



HOWARD COUNTY  
CLIMATE FORWARD:

# Climate Action and Resiliency Plan

PRELIMINARY  
REPORT 2022



# 1. Introduction

This Preliminary Report presents preliminary findings that will be further detailed in the upcoming final report, Howard County Climate Forward: Climate Action and Resiliency Plan (HoCo Climate Forward). This Preliminary Report includes Howard County-specific overviews of:

- Climate risks and impacts
- Climate vulnerabilities, particularly for underserved populations
- Community-wide greenhouse gas (GHG) emissions inventory
- New climate goals
- Climate solutions

To get to this point, Howard County's Office of Community Sustainability led an effort to create a Climate Action and Resiliency Plan that is science-based and focused on immediate and practical action. Research has included:

- Introductory public meetings and requests for written comments
- Review of relevant local and regional climate action plans and climate vulnerability assessments
- Meetings with internal and external stakeholders to generate ideas and get a complete picture of the work already in progress
- Community-wide and government operations GHG emissions inventory for calendar year 2019
- Expert input from subcontractor ICF to prepare draft Mitigation and Resiliency Strategies based on climate science and what would be the most impactful
- Focus groups with internal stakeholders to refine Mitigation and Resiliency Strategies
- Community survey, specifically reaching out to underserved populations, to gather feedback on climate emergency preparedness.

There will be opportunities for public comment following the release of this Preliminary Report. Howard County will review these comments and address them as it drafts the final report.

The final report will include more detailed versions of the GHG emissions inventory and climate vulnerability research, detailed implementation steps and timelines for all Mitigation and Resiliency Strategies, and modeling results showing expected greenhouse gas emissions reductions from Mitigation Strategies. In addition, the final report will include several Appendices, including detailed information about methods used to develop the inventory, vulnerability assessment, and GHG emissions reduction modeling and information about Howard County government's existing sustainability and climate efforts and programs. When completed, HoCo Climate Forward will serve as a science-based and shovel ready work plan for every department and level of Howard County government. It will also include some recommendations for what partners and individuals can do. Following this work plan, we will reduce greenhouse gas emissions, sequester carbon, and make our communities more resilient to climate change.

## 1.1 Why a Howard County Climate Action Plan?

Howard County has a strong history of taking action on climate change. In its 2010 Climate Action Plan, Howard County set a goal to reduce the County's greenhouse gas emissions 7% below 2007 levels by 2012. The County surpassed this goal by reducing emissions 12%.

In 2019, during a void in national leadership on climate change, Howard County Executive Calvin Ball stepped forward with other local leaders across the country and committed our community to meeting the protocols set forth in the Paris Agreement regardless of what the federal government did. This meant committing to reach net zero greenhouse gas emissions by 2050 to keep global average temperature rise below 1.5 degrees Celsius. By joining forces with every sector of society to meet this science-based goal, we can avoid the worst of potentially life-threatening heatwaves, sea level rise, and ecosystem loss.

Also in 2019, Howard County was the first county in the United States to accept the Natural & Working Lands Challenge to actively pursue nature-based climate solutions to maximize opportunities to reach net zero emissions through carbon storage in healthy soils, forests, meadows, and farmland. At that time, Howard County set new, more ambitious goals for greenhouse gas emissions reductions from County government operations of 45% below 2010 levels by 2030 and net zero emissions by 2050. The County has further demonstrated its commitment to combating climate change through an impressive array of sustainability and quality of life initiatives across the County's departments. Howard County's commitment to sustainability is further demonstrated by the Howard County becoming the first county in the US to achieve a LEED Platinum designation in the U.S. Green Building Council's LEED for Cities and Communities program.

While focused on making this great progress on fighting climate change, Howard County has not updated its Climate Action Plan since 2015. It is important to have regular updates to the County's Climate Action Plan, especially as new climate science is published that may impact GHG emissions reduction goals and as climate change impacts lead to more hazardous conditions such as heat waves and extreme storms. In recent years, the County has experienced damaging floods, more frequent and severe heat events, and damage and power disruptions due to severe storms. Climate scientists project that these hazards will continue to increase in the future. These changes in climate can threaten public health, increase utility bills, and reduce the quality of life in the County.

The County must do far more both to reduce its emissions of greenhouse gases that cause climate change and to make itself more resilient to the changing climate. The HoCo Climate Forward full report will include the most impactful strategies to reduce GHG mitigation for the entire county and from all sectors, public and private. It also will include strategies for carbon storage and for increasing resiliency of infrastructure, ecosystems, and communities to expected changes in weather and climate. This Climate Action and Resiliency Plan will provide a detailed road map to reach the County's climate goals.

## 1.2 Setting New Climate Goals

Recent reports from the Intergovernmental Panel on Climate Change (IPCC) show that we need to act even more quickly and aggressively than we previously thought to avoid the most catastrophic impacts of climate change. With this most recent climate action plan, Howard County is answering this challenge and is even surpassing state and federal greenhouse gas emissions reduction goals. Howard County's new greenhouse gas emissions reduction goal is to achieve a 60% reduction over 2005 levels by 2030 and net zero emissions by 2045. In addition, for the first time, Howard County is including resiliency, adaptation, carbon sequestration, and a focus on underserved populations into its climate action plan. This plan will serve as a workplan for Howard County government and our community partners to focus our efforts over the next five years on maximizing climate victories.

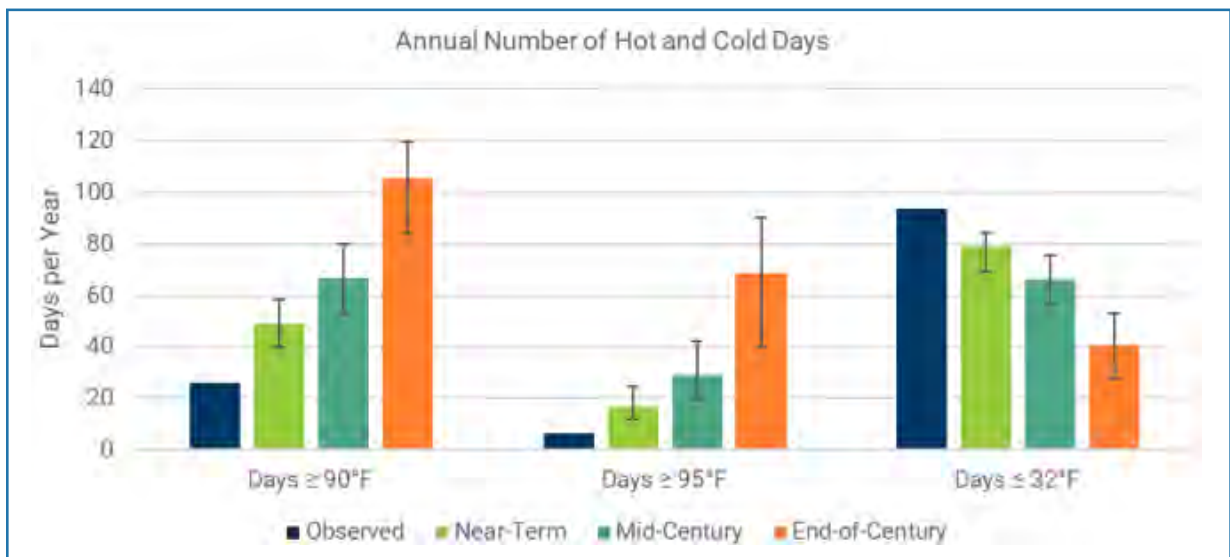
# 2. How Will Climate Change Affect Howard County?

## 2.1 Impacts of Climate Change

Howard County is already experiencing documented impacts from climate change. For example, records show that average annual temperatures in the Baltimore region have been rising about 0.2 degrees Fahrenheit each decade over the last century.

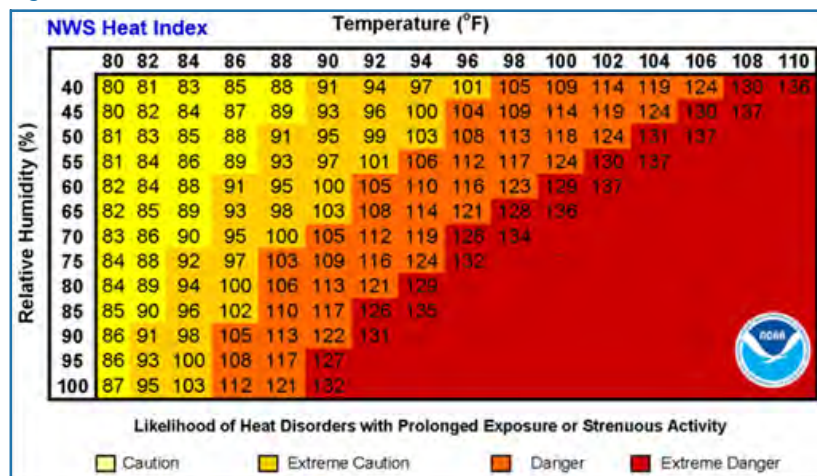
Within the lifetime of many people reading this Preliminary Report, there will be even more notable changes in climate in Howard County. Over the 20-year period between 1986 and 2005, there were on average 6 days each year above 95 degrees Fahrenheit. Climate models predict that during the 20-year period between 2020 and 2039 there will be an average of 17 days above 95 degrees Fahrenheit each year. By mid-century, that number goes up to 30 days and by the end of the century, we can expect nearly 70 days above 95 degrees Fahrenheit each year (see Figure 1 below).

Figure 1: Annual Number of Hot and Cold Days



For perspective, the National Weather Service Heat Index (see Figure 2) considers 95 degrees Fahrenheit to be potentially dangerous when humidity levels exceed around 45%—a level that is common in Howard County in the summer. Therefore, these temperatures are not just uncomfortable, but are potentially dangerous.

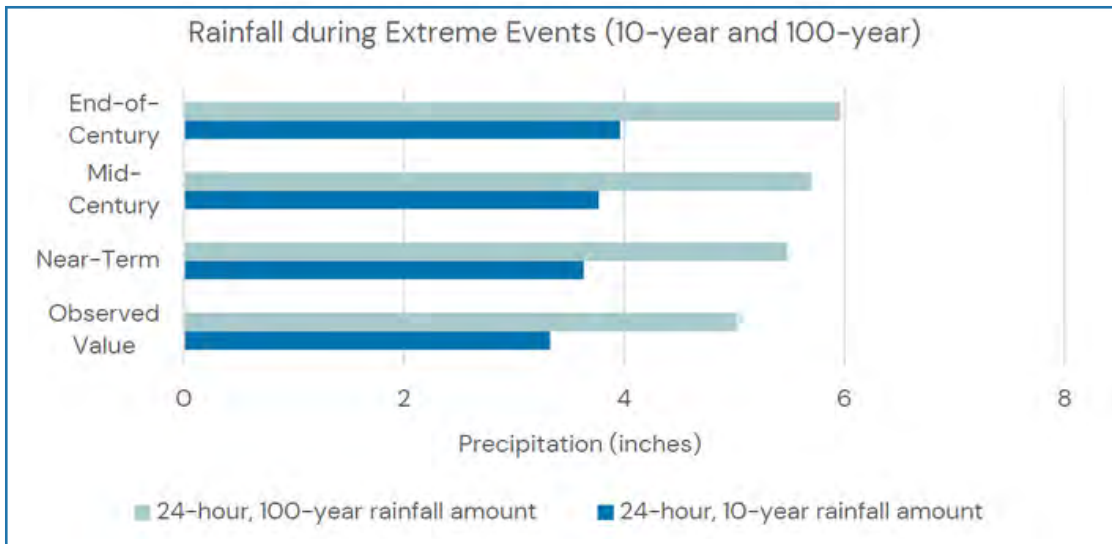
Figure 2: National Weather Service Heat Index



Source: National Weather Service, Heat Index chart. <https://www.weather.gov/ama/heatindex>

Howard County also is expected to experience more rain and snow over the coming decades. The county may see, on average, an additional 2.8 inches of precipitation per year by mid-century and an additional 5.1 inches by the end of the century. These increases in precipitation will not happen uniformly across the year. For example, the greatest increases are expected in the late winter and early spring, which may lead to more severe flooding during that time of year. In contrast, more modest increases (or even decreases) in precipitation may occur in the late summer and early fall, which could lead to drought conditions. Rainfall during extreme events is expected to increase significantly as well (see Figure 3). More intense rainfall can lead to more flooding. It is reasonable to expect that areas that already experience flooding now will experience more frequent and/or more severe flooding events in the future. Flooding may also occur in areas that historically have not experienced flooding.

Figure 3: Rainfall during Extreme Events (10-year and 100-year)



Scientists also predict more intense storms, which are associated with more wind damage and flooding. Finally, although temperatures may increase overall, there may be more frequent winter cold snaps due to a cold air mass above the arctic, known as a polar vortex, weakening. A weakened polar vortex event pushes cold air into southern regions of the United States. Weakened polar vortex events and their impacts on the United States could be exacerbated due to climate change.

Figure 4: Howard County: Moving Toward More Extremes



Anticipated changes to Howard County’s climate will have negative impacts on human health, natural systems, basic services, infrastructure and other community systems. Based on research done for this Climate Action and Resiliency Plan, extreme heat and flooding were determined to be the most dangerous hazards, requiring the most resiliency action. Extreme heat and flooding can cause utility disruptions, work challenges, ecosystem changes, health complications, and more. Table 1 summarizes potential impacts of these hazards on Howard County community systems.

Table 1: Potential Impacts of Heat and Flooding to Howard County Community Systems

SYSTEMS	EXTREME HEAT POTENTIAL IMPACTS	FLOODING POTENTIAL IMPACTS
<b>Basic Services &amp; Infrastructure</b>	<ul style="list-style-type: none"> <li>• Worker health and safety impacts</li> <li>• Reduced productivity</li> <li>• Reduced roadway service life</li> <li>• Internet outages or brownouts</li> <li>• Electricity outages or brownouts</li> <li>• Increased demand for potable water</li> <li>• Increased deterioration and structural deficiencies of roadways and buildings</li> </ul>	<ul style="list-style-type: none"> <li>• Significant delays in normal operations due to flood response and cleanup</li> <li>• Deterioration of roads, bridge supports, and stormwater conveyance systems</li> <li>• High risk for rescue workers</li> <li>• Worker safety impacts</li> <li>• Disruptions to equipment and operations</li> <li>• Impassable roads inhibiting emergency response</li> <li>• Electric service restoration challenges in areas with significant flooding</li> </ul>
<b>Economy &amp; Employment</b>	<ul style="list-style-type: none"> <li>• Disruptions to operations in facilities with little or no climate control</li> <li>• Outdoor worker health and safety impacts</li> <li>• Reduced use of outdoor attractions, dining, and spaces for visitors</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced visitor trips to the County</li> <li>• Damage to or destruction of businesses</li> <li>• Disruptions to services in flooded zones</li> </ul>
<b>Natural Systems &amp; Agriculture</b>	<ul style="list-style-type: none"> <li>• Increased release of chemicals into waterways due to rising sea-levels, melting glaciers, and eroding soils</li> <li>• Species metabolic rates, growth rates, time to maturity, and survivability impacts due to increased exposure to chemicals from higher temperatures</li> <li>• Reduced dissolved oxygen impacts aquatic species survivability and breakdown of pollutants</li> <li>• Climate becomes too hot for native species</li> <li>• Increased invasives</li> <li>• Stunted crop growth</li> <li>• Garden and landscape plants wilt or die due to heat stress</li> <li>• Increased length of fire season</li> <li>• Water quality in ponds, streams, wetlands and rivers decline</li> <li>• Increased algae blooms and dead zones</li> </ul>	<ul style="list-style-type: none"> <li>• Damage to or destruction of property and small BMPs (Best Management Practices) that treat water quality</li> <li>• Increased pollutants, litter, and toxins in waterways</li> <li>• Increased risk of disease transmission from mosquitoes due to increased areas of still water</li> <li>• Crop damage</li> <li>• Increased erosion</li> </ul>
<b>People &amp; Community</b>	<ul style="list-style-type: none"> <li>• Increased risk of heat-related illness and deaths especially for seniors, outdoor workers, and individuals</li> </ul>	<ul style="list-style-type: none"> <li>• Increased risk of injury or death in flooded areas due to individuals stuck in cars, debris, drowning or</li> </ul>

- without air conditioning
  - Increased risk of asthma flare-ups and attacks due to heat and humidity
  - Mental health deterioration due to reduced opportunity to relieve stress and exercise outdoors
- electrocution

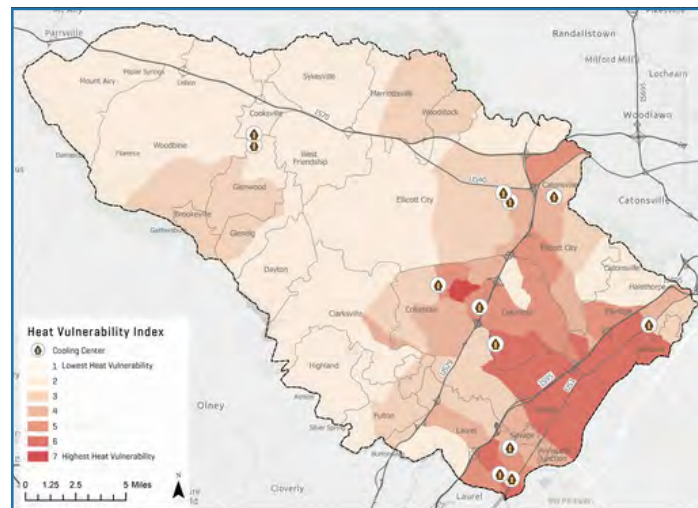
Overall, the climate in Howard County is getting hotter, with more frequent and intense extreme weather events. Notably, impacts from climate change are not felt uniformly across the County, both in terms of geography and in terms of populations. Some areas are more prone to flooding events, and some areas are expected to experience higher temperature increases than others due to local characteristics, including the urban heat island effect.

Underserved populations may be less resilient to extreme weather. For example, they may be less able to absorb increased utility costs, may live in buildings with less weatherization to help keep homes comfortable or buildings that lack air-conditioning, may be less able to afford amenities that make heat more tolerable (e.g., air conditioning, swimming pool access), and may have fewer transportation options to buildings, shaded parks, and other places that may offer relief. They may be less able to absorb the financial impacts of damage to homes and property or have fewer transportation options when a given roadway is temporarily impassible from a flood.

The Baltimore Metropolitan Council (BMC) created a Vulnerable Populations Index which identifies the spatial distribution of individuals, who may be more vulnerable to a variety of situations, meeting one or more of the following criteria: non-Hispanic, non-white; Hispanic; limited English proficiency; disabled, elderly, carless. Howard County combined BMC's Vulnerable Populations Index with a spatial heat index that indicates geographical differences in temperatures during a high heat event to help identify communities that are more vulnerable to extreme heat increases.

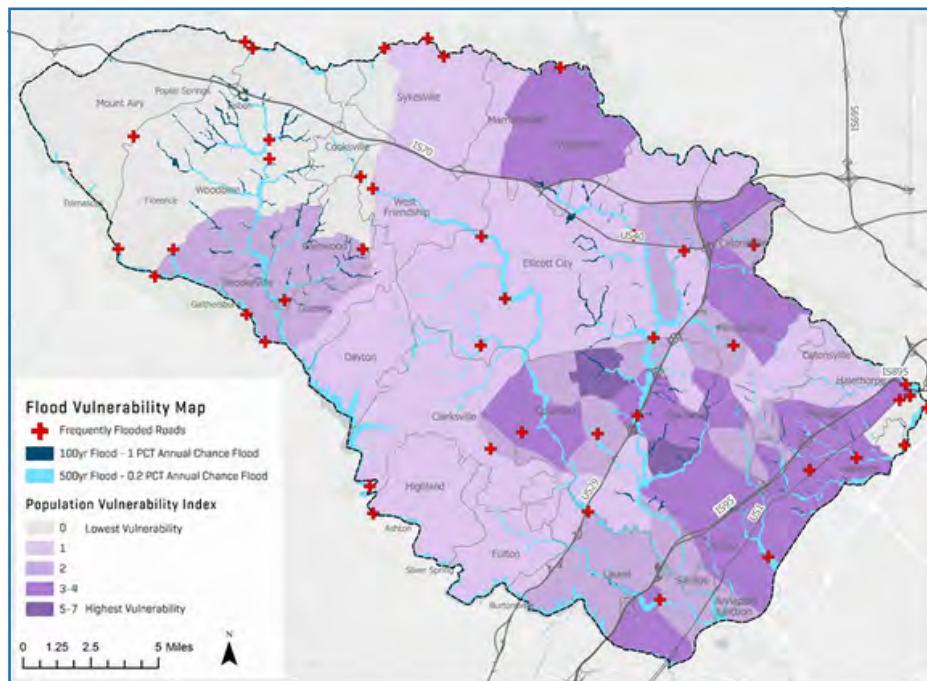
The resulting heat vulnerability index shown in Figure 5 indicates higher heat vulnerability in the eastern and southern parts of the County. The Figure also shows the location of Howard County's emergency cooling centers.

**Figure 5: Heat Vulnerability Index in Howard County**



To better understand areas and communities at potential risk for flooding, Howard County has compiled spatial layers of the Federal Emergency Management Agency (FEMA) 100-year and 500-year flood zones, locations of frequently flooded roads, locations of County and critical facilities, and the BMC Vulnerable Populations Index. This information will help the County make informed decisions on where to prioritize investments to increase resiliency to flooding. To illustrate this information, Figure 6 below shows the flood zones, locations frequently flooded roads, and the Vulnerable Populations Index. As this figure shows, there are flood zones and frequently flooded roadways throughout the County, including in communities that score higher on the Vulnerable Populations Index.

**Figure 6: Flood Zones, Vulnerable Populations Index, and Frequently Flooded Roads**



## 2.2 Climate Change Preparedness Survey

The 2022 Climate Change Preparedness Survey, administered by Howard County’s Office of Community Sustainability, was designed to get feedback from Howard County residents on how well they feel they are prepared for climate hazards that are expected to increase in intensity and/or frequency, what they need to feel prepared, and what climate related hazards they’ve experienced. The survey was primarily distributed to underserved communities, such as individuals aged 65 and older, individuals with low or moderate income, people of color, and individuals with disability/access and functional needs.

The results showed that citizens have already experienced weather-related disruptions in power and do not feel adequately prepared for flooding and major storm events (Figure 7). Citizens also expressed concern about how increasing temperatures could affect air quality and their health. The results also indicated communication gaps and suggested that community members are not aware of available resources and services, what a heating/cooling center is or where they are located (Figure 8), and where they can find information related to emergency preparedness.

This feedback from the community played a crucial part in shaping the proposed resiliency strategies and actions to improve emergency preparedness.

Figure 7: Hazards Howard County Residents Feel They Are Least Prepared For

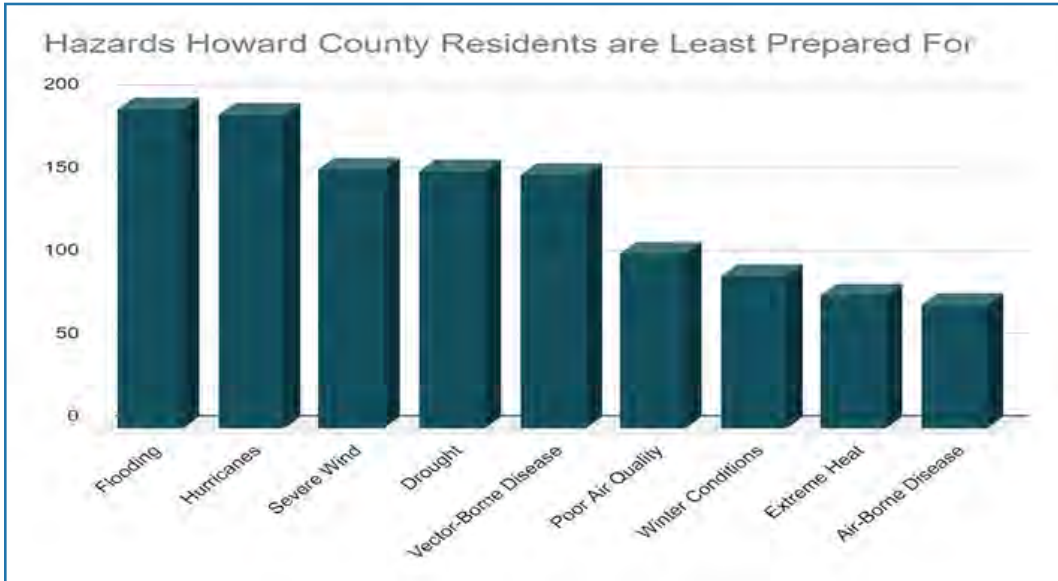
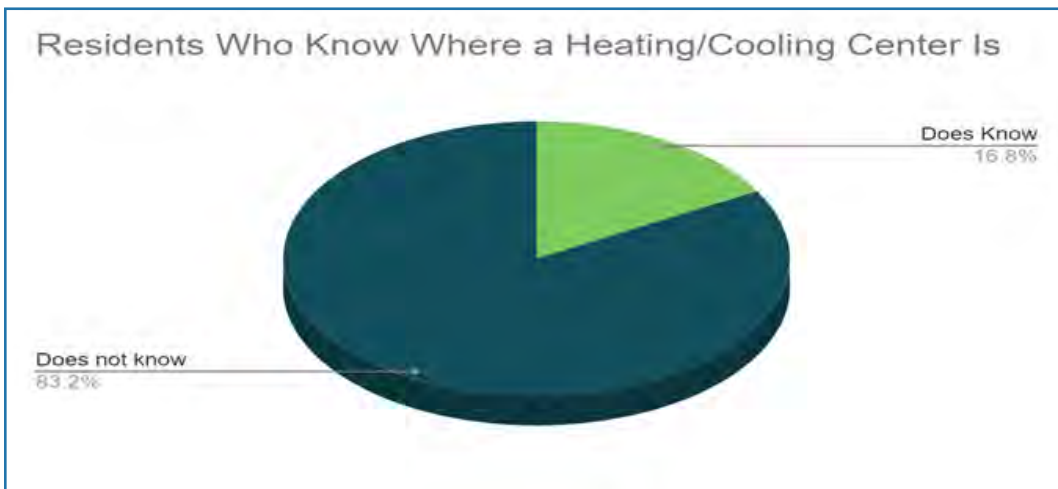


Figure 8: Howard County Residents Who Know Where a Heating/Cooling Center Is



## 3. How Does Howard County Contribute to Climate Change?

### 3.1 GHG Emissions Inventory

Howard County developed a community-wide greenhouse gas (GHG) emissions inventory to identify current sources and drivers of emissions. This inventory informed the GHG emissions reduction strategies presented in this plan and provides a baseline for the County to track progress over time. Specifically, the GHG inventory estimates emissions from the following sectors:

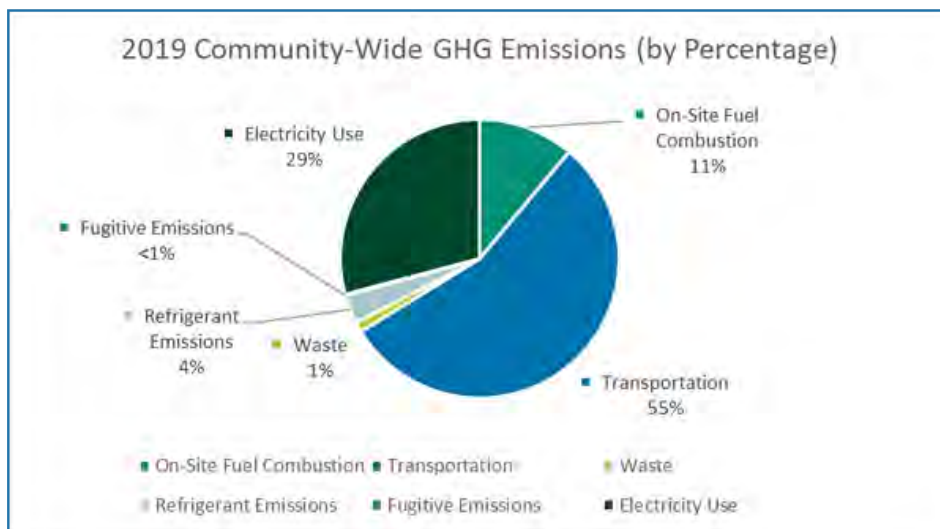
- Transportation (vehicle miles traveled)
- Built Environment (electricity use and stationary combustion of fossil fuels such as natural gas) by residents, businesses, and government operations; refrigerant leakage from refrigeration and air

conditioning equipment; and fugitive emissions from industrial oil and gas operations within the County. Fugitive emissions are emissions that escape from tanks, pipelines, and other pressurized equipment during typical operation.)

- Solid Waste (waste disposal and composting at the Alpha Ridge landfill; the disposal of waste generated by the community and landfilled outside of the County)

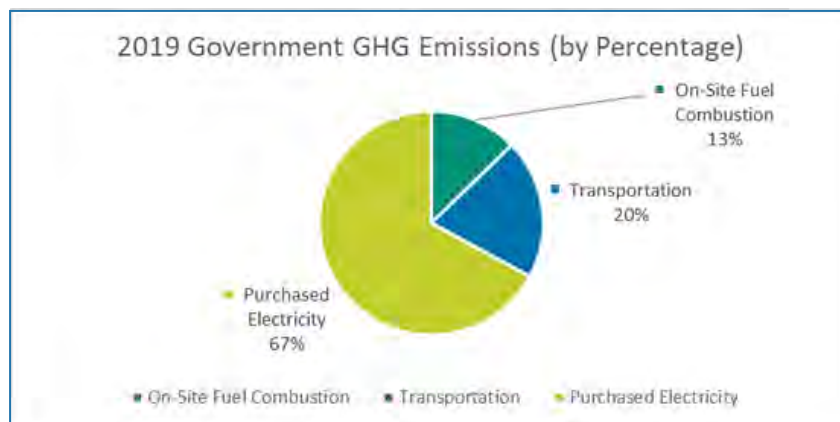
In 2019, Howard County generated 3.9 million metric tons of carbon dioxide equivalent (MT CO<sub>2</sub>e) community-wide, including the public and private sectors. Over half of these emissions were from the transportation sector, and more than 40% were from the built environment (man-made or modified structures that provide people with living, working, and recreational spaces), including building energy use. More than half (53%) of energy-related emissions are from commercial space, with residential space making up the remainder (47%). Less than 1% of energy-related emissions are from industrial properties. Figure 9 shows the breakdown of emissions in 2019.

Figure 9: Howard County's 2019 Community-Wide GHG Emissions



Emissions from Howard County government operations have a different breakdown than the community-wide emissions. In 2019, Howard County government operations generated nearly 35,000 metric tons of carbon dioxide equivalent (MT CO<sub>2</sub>e), representing only 1% of total community-wide emissions. The overwhelming majority of government operations emissions is from electricity use (67%), with County fleet fuel consumption contributing 20% of emissions and the remaining 13% coming from on-site fuel combustion.

Figure 10: Howard County's 2019 Government Operations GHG Emissions



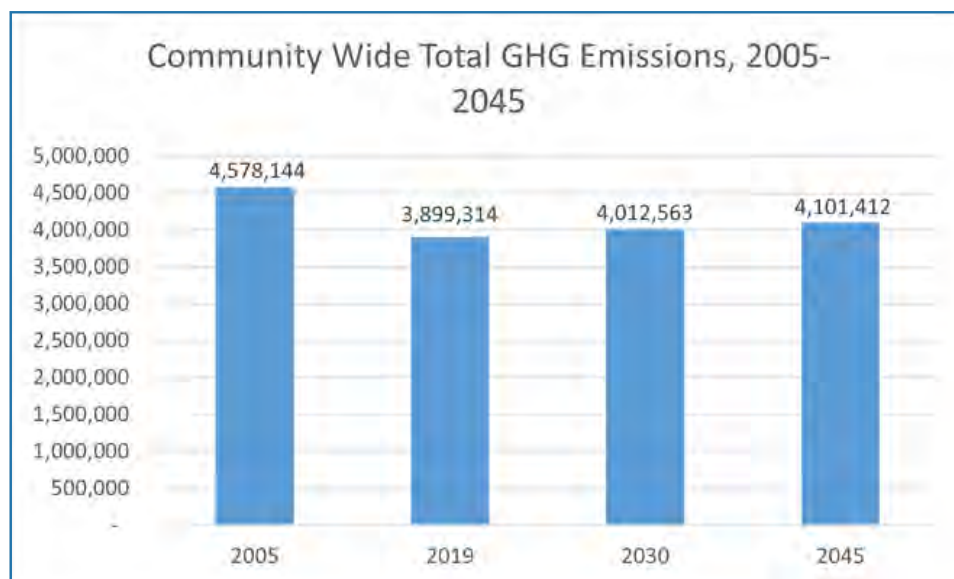
Howard County anticipates that without additional action, the County’s emissions from all public and private sector sources will increase by 3% and 5% in 2030 and 2045, respectively, compared to 2019. This projected increase is primarily driven by changes in population. The County’s population is anticipated to grow by 13% between 2019 and 2045, which will result in increased energy use, vehicle miles traveled, and waste generation. During this time, there will also be a shift toward more renewable sources of grid electricity and increased use of electric vehicles, so these changes have been factored into the projected emissions increases.

Emissions from transportation, the largest source of emissions in 2019, are expected to increase by 5% in 2030 and 4% in 2045 compared to 2019, and emissions from the built environment (the second largest source of emissions in 2019) will remain flat in 2030 and increase by 5% by 2045. Emissions from the other sectors are projected to increase roughly proportionally to population growth.

### 3.2 Progress to Date

The County has made significant progress already, as community-wide GHG emissions have decreased 16% over 2005 levels (as of 2019). To achieve the reductions outlined in this plan of 60% by 2030 and net zero by 2045, this climate action plan includes key strategies for reducing emissions and sequestering (storing) carbon. As transportation and building energy use are the largest sources of the County’s emissions, a majority of the strategies focus on the most impactful ways to reduce these emissions.

Figure 11: Community Wide Total GHG Emissions, 2005-2045



## 4. County Government Climate Solutions

Howard County has chosen to focus on the strategies and actions that County government can take that have the greatest impacts in the near- and mid-term. These strategies and actions include updates to policies, plans, incentives, and regulations; education and outreach, working with partners; and making changes as needed to County facilities, fleet, and operations. The County identified priority governance,

mitigation, and resiliency strategies based on:

- Effectiveness in reducing GHG emissions or sequestering carbon
- Effectiveness in reducing identified climate risks
- Institutional and technical feasibility
- Alignment with near-term climate change goals and objectives
- Ability to reduce climate risks and impacts within underserved and under-resourced communities

Howard County plans to periodically re-evaluate progress and adjust course if necessary and to tackle other important strategies once these top priority strategies are underway.

## 4.1 Climate and Equity Focused Governance

Everyday decisions and activities across nearly all elements of County operations impact greenhouse gas emissions and resiliency to the changing climate. From the equipment the County purchases to the types of vegetation it plants, to how it communicates internally and to the public, to how it manages information and data—all of these actions can influence whether systems are set up to make smart climate decisions and create resiliency in the face of extreme climate events.

Therefore, it is crucial that climate action is not seen as something that is the responsibility of only one department. To truly tackle the challenges of climate change, climate-informed decisions must be made at every level, across all departments, on a routine basis.

Moreover, Howard County is committed to taking climate action in a way that is equitable. The impacts of climate change are not experienced uniformly across the county. Underserved and under-resourced communities can be more vulnerable to extreme weather events for a variety of reasons. For example, they may lack the resources to absorb higher utility bills or to pay for supplies, equipment, or upgrades that may make extreme events more tolerable. They may have fewer travel options to areas that provide resources during extreme events or have less access to critical resources. Populations that are more limited in mobility may be more greatly impacted if they cannot temporarily access safe facilities or other resources during climate hazard events. Populations with greater health concerns may be more vulnerable to the health impacts that accompany higher heat.

Similarly, the co-benefits of reducing greenhouse gas emissions are not necessarily uniformly distributed across populations. Improved weatherization of any building could reduce emissions, but weatherization may provide more co-benefits when it reduces utility bills for residents with lower incomes. Planting trees is a good thing to do throughout the County, but it may improve the quality of life more in areas that lack shade and trees.

Ensuring equity in climate action is a complex and nuanced endeavor—but it is absolutely achievable. Howard County believes that a single strategy or department focused on equity is not sufficient. Rather, equity must be woven into the overall approach to climate action to ensure that equity is accounted for in decision-making processes.

To achieve a successful and equitable implementation of this Climate Action Plan, Howard County will pursue the Climate Forward and Equitable Governance Strategies listed below. A complete summary of all strategies and actions in this Climate Action Plan are listed at the end of this Preliminary Report.

## Governance Strategies

### **G-1: Establish a Climate Action Subcabinet**

Working collaboratively with multiple agencies and departments during development of the Climate Action Plan fostered innovation and highlighted just how critical it is that all agencies and departments work together to tackle climate change. Through an Executive Order dated October 12, 2022, County Executive Calvin Ball established a Climate Action Subcabinet to ensure that implementation of this Climate Action Plan is a County-wide priority. The Climate Action Subcabinet are a centralized committee of department heads and appointees who are responsible for coordinating across departments, establishing targets and milestones, and supporting County staff in implementing the strategies outlined in this plan.

### **G-2: Prioritize Climate Action in all Aspects of Planning and Operations**

This strategy will ensure that all levels of County government address climate change and will prioritize emissions reductions and climate resiliency in planning and operations. Climate change mitigation, carbon sequestration, and resiliency must be integrated into future codes, ordinances, and design manuals. County departments and offices need to adopt internal policies to prioritize climate action in purchasing, project management, community outreach, maintenance efforts and other aspects of operations.

### **G-3: Integrate Equity and Inclusivity Into All Climate Action and Prioritize Communities Most Vulnerable to the Impacts of Climate Change**

Climate change impacts underserved communities disproportionately so climate mitigation and resiliency actions need to include measures to address and reduce these inequalities and disparities. This strategy will ensure that equity and inclusivity are integrated into every aspect of implementing climate action, including new or existing processes, programs, and projects. This Climate Action Plan will consider how greenhouse gas emission mitigation and resiliency strategies are implemented so that equity is maximized, and the communities most vulnerable to the impacts of climate change are prioritized.

### **G-4: Communicate Climate Action Progress Regularly and Transparently and Create Outreach That Engages the Community in Accomplishing Goals**

Carrying out the strategies and actions in this Climate Action Plan will be a collaborative process involving the County, businesses, organizations, residents, and more. Transparent communication from the County will help ensure the community understands why these actions and strategies are being carried out and enlist their help in accomplishing goals. This strategy will ensure the community is aware of the Climate Action Plan's implementation process, progress, and successes.

### **G-5: Leverage State and Federal Programs and Funding Sources Whenever Possible to Advance Climate Action**

Adequate and reliable funding is critical to the success of several of the strategies and actions outlined in this plan. Significant state and federal legislation have been passed recently that increases resources available to combat and prepare for climate change. Maryland passed the Climate Solutions Now Act and the federal government passed the Infrastructure Investment and Jobs Act and the Inflation Reduction Act. In addition to new funding sources, there are many existing state, federal and non-governmental programs that provide funding, rebates, technical assistance or other resources for climate initiatives. Under this strategy, the county will pursue state, federal, and non-governmental funding sources to support climate initiatives.

## 4.2 Mitigation Strategies: How Will This Climate Action Plan Reduce Emissions?

Howard County identified the most impactful, priority greenhouse gas mitigation strategies. These strategies were selected because they reflect activities that the County has control or strong influence over, are feasible to implement from a technology or policy standpoint, and are expected to result in meaningful reductions. The County was able to quantify the reduction potential for strategies in the Energy, Transportation, and Waste sectors. Agriculture and land use were not included in the base inventory and therefore reductions from nature-based strategies were not quantified, but these strategies will still make an important contribution to lowering the County's net greenhouse gas emissions, especially through carbon storage.

### Mitigation Strategies: Energy

#### **E1** Reduce Greenhouse Gas Emissions From Existing Buildings

Buildings continue to be a major source of greenhouse gas emissions in Howard County and throughout the region. These emissions primarily result from on-site combustion of fuels in boilers and hot water heaters, electricity use, and leaking refrigerants. Actions to address these emissions can include energy efficiency upgrades, occupant education and behavior change programs, beneficial electrification, and conversion to low-global-warming-potential refrigeration equipment.

##### **Action 1: Increase energy efficiency and conservation in all existing residential, commercial and government buildings.**

This action will improve energy efficiency and conservation by leveraging and expanding upon existing utility and weatherization programs. This also includes educating and incentivizing individuals and businesses to adopt cost-effective energy efficiency and conservation measures at home and at work. Measures may include weatherization, lighting upgrades, HVAC equipment upgrades, and individual behavior change such as turning out lights or shutting down computers when not in use.

##### **Action 2: Pursue beneficial electrification in existing residential, commercial and government buildings.**

Building electrification means replacing boilers, hot water heaters, and other equipment that uses on-site combustion of fossil fuels to equipment that runs on electricity. Paired with grid decarbonization, electrification can significantly reduce emissions from buildings. Beneficial electrification results in improved performance and reduced costs, providing other benefits in addition to reducing emissions. For example, when used in buildings under 20,000 square feet, electric heating and hot water can reduce energy costs as well as emissions.

##### **Action 3: Promote the use of low GWP refrigeration and air conditioning equipment in commercial properties.**

Refrigerant leaks can be a significant source of emissions as these chemicals emit potent greenhouse gases that have a high global warming potential (GWP) and contribute exponentially to climate change. Refrigerant leaks also can be costly because leaky systems need to be recharged more frequently. Howard County can lead by example through regular refrigerant system maintenance and replacing outdated equipment with low-GWP alternatives in County buildings. In addition, Howard County can help food retail and other businesses access available programs to help them follow best practices in refrigeration.

## E2

### Construct Efficient and Low-Carbon Buildings

New buildings should be highly efficient and emit the least carbon possible. By integrating green design principles, energy efficiency, and electrification in new buildings, the public and private sectors can avoid having to later retrofit these buildings to comply with Maryland's Climate Solutions Now Action of 2022 and other regulations.

#### **Action 1: Implement more stringent green building standards for new residential, commercial, and government properties.**

This action increases the energy efficiency of new construction and major renovations. To encourage compliance with voluntary green building codes, Howard County will work with the construction community to educate and train contractors and their workforce on green building benefits, new approaches and technology, and installation techniques. Howard County also will continue to actively engage with the state on the timing and process for adoption and implementation of new codes.

#### **Action 2: Phase-in requirements for all-electric new construction for residential, commercial and government properties.**

This action will encourage all new residential and commercial construction to be all-electric, with an initial emphasis on buildings under 20,000 square feet, which are the most cost-effective to electrify. Electrification is being considered for inclusion in the 2024 code, but on a voluntary and not mandatory basis. When paired with decarbonization of grid electricity, all-electric buildings reduce on-site fuel combustion and associated GHG emissions.

## E3

### Decarbonize the Energy Supply

A clean energy grid with a carbon-free fuel mix is a foundational strategy because it enables both vehicle and building electrification to dramatically reduce emissions. Maryland's Renewable Portfolio Standard requires half of the state's electricity to come from renewable sources by 2030, with 14.5% carved out for solar. Howard County can support local renewable energy development and use through education, outreach, eliminating barriers, or considering new options for incentives.

#### **Action 1: Expand the development of onsite solar energy for residential, commercial, and government properties.**

This action aims to increase the development of local, onsite solar installations on residential, commercial, and government properties, leveraging both new and existing policies and programs. Howard County can encourage and promote onsite solar deployment and can help ensure equitable access. The County also can provide unbiased solar information to homeowners and businesses and can help drive down the upfront costs of solar.

#### **Action 2: Encourage the use of renewable natural gas for hard-to-electrify end uses.**

Renewable natural gas (RNG) refers to biogas created from decomposed organic matter through anaerobic digestion, thermochemical processes, or gasification and is interchangeable with conventional natural gas. RNG can reduce the upstream impacts of fuel extraction, and production, and is considered a lower-carbon fuel, depending on its feedstock. RNG could be generated either regionally or transported from national feedstocks such as landfills, animal waste, water resource recovery facilities, food waste, agriculture

residues and/or feed product residues. As the RNG market matures, the County can evaluate and promote the use of RNG for industrial applications, district energy systems and larger, energy intensive buildings that are harder to electrify.

## Mitigation Strategies: Transportation

### T1 Maximize the Use of Electric Vehicles

Electric vehicle adoption should be increased in the public and private sector. This strategy works in tandem with grid decarbonization strategies, as the electricity used to charge EVs becomes cleaner over time. Electric vehicles currently make up only 1% of vehicles registered in Howard County. This strategy advances EV charging infrastructure, encourages private EV purchases, and converts school and transit vehicles to electric.

#### Action 1: Continue to develop a robust EV charging station infrastructure.

As of 2022, 62 chargers have been installed on Howard County government property, a 450% increase from the pre-2019 number of 12. As of 2019, all new residential construction with driveways or garages are required to have the electric wiring to enable electric vehicle charging and new multi-family residential building must provide EV chargers. This action supports the expansion of publicly accessible charging stations in the County to encourage the adoption of electric vehicles.

#### Action 2: Accelerate the adoption of electric vehicles in the community and County government fleet.

With EVs at only 1% of vehicles registered in Howard County, there is a long way to go in wide-spread EV use. This action seeks to increase the rate of EV adoption in the community and the County government fleet. Under this action, the County will pursue an accelerated schedule for replacing County vehicles with electric vehicles. Outreach programs will encourage EV adoption among the community by helping to reduce barriers to EV purchase and use.

#### Action 3: Transition to a zero-emissions transit vehicle fleet.

This action will convert transit buses and vehicles serving Howard County to a low/no-emission option, with a particular focus on EVs. Howard County will develop and implement a transition plan to zero emission buses. The transition plan will determine the feasibility, cost and timeframe for a conversion of the fleet. To bridge the gap in the near term, other low-emission technologies, such as clean diesel, clean natural gas, and renewable natural gas, may be employed.

#### Action 4: Transition to a zero-emissions school bus fleet.

Howard County Public School System (HCPSS) has significant obstacles to converting buses to electric since bus service is contracted out and the buses are not owned by the County. HCPSS is in the process of revising school bus policies and contracts EV bus range and fast charging infrastructure will need to be carefully considered. Under this action, HCPSS will create and implement a plan to transition buses to electric.

### T2 Reduce Vehicle Miles Traveled in Single Occupancy Vehicles

Howard County had the fifth highest vehicle miles traveled (VMT) in Maryland in 2019. High VMT contributes to transportation being the largest source of GHG emissions within Howard County. Opportunities to lower VMT include expanding transit options and reliability, increasing transportation connections from homes to jobs and amenities, increasing telework opportunities, and encouraging behavior changes. Expanding transit access has the additional benefit of improving equitable access for those with few mobility options.

**Action 1: Increase public transit ridership by enhancing the effectiveness and reliability of local and regional public transit.**

Public transit can be an effective way to reduce vehicle trips. Opportunities to increase local and regional transit frequency and reliability should be evaluated and implemented where ridership has the best chance of being increased. Outreach about how to use public transit can also help to increase its use.

**Action 2: Implement microtransit in less dense areas that have a demonstrated need of connection between homes, jobs, and services.**

Microtransit is an on-demand, flexible transit mode that can provide a higher level of service than fixed route transit in certain contexts. Opportunities to apply this in Howard County should be examined. This work will aim to have the system implemented by 2030. Microtransit enables more user-specific access and acts as a public alternative to ride-hail services.

**Action 3: Expand and improve walking paths and bike lanes and connect them to jobs, shopping, schools, and recreational amenities.**

This action will improve and expand bike and pedestrian infrastructure to provide safe, comfortable and effective walking and cycling short trip options, including education and outreach programs.

**Action 4: Increase and normalize teleworking options for employees whenever possible.**

Telework reduces the number of commuters on the road, which can ease congestion and reduce overall VMT. This action will encourage the continuation of full or hybrid telework environments for all occupations that can support telework.

**Action 5: Implement policies, outreach programs, and incentives to promote individual behavior changes to reduce emissions from personal vehicles.**

Individual behavior change can be difficult, but since transportation is the largest GHG polluter in Howard County, we must use all the tools in the toolbox. Behavior changes such as trip chaining, carpooling, and reducing idling are very low-cost ways to reduce VMT.

## Mitigation Strategies: Waste

### **W1 Reduce Organic Waste Sent to Landfills and Manage Landfill Methane**

Organic waste in landfills is a significant source of methane generation and subsequent emissions. Diversion techniques such as composting organic waste can reduce methane generation. Ensuring that methane generated in landfills is captured and managed using best practices is also very important.

**Action 1: Expand composting in the residential sector.**

Howard County has mandatory yard trim collection for most homes and an innovative Feed the Green Bin

food waste collection program. This action will increase residential organic waste diversion by expanding residential access to the Feed the Green Bin program, increasing participation within existing collection areas, and promoting home composting.

**Action 2: Incentivize businesses and schools to reduce organic waste and participate in composting.**

Food waste can be a large portion of the waste stream for businesses and schools. This action encourages local businesses and schools to engage in organic waste reduction and composting. Reducing organic waste at the source is even better and more efficient than managing waste after the fact.

**Action 3: Ensure that Howard County’s Alpha Ridge Landfill and closed landfills meet or exceed the state and federal methane requirements.**

This action reinforces that Howard County will meet or exceed the state and federal landfill gas requirements. Howard County will also pursue innovative methane reduction technologies for landfills such as biofilters.

**W2 Expand the Use of Sustainable Materials and Reduce Waste Generation and Disposal**

This strategy seeks to identify opportunities to reduce non-organic waste from Howard County sent to landfills. Adoption of sustainable government procurement practices can help Howard County government lead the way for the community to similarly identify opportunities to reduce waste.

**Action 1: Improve sustainable procurement in government operations.**

This action will establish or expand the county government environmental procurement policy to encourage the purchase of sustainable materials and products and to minimize waste. Howard County should also consider life-cycle analysis and long-term benefits when evaluating procurements.

**Action 2: Reduce the use of single-use items, particularly plastics and promote waste reduction and reuse throughout Howard County.**

Community outreach should increase focus on waste reduction, repair and buying less. Howard County agencies should evaluate their operations looking for waste reduction possibilities and engage local partners to amplify waste reduction efforts and messaging.

**Mitigation Strategies: Nature Based**

**N1 Support Nature Based Climate Solutions to Improve Soil Health, Increase Carbon Sequestration, and Reduce Emissions**

Conservation-focused practices that improve soil health reduce emissions to the atmosphere and increase carbon sequestration by minimizing soil disturbance while maximizing soil cover, biodiversity, and the presence of living roots. By focusing on soil health as a climate solution, we also gain co-benefits such as reduced soil erosion, improved water infiltration, increased nutrient cycling, decreased money spent on inputs like fertilizer and more resilient soils over time.

### **Action 1: Incentivize adoption of Natural Resources Conservation Service (NRCS) conservation practices that reduce GHG's and sequester carbon**

Howard County provides agricultural technical assistance as well as cost sharing assistance from federal, state and local sources for conservation practices. Under this action, the County will increase outreach and technical and financial assistance to farmers about practices that reduce soil erosion and create healthy soil.

### **Action 2: Improve soil health on private lands through outreach and program expansion.**

Native and deep-rooted plants sequester carbon, decompact soil to increase infiltration and retention, are more adaptable to local weather patterns without additional water or fertilizer, and provide habitat. This action will encourage improving soil health through planting native plants and increasing sustainable landscaping practices on private lands.

### **Action 3: Increase sustainable landscaping practices on public lands to improve soil health and reduce GHG emissions.**

This action will encourage improving soil health through increased use of native plants and other sustainable landscaping practices on public lands. Additionally, reduced mowing on county land can reduce GHG emissions from lawn maintenance equipment.

## **N2 Conserve Existing Forests and Expand the Tree Canopy**

Healthy forests hold significant potential for carbon sequestration. Trees outside of forests sequester carbon as well but less so than those within forests. Planting and maintaining native tree species also preserve biodiversity and improve climate resiliency. This strategy builds on the County's ongoing work to increase tree cover and sequester carbon by identifying priority areas for forest conservation and new tree planting.

### **Action 1: Protect and restore forest and non-forest tree canopy**

This action seeks to protect and conserve existing forests and trees, restore degraded forests, and increase the planting of native trees throughout the County on public and private lands. This will increase carbon sequestration and offer additional co-benefits.

## **4.3 Resiliency Strategies: How Will this Climate Action Plan Increase Resilience?**

Howard County has identified the most impactful strategies to increase resilience to the increased heat and flooding expected from the changing climate. These strategies cover a range of topics meant to make County infrastructure and natural systems better able to withstand future climate conditions to minimize impacts from extreme heat and flooding, and to help better prepare residents and communities for impacts that do occur. Several strategies are focused on improving resilience of underserved and under-resourced communities, as they are often the most vulnerable to climate change impacts. There are also many nature-based solutions which can help to absorb the impacts of climate hazards.

### **Resiliency Strategies**

## **R1 Become a Model for Excellent Communication, Education, and Outreach About Climate Hazards, Emergency Preparedness, and Available Resources**

Howard County will take its emergency preparedness and climate resiliency communication, outreach, and education to the next level by ensuring highly accessible and relevant information is disseminated in the most effective means possible and that all County residents, businesses, and employees are aware of how to prepare for and mitigate impacts of disasters, and to educate them on what resources are available and where to go for more information.

**Action 1A: Create a one-stop-shop for all resources and services relating to climate hazards.**

This action focuses on consolidating all relevant emergency preparedness, public health, and State and local resources related to preparing for and dealing with climate-related and non-climate related emergencies to one single online portal.

**Action 1B: Inventory existing communication, education, and outreach methods and research best practices to reach all communities.**

This action focuses on identifying communication, education, and outreach strategies that can be improved. Stakeholders should incorporate new or improved communication, education, and outreach practices into messaging specific to emergency preparedness, climate resiliency, and other climate-related information.

**Action 1C: Ensure equitable access to information.**

Information should be accessible for those who may struggle to gain information through traditional communication modes (i.e., social media, internet-based news, television, etc.). The information the County publishes should be easy to understand and made available in languages other than English and in alternate formats that are more accessible to people with disabilities.

**Action 1D: Maximize outreach opportunities by layering emergency preparedness information into all county communications.**

Outreach opportunities should be utilized to their fullest potential to make sure people are aware and know how to access available emergency resources and services, emergency preparedness information, and climate-specific preparedness information. Departments who interface the public often and have a lot of opportunities for public outreach are encouraged to push out emergency preparedness information.

**R2 Improve Emergency Preparedness of Howard County Citizens**

As more emergency/disaster events are expected to occur, the County will increase the amount of people who know how to respond to climate disasters, what emergency supplies to have, and where to access emergency resources and services.

**Action 2A: Increase number of individual citizens with emergency kits and emergency plans.**

This action focuses on increasing the number of individuals with emergency supply kits or information on what goes in an emergency supply kit can help increase community preparedness and resiliency.

**Action 2B: Increase capacity of organizations that can provide emergency services before and during an emergency.**

This action focuses on making sure that organizations who already provide emergency services have adequate supplies to give out during an emergency by helping them secure additional funding for resources and services.

**Action 2C: Target more education and outreach efforts about emergency preparedness to communities most vulnerable to extreme temperature and hazardous weather impacts.**

This action focuses on targeting education and outreach efforts to increase emergency preparedness toward individuals living in parts of the County that are expected to be most impacted by extreme temperature and hazardous weather, as well as individuals with higher health risks when exposed to these conditions.

**R3**

**Improve Access to Emergency Shelters, Cooling Centers, and Other Resiliency Resources During Climate Hazard Events, Especially for Underserved and Under-Resourced Communities**

This strategy will explore options to improve access to emergency shelters, warming/cooling centers, and other resiliency resources. The County should explore additional opportunities to add more emergency shelters and warming/cooling centers throughout the county in feasible locations. Additionally, this should determine strategies to increase transportation options to get people to and from emergency shelters and warming/cooling centers.

**Action 3A: Add new warming/cooling centers, emergency shelters, and comfort centers as needed, prioritizing underserved areas.**

This action considers adding warming/cooling centers, emergency shelters, etc. in places where vulnerable populations are more impacted by extreme temperature events and in more accessible and equitable locations (i.e., close to bus stations, within walking distance of residential areas, etc.).

**Action 3B: Maximize transportation options to get to and from emergency centers during climate hazard emergencies.**

During extreme weather events, people need to be able to access various transportation modes and options. An ADA-compliant transportation plan during large and localized climate emergency events should be developed. Affordable transportation options focused on getting people to and from emergency centers should be considered a priority during extreme weather events.

**R4**

**Increase Resiliency of Buildings, Infrastructure and Communities to Match Anticipated Climate Hazards**

Ensure commercial and residential buildings, roads, bridges and other built infrastructure can withstand the stress of more intense heat waves, extreme storms, flooding, and other anticipated climate hazards. Building codes, design standards, and best practices that improve resiliency can include energy efficiency, on-site renewable energy generation and storage, climate-resilient construction, placement of new infrastructure well outside of floodplains, and a skilled workforce to repair critical equipment in emergencies.

**Action 4A: Continue to lead nationally on building safety and resiliency by researching and piloting building code updates to increase resiliency to severe storms, flooding and heat beyond life safety.**

Building codes traditionally focus on life safety, ensuring buildings operate long enough to safely evacuate people in a disaster, rather than ensuring people can continue to safely live in or use those buildings during and after emergency events. Targeted building code updates can improve long term building resiliency and human health in a changing climate. Some examples include elevating mechanical and electrical equipment and using storm resistant construction materials.

**Action 4B: Promote existing programs to protect underserved populations from extreme heat and explore opportunities to expand eligibility for these programs to more people.**

Weatherization programs funded by federal and state grants provide free energy audits and energy efficiency upgrades, including new air conditioning units or air conditioning upgrades, to income-qualified individuals. Additional outreach in Howard County can increase the number of people who benefit from these programs.

**Action 4C: Promote and incentivize building best practices that protect people from impacts of extreme heat.**

Reflective rooftops, green roofs, cool pavements, shade plantings and other best practices can reduce heat island effects and protect heat-prone areas from increased intensity and duration of heat waves.

**Action 4D: Improve resilience of critical infrastructure to flooding, heat and other climate hazards.**

Roads, bridges, dams, public water and wastewater utilities and other critical infrastructure may experience additional stress from more extreme heat, flooding and other climate hazards. Mapping flood risks to infrastructure can help the County identify and prioritize any improvements needed. Evaluating and considering updates to design requirements for infrastructure and critical facilities can help ensure resiliency to climate hazards.

**Action 4E: Implement microgrids throughout Howard County where feasible, prioritizing areas that meet critical community needs.**

A microgrid is a local power generation system that can operate independently of the utility grid. Microgrids often include a combination of solar panels, battery storage, generators, and system controls that work together to provide on-site power. Careful siting of microgrids can ensure critical public safety functions and vital community services are available even during extreme heat, severe storms, and long-duration power outages.

**Action 4F: Implement resiliency hubs to meet critical emergency needs for the community.**

Resiliency hubs provide safe places for the public to gather, meet critical needs, and gain information and assistance. Resiliency hub services can include temporary access to heating or cooling, medication refrigeration, device charging, and accessing additional emergency preparedness and response resources.

**Action 4G: Expand recruitment and training for technicians to support HVAC, microgrids, and emergency generators.**

Longer and more intense heat waves will increase electricity demand and put more stress on air conditioning systems, leading equipment to break when its needed most. At the same time, an increase in severe storms may lead to more power outages. This in turn will increase demand for skilled technicians who can install and repair equipment during emergencies.

**R5 Reduce Heat Islands and Increase Shade in Heat Vulnerable Areas**

Heat is one of the most dangerous climate hazards to human health. Urban heat islands, the result of dark, heat-absorbing surfaces like asphalt streets and parking lots can increase temperatures from 6 to 12 degrees Fahrenheit. Strategically planting native drought- and heat-resistant trees will decrease heat islands and improve health.

**Action 5A: Research and map heat vulnerable areas with a focus on underserved populations.**

Mapping geographic areas that have a combination of high heat, underserved populations, and little tree canopy allows the County to target programs to the most impactful locations.

**Action 5B: Strategically increase tree planting in heat vulnerable areas on both public and private land.**

Using the maps developed in Action 5A, the County will prioritize high heat risk neighborhoods for shade tree plantings. The majority of available planting space in Howard County is on private property, so working with the public will be crucial to these efforts.

**Action 5C: Research and incorporate use of shade structures and cool surface technologies in public amenities and spaces.**

Nature-based solutions have the most co-benefits, but as annual average temperatures and extreme heat waves continue to increase across the country, structural cooling practices and products such as shade structures and reflective surface materials also need to be used.

**R6**

**Increase Installation and Facilitate Maintenance of Stormwater Best Management Practices on Residential, Commercial, and Non-Profit Properties**

Increase the installation and long-term maintenance of small-scale stormwater management practices, nonstructural techniques, and better site planning to mimic natural hydrologic runoff characteristics, preserve natural features, and minimize the impact of land development on water resources. These best practices may include bioretention, rain gardens, conservation landscapes, and tree canopy expansion.

**Action 6A: Expand the CleanScapes program to increase installation and maintenance of stormwater practices on residential properties, with a focus on areas of high flood risk as well as underserved communities.**

By expanding its existing CleanScapes program, Howard County can increase the use of stormwater best management practices (BMPs) on residential properties while increasing equity and maximizing resilience of installed BMPs through maintenance or retrofits.

**Action 6B: Enhance the Community Stormwater Partnership Grant program to further support stormwater best management practices in flood-prone areas, vulnerable watersheds, and underserved communities.**

Non-profit organizations and homeowner's associations can be private landowners that tend to have large open space areas available for installation of stormwater practices. These larger projects that are predominantly in shared spaces provide an opportunity for educational signage and further community acceptance of nature-based stormwater solutions.

**Action 6C: Expand Commercial Stormwater Solutions Program to provide flexibility in program structure and account for the financial impacts of BMP installation and retrofits to property owners.**

Commercial properties often have large areas of impervious surfaces and therefore can contribute runoff. The current Commercial Stormwater Solutions program does not thoroughly address the financial impacts

of BMP installation and maintenance to property owners and therefore the program is not being fully utilized by the commercial sector. Greater incentives and continued flexibility in the program could increase participation and encourage more innovative projects.

**Action 6D: Provide BMP maintenance support and resources that ensure long term success of BMPs installed as part of new development.**

Providing resources and maintenance support to property owners, especially residential property owners, who have BMPs installed on their property as part of the development process will improve the long-term functionality of these systems. This is critical to ensuring that stormwater from new developments is not negatively impacting local waterways and existing stormwater infrastructure.

**Action 6E: Leverage existing Nonprofit Watershed Protection Partners to implement stormwater management and outreach.**

The existing Nonprofit Watershed Partnership should be reevaluated to be more effective. Nonprofit Partners are currently very inactive and few have installed or retrofitted practices on their properties. This Partnership provides an opportunity to work with nonprofits and utilize their lands to provide greater stormwater management.

**R7**

**Prioritize Stormwater Management by Strengthening Regulations, Policies, and Innovation**

Implement climate resilient stormwater management regulations, policies, and programs utilizing the best available climate science and best practices to design stormwater systems for forecasted future climate conditions. Strengthen existing initiatives, update infrastructure, incorporate new maintenance efforts, and ensure adequate funding.

**Action 7A: Develop a Howard County specific stormwater guide.**

Develop an understanding of what presently works well to combat issues related to stormwater management and what perceived gaps might be filled by innovative and new strategies. Package the findings of pilot projects, past experiences, priorities, funding options, and policies for Howard County staff into a document that is utilized and can be referenced internally county-wide.

**Action 7B: Consider adjusting and strengthening stormwater management regulations based on climate change predictions.**

Consider increasing stormwater management regulations for redevelopment, as well as expanding special stormwater management zones requiring higher treatment levels for watersheds with known or predicted flooding. Also consider increasing stormwater treatment requirements based on scientific predictions for future weather events.

**Action 7C: Increase support for maintenance and infrastructure updates.**

Provide funding dedicated to maintenance of existing stormwater management infrastructure, including storm drains, environmental site design practices, and stormwater ponds. Prioritize funding and action based on climate predictions and proximity to vulnerable watersheds and underserved populations.

#### **Action 7D: Employ innovation and natural solutions in stormwater management.**

Seek opportunities to employ innovative best practices to maximize stormwater quantity and quality control within existing stormwater management infrastructure and/or for creating new stormwater storage capacity on already developed land. Consider natural solutions prior to structural solutions in all cases and only select structural solutions after careful analysis and elimination of alternatives.

#### **Action 7E: Establish a fund for pilot projects to encourage innovation.**

Establish a fund to support pilot projects that test new solutions on a small scale. Establish baseline performance of pilot projects and develop scalable plans to implement successful pilot projects throughout Howard County. Simultaneously, begin to identify local, state, and federal resources that can fund large scale implementation programs.

#### **Action 7F: Explore increasing the Watershed Protection and Restoration Fee, as well as alternative funding solutions.**

Additional funding is needed to be able to provide necessary maintenance, upgrades, and additional infrastructure and treatment facilities. Consider a variety of Fee increase structures and explore funding opportunities from private, state, and federal sources.

#### **Action 7G: Improve graywater capacity and usage.**

Capturing rainwater to be used as graywater reduces stormwater flows and demand on infrastructure. The graywater can then be utilized for a multitude of applications and may be essential during severe storm or emergency events, drought, or if water systems are compromised.

### **R8 Determine Vulnerable Watersheds and Prioritize Recommended Stormwater Solutions**

Create a program focused entirely on Vulnerable Watersheds, which are areas within the County subject to flooding both from overflowing streams and from local drainage systems inadequate to convey runoff from large storm events. As weather events continue to intensify, prioritize identifying, assessing, and implementing actions to aid these communities. Long-term sustainability and maintenance of installed projects must be carefully considered and planned, including dedicated funding.

#### **Action 8A: Establish a new program designed to aid vulnerable watersheds.**

Create a Vulnerable Watershed Restoration and Resiliency Program to assist communities with flooding issues. Utilize a set of criteria to locate, assess, and implement recommendations to assist in flooding. Prioritize recommended stormwater enhancements and maintenance in these areas of the county to create more resilient neighborhoods.

### **R9 Maximize the Resiliency Benefits Derived from Ecosystem Services by Improving Protections for Wetlands, Forests, and Streams and Increasing the Acreage of these Resources through Restoration or Creation**

Ensure that the resiliency benefits provided by ecosystems are valued and protected. Healthy wetlands, forests, and streams mitigate environmental conditions more cost effectively than engineered systems and have greater co-benefits. These ecosystems absorb water and wind, mitigate heat, treat pollution, and perform many other ecosystem services essential to human health. These services are increasing in value as we prepare for a changing climate.

**Action 9A: Improve the protection of existing wetlands, restore degraded wetlands, and investigate wetland creation opportunities in areas most likely to face resiliency stresses.**

Wetlands act as natural sponges built into the landscape, swelling to absorb larger quantities of water than most other land covers. Preserving existing wetlands is more technically feasible and cost effective than creating wetlands; nevertheless, opportunities to create, restore, or expand wetlands may exist throughout the county. Consider increasing buffers or other protections for wetlands in vulnerable watersheds and near underserved populations. Investigate options for wetland preservation, restoration, and creation.

**Action 9B: Improve the protection of existing forests, restore degraded forests, and increase forest acreage where possible. Retain and expand non-forest tree canopy.**

Use a variety of tools to protect and enhance the county's forest and tree canopy resources. Further research our forest needs. Look at different types of forests and tree canopy and how they might merit different levels of protection in preparation for climate change. Periodic updates of the Forest Conservation Act and Forest Conservation Manual are essential to long-term forest protection in Howard County.

**Action 9C: Improve the protection of streams, restore degraded streams, and increase stream buffers where possible.**

Improving stream resiliency benefits surrounding development and ecosystems. The ability of stream systems to absorb and retain water volume and dissipate erosive energy is reliant on the health of the stream prior to a severe weather event. Streams that are connected to their floodplains and streams with forested banks are more resilient to extreme weather and provide greater resiliency benefits to surrounding developments.

**Action 9D: Protect and enhance the natural resources in the Green Infrastructure Network.**

Connectivity between ecosystems is critical for their health and function, especially in the wake of a natural disaster or with shifting climate patterns. After a major disturbance such as fire, flood, or insect invasion, ecosystems which are connected to other ecosystems will recover more quickly than ecosystems without those connections. Similarly, if shifting weather patterns degrade an ecosystem in one location, such as the long-term drying of a wetland, the Green Infrastructure Network provides potential routes for species to emigrate to other locations. The plant and animal species in the Green Infrastructure Network rely on its connectivity for their long-term vitality, and human populations rely on the ecosystem services provided by these species and their associated ecosystems.

**Action 9E: Ensure that planting practices evolve to be resilient to climate change.**

As climate changes, some plant species will become less viable in certain locations. Assess planting pallets across County programs, including the development of new county facilities, land development regulations, tree planting programs and other environmental incentive programs such as CleanScapes. Update planting pallets and practices as needed.

# 5. Federal, State, and Community Climate Solutions

With proper attention and investment, County government can do a lot to reduce greenhouse gas emissions, sequester carbon, and improve resiliency to climate change. Howard County has already made great strides on sustainability and resiliency both within county operations and through education, outreach, and policy. As this Preliminary Report demonstrates, there are more actions the County can and must take to reduce greenhouse gas emissions, sequester carbon, and steward improved resiliency to climate hazards. However, County government alone is unable to solve the climate crisis. Many of the actions needed to reduce the impacts of and prepare for climate change are outside of the County's jurisdiction, geographic boundaries, or ability to control. Meeting the ambitious and crucial goals set forth in this Climate Action Plan will require coordinated and sustained efforts by not just County government but also all members of the community, including federal and state government, neighboring jurisdictions, residents, businesses, organizations, and other partners.

## 5.1 Federal and State Climate Action

Strong federal and state policies, programs, and financial commitments are critical to addressing climate change. Local governments have limited jurisdictions and are unable to affect the types of sweeping and far-reaching changes that are possible with state and federal engagement.

Fortunately, recent actions at the state and federal level will help support the ambitious changes that are needed. The federal government, under the Biden Administration, has rejoined the Paris Agreement and has set a national goal to reduce greenhouse gas emissions 50% over 2005 levels by 2030 and to achieve net zero emissions by 2050. In April 2022, the State of Maryland passed the Climate Solutions Now Act, which sets an even more aggressive goal of achieving net zero greenhouse gas emissions by 2045. The Act also includes funding sources and policy support that will help achieve that target across the state. Meanwhile, Congress recently passed two major pieces of legislation—the Infrastructure Investment and Jobs Act (IIJA) in 2021 and the Inflation Reduction Act (IRA) in 2022—which will mobilize billions of dollars to support efforts to reduce greenhouse gas emissions and increase infrastructure resiliency. In addition, the recent passage of the American Innovation and Manufacturing Act (AIM) also has great potential to reduce greenhouse gas emissions. Some of the most impactful results expected from these state and federal policies are noted below.

Climate Solutions Now Act (Maryland):

- Develops codes that will significantly reduce the energy consumption of buildings
- Incorporates long-term electric distribution planning necessary to decarbonize the electricity supply
- Directs climate-related funding and efforts to benefit overburdened and underserved communities
- Pilots an electric school bus program
- Establishes new funding for a variety of climate initiatives

Inflation Reduction Act (Federal):

- Directs \$369 billion for addressing domestic energy security and climate change
- Increases resiliency of electrical grids
- Funds and promotes low-carbon technologies and materials for homes and other buildings

- Provides tax credits and other support to increase electric vehicle adoption
- Covers incremental costs of zero-emissions school buses, garbage trucks, and transit buses
- Funds energy efficiency upgrades, climate resilience measures, and electrification of affordable housing

Infrastructure Investment and Jobs Act (Federal):

- Directs \$550 billion to make the nation’s infrastructure and economy more sustainable and resilient
- Supports public transportation improvements
- Expands EV charging infrastructure
- Improvements to roads and bridges with a focus on climate resilience

American Innovation and Manufacturing Act (Federal):

- Phases out the use of high global warming potential hydrofluorocarbons used in refrigerants

These and other state and federal initiatives go a long way toward curbing greenhouse gas emissions and improving climate resiliency in Howard County, Maryland, and the United States. However, more efforts will be needed at the state and federal level to reduce greenhouse gas emissions enough to avoid catastrophic climate change. Howard County will work with other local jurisdictions, activists, businesses, organizations, and other partners to advocate for additional positive change at the federal and state levels. For example, additional changes to the state of Maryland Renewable Portfolio Standard (RPS) could allow for a carbon-free electricity grid (compared to Maryland’s current RPS of 50% renewable by 2030). A carbon-free electricity grid is a foundational policy which unlocks the potential for lower emissions as transportation and building energy use continues to transition to electric power. Additional financial investment at the state and federal level can help accelerate our transition to carbon neutrality more quickly.

## 5.2 Engaging the Community in Climate Action

We also call on individuals to join this fight. It’s important that Howard County residents, businesses, organizations, and visitors understand how our actions can play a role in mitigating the impacts of climate change. The individual choices we make each day can significantly reduce our contributions to unwanted pollution and emissions. It’s also critical that each of us is prepared for climate related emergencies and is aware of and has access to government and partner resources to survive and thrive in the changing climate. The full HoCo Climate Forward report will include detailed suggestions of top mitigation, sequestration, and resiliency actions for individuals, businesses, and groups. Together, we can achieve the needed GHG emissions reductions, carbon storage, and resiliency measures to for our communities to survive and thrive now and in the future.

