and impacts in Miami-Dade County are not uniform across neighborhoods. A lack of green space and trees, an abundance of heat-absorbing and/or impervious surfaces, such as asphalt, and wasted heat from building AC systems and internal combustion cars all contribute toward creating urban heat islands. The Heat Vulnerability Assessment[36] illustrates a strong correlation between areas with high rates of severe heat-related illness and those with high land surface temperatures and neighborhoods with lower area median income. Urban heat islands exacerbate increasing extreme heat and cause undue economic and health burdens on residents, making it more costly to cool homes and oppressive to be outside. Trees and vegetation can provide shade for people, buildings, and parking lots and lower surface and air temperatures. According to the Environmental Protection Agency, trees not only mitigate the urban heat island effect but also reduce energy use, improve air quality, enhance stormwater management, and water quality, provide wildlife habitat, and sequester carbon. Safe and cool streets in Miami-Dade County encourage active mobility and improve quality of life.

The County has a long-standing commitment to preserving and enhancing its tree canopy through regulatory measures such as the tree protection ordinance and landscape code, County planting and protection initiatives in parks, Environmentally Endangered Lands (EELs), and tree giveaways through our Adopt a Tree and Neat Streets programs. Miami-Dade County Commission approved a goal to reach a 30% tree canopy back in 2008 in its Comprehensive Development Master Plan and then again in 2010 in GreenPrint, Miami-Dade's Design for a Sustainable Future. The original goal was to achieve 30% by 2020. However, according to the 2021 Urban Tree Canopy Assessment[37], the tree canopy has remained essentially flat at 20% since the previous assessment in 2016. Given that thousands of trees were lost in 2017 with Hurricane Irma, the rapid rise in development over this time, and the weakening of local government's ability to regulate tree removals by the Florida state legislature in 2019[38], remaining flat is a testimony to the strength of many incentive programs enacted by the County and its municipal partners. The following recommended actions aim to guide us towards reaching and ideally surpass the 30% tree canopy goal, especially in areas where people are most exposed to extreme heat.

In addition to green infrastructure, human exposure to extreme heat can be reduced by expanding access to water, man-made shade structures and cool pavements; allowing for a more enjoyable and livable place to work, play, and move around outdoors.

[36] *Understanding Heat Exposure in Miami-Dade County*, 2022

[37] *Urban Tree Canopy Assessment,* 2021

[38] *New Florida Tree Law – Chapter 2019 - 155*

ACTION 13: Create a bold tree plan

Develop a countywide strategy, involving municipal, school district, nonprofit and private partners to preserve our tree canopy and enhance it where we need it most. This action also supports a directive, Resolution No. R-588-2, by Miami-Dade Board of County Commissioners to the Mayor and her administration. Per the June 2022 directive, the plan shall, at a minimum:

- Address inequities in urban tree canopy coverage currently experienced in low-income communities as identified in the 2021 Urban Tree Canopy Assessment[39], prioritizing those areas within Unincorporated Miami-Dade Service Area (UMSA) and County-controlled land;
- Include strategies to collaborate with non-government entities; and
- Identify legally available funding sources, including possible grant funding, and include in future proposed budgets sufficient funds to implement the plan and achieve the canopy goals by 2026 and 2032.

The multiple benefits of tree canopy including shade and cooling, stormwater management, habitat/ecosystem preservation, carbon sequestration and reduction of air pollution, and equity considerations will be assessed in the plan. Additionally, progress from this plan will be documented and periodically shared with the key stakeholders involved to hold key players accountable and continue the trajectory for increasing tree canopy. In particular, the County will prioritize actions to increase tree canopy in areas indicated as having 15% or less tree canopy by the 2021 Urban Tree Canopy Assessment, such as Hialeah, Brownsville, Westview, and Naranja.

This plan will strengthen policies, regulatory enforcement, and administrative procedures related to land development and tree maintenance, protection, and planting to ensure the County is placing a more accurate valuation on the benefits of an existing tree and strengthening tree selecting, siting and planting requirements for new development and on county land. Training and workforce development opportunities and considerations for protecting those involved in tree nurseries, planting and maintenance from extreme heat will also be addressed. Finally, the plan will include improved coordination and expansion of communications and public engagement critical to reaching our tree preservation and canopy enhancement goals.

Additionally, progress from this plan will be documented and periodically shared with the key stakeholders involved to hold the key players accountable and continue the trajectory for increasing tree canopy.

[39] *Miami-Dade County Urban Tree Canopy Assessment,* 2021

Timeline: 0-1 years.

Partner agencies: Miami-Dade County Chief Operating Officer (COO), Miami-Dade Department of Regulatory and Economic Resources (RER), Miami-Dade Department of Parks, Recreation and Open Spaces (PROS), other Miami-Dade County departments, American Forests, Municipalities and Community-Based Partners.

ACTION 14: Cool our commutes

Identify priority bus stops and pedestrian walkways with the highest urban heat island effect, lowest current tree canopy, and high pedestrian and transit use. This could include pedestrian walkways leading to a highly used transit stop or to schools. These areas will be prioritized for the 2022-23 $1.5 million funding for tree planting in the right-of-way and used to pursue additional grant funds. Shading Dade[40], a citizen science initiative led by Florida International University in partnership with the University of Miami, placed sensors at 40 bus stops with shelters, 20 with shade and 20 without, to collect data on the relative microclimatic conditions at each. We will continue to work with Shading Dade and other community-based partners to engage residents in the process of identifying and prioritizing bus stops and pedestrian thoroughfares that would benefit from trees, other shade, and hydration stations. This action supports community priorities identified through Thrive305 for safe mobility options, the Better Bus Network, Vision Zero, SMART Program, Climate Action Strategy, Active Design Guidelines, and the Great Streets Vision in the Parks and Open Space Master Plan.

Timeline: 0-3 years.

Partner agencies: Miami-Dade Department of Parks, Recreation and Open Spaces (PROS), Miami-Dade Department of Transportation and Public Works (DTPW), Municipalities, Resilient 305 Collaborative-Shading Dade Initiative, iseechange.org, and Transit Alliance.

ACTION 15: Cool our schools

Expand Miami-Dade County's partnership with Miami-Dade County Public Schools (M-DCPS) by creating a "Cool Schools Initiative." Miami-Dade County Public Schools has the second largest amount of available land for increasing the tree canopy after recreational lands owned by the County and its municipal partners (Urban Tree Canopy Assessment 2021). The County has historically provided support to individual schools seeking to enhance their tree canopies. The Cool Schools Initiative would build on that work by prioritizing schools with the greatest need and opportunity to grow the urban forest and create cool outdoor spaces for school children, one of the County's most vulnerable groups to extreme heat. M-DCPS will work with

[40] *Shading Dade,* FIU, 2021

Miami-Dade County and community partners to integrate lessons that meet district standards and involve students in tree site selection, planting, care, and maintenance.

Timeline: 0-3 years.

Partner agencies: Miami-Dade County Public Schools (M-DCPS), Miami-Dade Regulatory and Economic Resources - Environmental Resources Management Division (DERM), Neat Streets Miami, Community-Based Organizations.

ACTION 16: Expand access to water and shade

Continue to enhance access to cooling features such as publicly accessible shade structures or overhangs, hydration stations, misters, and splash pads to provide residents and visitors with critically needed cooling while adding beautiful features to our landscape. Miami-Dade County's Department of Parks, Recreation and Open Spaces (PROS) now prioritize all these amenities along with nature-based playgrounds in their capital improvement plans. The County's Chief Heat Officer will work across departments to identify opportunities for more cooling features specifically aimed at serving our most vulnerable, including unhoused populations.

Timeline: 0-3 years.

Partner agencies: Miami-Dade Department of Parks, Recreation and Open Spaces (PROS), Miami-Dade Homeless Trust (HT), Miami-Dade Internal Services Department (ISD), Miami-Dade Public Housing and Community Development (PHCD), Miami-Dade Internal Services Department (ISD), Miami-Dade Seaport (PortMiami), Miami-Dade Water and Sewer Department (WASD), Miami-Dade Aviation Department (MDAD), Municipalities.

ACTION 17: Expand and protect trees on county land

Begin with an inventory and identification of opportunities to improve County tree maintenance/ preservation, selection and planting practices, requirements, and capacity. Prioritize new plantings in low-canopy areas used by the public. Develop and implement a training program for County and contracted staff involved with tree siting, selection, planting, and maintenance. Consider interventions

to support tree preservation and reforestation in operations and all capital projects – such as the incorporation of a cost-benefit calculator, Administrative Orders, updates to the Sustainable Building Ordinance, along with revisions to regulations on stormwater, streetscapes, and the Urban, Public Works, and Landscape Design manuals.

Timeline: 0-3 years.

Partner agencies: Miami-Dade Regulatory and Economic Resources - Department of Environmental Resources Management (RER-DERM), Neat Streets Miami, and all departments that manage properties.

ACTION 18: Pilot and scale cool pavements

Conduct pilots of different types of cool pavements in low-impact areas, such as walkways, bike paths, parking lots, and low-volume roads, while also working with the Federal Highway Administration (FWA) and the Florida Department of Transportation (FDOT) on advancing pilot projects for higher trafficked roads.

In Miami-Dade County, as in many U.S. cities, pavements represent the largest percentage of a community's land cover, compared with roof and vegetated surfaces. The County's Sustainable Buildings Program was updated in September 2022. One of the key improvements to the Program was the formal adoption of Envision as a required rating standard for the County's infrastructure projects. In this case, infrastructure refers to County projects that go beyond a single building or structure including roads, bridges, parks, park and rides, or airport runways.

Through Envision, County infrastructure projects are incentivized to use techniques like cool pavement to earn points toward their required certification. Pilots conducted by cities such as Phoenix, Austin, Sacramento, and Los Angeles have led to informed decisions in scaling the use of cool pavements to reduce their urban heat islands. Cool pavement could either be permeable, allowing water and water vapor into the voids of the pavement that keep it cooler when moist, or it could be more reflective than standard pavement, reducing incoming solar radiation and cooling the air temperature, allowing for a more comfortable environment. Unlike cool roofs, it can be challenging to select affordable pavement that can also meet performance requirements for cooling and maintenance, which is why piloting different types of pavements is an integral part of the process. Additionally, since the Miami-Dade Transportation Planning Organization and Department of Transportation and Public Works rely on specifications typically approved by the Florida Department of Transportation (FDOT), collaborating between agencies is critical.

Timeline: 1-3 years.

Partner agencies: Miami-Dade Department of Parks, Recreation and Opens Spaces (PROS), Miami-Dade Department of Transportation and Public Works (DTPW), the Transportation Planning Organization (TPO), Florida Department of Transportation (FDOT), Miami-Dade Department of Regulatory and Economic Resources (RER), Arsht-Rock Resilience Center, Municipalities.

ACTION 19: Ramp up engagement and citizen science

Citizen science is scientific research conducted with participation from the public. The County aims to continue building public engagement and data collection through citizen science and community partners. Since 2019, the County has been a partner in outreach efforts for the Shading Dade initiative, a citizen science effort that deploys iButton sensors in locations throughout Miami-Dade County to better understand how our urban landscape impacts extreme heat conditions. This work seeks to answer two overarching questions:

1) How might we adapt extreme heat warnings to better reflect microclimatic conditions people are experiencing?

2) How do we design our public spaces and regulate land use to mitigate urban heat islands, especially where people are living, working, taking public transportation, waiting at a bus stop, or enjoying time outdoors at a playground?

In answering these questions, residents can be better informed on how to protect themselves from the increasing effects of climate change. Data collected through the Shading Dade initiative and other research partnerships will also enhance the County's understanding of how buildings, pavements, tree canopy and other green infrastructure can influence ambient air temperature and humidity. This will inform extreme heat warning systems and update our streetscape design standards, as well as land use and zoning policies.

Timeline: 0-1 years.

Partner agencies: Resilient305 Collaborative – Shading Dade Initiative and Urban Heat Research Group, Miami-Dade Department of Regulatory and Economic Resources, other nonprofit and private sector partners.

GOAL 3 - Proposed Metrics:

- Number of trees planted on county land.
- Number of trees planted on county land within census places with lower than 20% tree canopy and greater than 20% poverty rates.
- Number of trees planted on other public lands through green matching grant program and or other partnership programs.
- Number of trees planted on other public lands within areas with lower than 20% tree canopy and greater than 20% poverty rates.

- Number of trees given to private residents by the County.
- Percentage of community-wide tree canopy.
- Number of other cooling features installed by the County.
- Miles of cool pavements installed by the County.
- Change in relative temperature and humidity conditions.
- Number of schools involved in education programs.
- Number of children educated.

DEFINITIONS

Below is a list of our working definitions to better understand the content of this document.

Adaptability › The ability of a person to take measures to reduce exposure and sensitivity - for example, avoiding outdoor activities during the day or wearing personal protective equipment (PPE) that is designed to mitigate heat buildup. When exposure is not preventable, adaptability can help reduce the impact of heat (heat.gov).

Citizen Science › Citizen science is scientific research conducted with participation from the public.

Equity › Respectful treatment and fair involvement of all people in a society. It is the state in which everyone can thrive—access to opportunity, networks, resources, and supports—based on where they are and where they want to go.

Energy Burden › The percentage of household income spent on home energy costs. This is an indicator of the affordability of a household's energy costs. According to the American Council for an Energy-Efficient Economy, a household is considered to have an excessive energy burden when the home energy costs are 6% or more of the household income and a severe energy burden when home energy costs exceed 10% of household income.

Excessive Heat Warning › In South Florida an excessive heat warning is issued within 12 hours of Heat Index values of 113 degrees Fahrenheit or higher, lasting at least two (2) hours with an 80% chance or greater of occurrence. The Excessive Heat Warning should normally be in effect for no more than a 24-hour period but may be reissued every 24 hours until the excessive heat event ends (South Florida National Weather Service).

Excessive Heat Watch › In South Florida, an Excessive Heat Watch is issued at least 12 hours, but no more than 48 hours, from when the conditions meeting Excessive Heat Warning criteria are forecast with a 50% chance or greater of occurrence (South Florida National Weather Service).

Exposure › The extent to which an individual is exposed to extreme heat. Going outside on a hot, humid day and working in direct sunlight constitutes high exposure while reducing exposure includes avoidance of these activities. Sometimes exposure is not preventable (heat.gov).

Heat Advisory › A notice issued by the National Weather Service of the United States to bring to the public's attention that the forecasted weather conditions may cause some inconvenience or hazards for people who have to be outdoors or may not have adequate indoor cooling. Local offices often have their own criteria. In South Florida, a heat advisory is currently issued within 12 hours of Heat Index values of 108 degrees Fahrenheit or higher lasting at least two hours with an 80% change or greater of occurrence (South Florida National Weather Service).

Heat Cramps › Painful muscle spasms that can be caused by dehydration or electrolyte loss. They can be brought on by strenuous activity, hot weather, or other causes. Heat cramps are often the initial symptoms of heat illnesses including heat stroke, a potentially deadly reaction to the body overheating.

Heat Exhaustion › Typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a form of mild shock. If not treated, the victim's condition will worsen. Body temperature will keep rising and the victim may suffer heat stroke (heat.gov).

Heat Index › The heat index is how hot it really feels when the relative humidity is factored in with the actual air temperature.

Heat Stroke › A life-threatening condition. The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly (heat.gov).

Heat Vulnerability Index › A way to identify how likely a population can be injured or harmed during periods of hot weather. Vulnerability to heat has been linked to individuals' characteristics (health status, socio-demographics, etc.) as well as certain aspects of the community where one lives (e.g., relative land surface temperatures, community demographics).

Resilience › Urban resilience is the capacity of a city's systems, businesses, institutions, communities, and individuals to survive, adapt, and grow, no matter what chronic stresses and acute shocks they experience. (Resilient Cities Network).

Resilience Hubs › Resilience Hubs are community-serving facilities augmented to support residents and coordinate resource distribution and services before, during, or after a natural hazard event.

DEFINITIONS

Retrofits › In the context of housing, a green and resilient retrofit is any refurbishment of an existing building that aims to reduce the carbon emissions and environmental impact of the building and to protect the building and people inside from natural hazards.

Sensitivity › Inherent characteristics of a person that make them disproportionately affected by heat, such as pre-existing conditions, age, or occupation. To understand how to protect these groups, see Populations of Concern (heat.gov).

Sustainability › Balancing the environmental, social, and economic needs of today without compromising those needs for tomorrow.

Urban Heat Island › Cities tend to get much warmer than their surrounding rural landscapes, particularly during the summer. This temperature difference occurs when cities' unshaded roads and buildings gain heat during the day and radiate that heat into the surrounding air. Waste heat from buildings and internal combustion vehicles can also contribute to higher temperatures. As a result, highly developed urban areas can experience mid-afternoon temperatures that are 15°F to 20°F warmer than surrounding, vegetated areas (heat.gov).

ACKNOWLEDGEMENTS

The Extreme Heat Action Plan and the many steps that preceded it could not have been achieved without the diversity and dedication of our partners. First, we'd like to acknowledge the following members of the Climate and Heat Health Task Force:

- **Jane Gilbert**, Chief Heat Officer, Resilient305/Miami-Dade County; *Task Force Co-Chair.*
- **Dr. Cheryl Holder**, Internal Medicine Specialist, Associate Dean for Diversity, Equity, Inclusivity, and Community Initiatives, Associate Professor, Florida International University; Co-Founder, Florida Clinicians for Climate Health; *Task Force Co-Chair.*
- **Zelalem Adefris**, Deputy Chief Executive Officer, Catalyst Miami.
- **David Clodfelter**, Director, Miami-Dade County Office of Management and Budget.
  - **Amy Horton-Tavera**, Coordinator, Miami-Dade County Office of Management and Budget.
  - **Carlos Maxwell**, Coordinator, Miami-Dade County Office of Management and Budget.
- **Aida Curtis**, Landscape Architect & President, Curtis & Rogers Design Studio.
- **Robert Hevia,** Assistant Chief & Emergency Manager, City of Miami.
- **Dr. H. Mary Leonce,** LMHC, Professional Psychologist, Professor, Writer, Entrepreneur; *Task Force Community Representative.*
- **Omar Leon**, Urban Forester, City of Miami Beach.
  - **Rodney Knowles**, Assistant Director, Public Works, City of Miami Beach.
- **Oscar Londoño**, Co-Executive Director, WeCount!
- **Gabriela Lopez**, Manager, NEAT Streets, Miami-Dade County Parks and Recreation.
- **Annie Lord**, Executive Director, Miami Homes for All.
- **Katharine Mach,** Ph.D., Professor, Department of Environmental Science and Policy, Rosenstiel School of Marine, Atmospheric, & Earth Science, University of Miami.
- **Lynée Turek-Hankins,** Doctoral student, Abess Graduate Program, Department of Environmental Science and Policy, Rosenstiel School of Marine, Atmospheric, & Earth Science.
- **Natalie Rivas,** Climate Justice Research and Policy Manager, The Chisholm Legacy Project; *Task Force Community Representative.*

ACKNOWLEDGEMENTS

- **Dr. Yesenia Villalta**, Administrator, Miami-Dade Office of Florida Department of Health.
  - **Samir M. Elmir**, Ph.D., PE, BCEE, CEHP, Division Director, Environmental Health and Engineering.

Additionally, we thank:

- The Miami Foundation for hosting the Climate and Heat Health Task Force Meetings and public workshop series, assisting with promotion, facilitation and notetaking and providing an online platform to house the content of our meetings and findings.
- The Office of Resilience of Miami-Dade County for providing promotion, facilitation and notetaking support to the Climate and Heat Health Workshop series, as well as for providing feedback of the drafts of this Action Plan.
- Many County departments including the Office of the Mayor, Office of Management and Budget, Department of Transportation and Public Works, Parks, Recreation and Open Spaces, Department of Regulatory and Economic Resources, Office of Emergency Management, Department of Public Housing and Community Development, and Department of Community Action and Human Services for participating and providing input to the process and specific actions in this plan.
- The Climate and Heat Health Taskforce for helping us develop the six Workshops that preceded this Action Plan and for helping us prioritize its findings.
- Miami Climate Alliance and the many individuals and organizations involved for helping to ensure strong participation in our workshops and providing input and feedback on this Action Plan
- The Urban Heat Research Group (UHRG) for advancing the capacity for applied research and evaluation on extreme heat in our region.
- The Arsht-Rock Resilience Center who provided financial and technical support for this planning process and will continue to support many actions in this plan.
- Our interns, Julia Marturano and Sedona Rose Webb of the University of Miami, Isabella Gandara from Massachusetts Institute of Technology, and Janet Hernandez of Harvard University for helping with gathering best practices, documenting meetings, and drafting parts of this plan.

We thank all who made this possible and who embarked on this journey with us: we look forward to evolving and shaping the implementation of the Action Plan and its development along your side.

- **Jane Gilbert**, Chief Heat Officer, and **Ludovica Martella**, Heat Program Coordinator.

NOTES

NOTES

EXTREME HEAT ACTION PLAN

MIAMI-DADE COUNTY

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