Baltimore Climate Action Plan Update

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Baltimore Office of Sustainability
People · Planet · Prosperity

LAND ACKNOWLEDGMENTS

The Baltimore Office of Sustainability acknowledges that, according to research conducted by the Maryland State Arts Council through tribal consultation, feedback from local experts, and archeological findings, the precolonial histories of the lands known today as Baltimore City and Baltimore County are linked to ancestors of the Piscataway, whose various bands still live in Maryland, the Susquehannock, and other tribal nations. Since the mid-twentieth century, Baltimore has also been home to the largest community of Lumbee people outside of their tribal homeland in North Carolina, as well as members of other southeastern tribal nations such as the Haliwa Saponi and Coharie. Furthermore, Baltimore is presently home to members of many different tribal nations who hail from all parts of the Americas.

The Baltimore Office of Sustainability also recognizes:

- The complex history of the land upon which our city was founded and currently has jurisdiction over. We pay respect and give thanks to the Indigenous tribes who have stewarded these lands since before they were colonized, and to Black/African American, Latino, Asian, immigrant and migrant populations, members of the LGBTQ++ communities, persons with disabilities, and others who have been historically exploited in this region through enslavement, indentured servitude, incarceration, and subjugation, or otherwise mistreated or excluded from contributing to critical land-use decisions about the lands that comprise the greater Baltimore region. We also want to address a too-common impression that Native people (also known to others as Native Americans, American Indians, Indigenous Peoples, Original Peoples of North America, or First Nations) are not presently in Baltimore City. This does not accurately reflect the fact that Native peoples of many nations exist, dwell and contribute to Baltimore City and its surrounding region.
- This statement is not in and of itself an outcome, accomplishment or symbol of progress, but merely a starting place from which to begin deeper and more contextualized dialogue and thoughtful actions that address the pains, struggles and joys of our shared and unique pasts and the futures we'd like to curate together as a city. Land use decisions play a critical role in the past, present and future of our city.

- The history of enslaved Africans, whose descendants now may identify as Black and/or African American, Caribbean American or Afro-Latino, or with another country of origin, or as Native peoples and other subjugated peoples on these lands. The enslavement of Africans was tethered to white supremacy, capitalism, and extractive economies – yielding a yet to be quantified amount of wealth for private industries, institutions (academic and otherwise), and local and other descendants of wealthy colonial land-owning families.
- The complex past of these lands known in present day as Baltimore City, that were stewarded by the aforementioned peoples and their descendants who were displaced, enslaved, incarcerated, subjugated or otherwise mistreated or excluded from contributing to critical land-use decisions on the lands that comprise the greater Baltimore region and the Chesapeake Bay Watershed, call for repair, reconciliation and atonement through the most appropriate measures. These measures may include but should not be limited to the allotment of sacred lands for Native peoples of these lands, reparations for Native peoples and descendants of enslaved Africans, intentional incorporation of Indigenous peoples' teachings and practices into modern narratives and practices of environmental protection, and other actions to compensate for the harm inflicted upon Indigenous, Black and other People of Color on these lands, and reconciliation with past atrocities which took place on the land today known as Baltimore City, MD.

A HEARTFELT THANK YOU

We thank everyone across Baltimore City who helped make the 2023 Climate Action Plan a robust, timely roadmap to reducing greenhouse gas emissions.

Thousands of residents and stakeholders responded to surveys, attended virtual and in-person workshops, events, and meetings, and shared their thoughts, comments, and ideas to guide climate action for years to come. Their suggestions and support will have a lasting impact on Baltimore.

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LETTER FROM THE MAYOR

On behalf of the City of Baltimore, I am honored to present the 2023 Climate Action Plan. The climate crisis is the defining challenge of our lifetimes and we are already feeling its impact. To tackle it, we must confront the crisis relentlessly.

This plan provides a comprehensive framework for the City of Baltimore to reach its ambitious greenhouse gas emissions goals while enhancing environmental justice, social equity, quality of life, and economic prosperity for everyone who lives, works, and plays in Baltimore.

Baltimore's 2023 Climate Action Plan (CAP) charts a path forward to increased energy efficiency, switching to low or no emission fuels, reducing and diverting waste, encouraging greater use of electric vehicles, public transit, and much more. The plan is just the beginning of a decade-long vision for ambitious climate actions that will require diverse strategies, significant time, talent, and support to accomplish. Through collaboration between agencies, governments, communities, and one another, our city can ensure we build resiliency and take the steps necessary to do our part in combating this crisis.

While Baltimore City government will play a critical leadership role in the implementation of this plan, achieving carbon neutrality by 2045 will require everyone. Engaged community members have worked alongside City employees, technical experts, nonprofit leaders, and so many others to set the goals and shape the actions included in this plan. As a result, the actions included in this plan are community-oriented. Both equity and effectiveness drove the creation of this plan to ensure people, businesses, wildlife, and ecosystems can thrive in Baltimore.

The 2023 CAP is a bold update to the 2012 Climate Action Plan that reflects our current climate challenges and – in combination with our 2019 Sustainability Plan – will guide our work to ensure our city is as resilient as possible as we confront the unprecedented challenges ahead.

We are all united by the common danger posed by the climate crisis. Together, we can, we will, we must make Baltimore a leader in climate resiliency.

Brandon Scott

LETTER FROM THE SUSTAINABILITY COMMISSION

The Commission on Sustainability is thrilled to share with you the 2023 Climate Action Plan. Since the original Climate Action Plan was adopted in 2012, residents, government agencies, nonprofit partners, and businesses have made major strides in reducing our city's greenhouse gas emissions. However, there is more to be done to achieve our targets, including making significant emissions reductions by the end of the decade and achieving full carbon neutrality by 2045.

While the 2012 plan had a strong focus on actions to reduce emissions, the updated plan includes a stronger emphasis on the social and economic impacts and benefits of the actions needed to reach our goals. This will enhance the ability of the City and local partners to consider the community benefits, costs, and cost savings of our climate actions as we prioritize implementation. The implementation roadmaps included in the plan provide guidance to the City and its partners to navigate and stay on track while pursuing the most complex elements of the plan.

It is the job of the Sustainability Commission to monitor the implementation of the Sustainability Plan and Climate Action Plan. These plans are reflections of the voices of Baltimore, with parameters set for equity. As we have for the past decade, each year we will conduct an annual review, prepare an annual report, and actively seek your feedback as we ask "How are we doing?"

We hope that you will see the value in subscribing to working together as we renew our commitment to creating a more sustainable and resilient Baltimore.

Mia Blom
Co-chair, Commission on Sustainability

Jared Lyles
Co-chair, Commission on Sustainability

LETTER FROM BALTIMORE OFFICE OF SUSTAINABILITY & DEPARTMENT OF PLANNING

2023 has been a critical year for climate action planning in Baltimore City, the State of Maryland, and the entire country. Historic levels of federal funding combined with new ambitious climate targets under Maryland's Climate Solutions Now Act align well with our citywide climate planning. Climate change and resilience are top of mind for a growing number of people in Baltimore and beyond as the realities of climate threats are inescapable. As a waterfront city in the Chesapeake watershed, we experience rising sea level rivaled by few U.S. cities. Wildfires located hundreds or even thousands of miles away have led to dangerous air quality. Extreme weather continues to be more common and results in myriad challenges that threaten the health and well-being of people in the City, especially the most vulnerable people.

Our 2023 Climate Action Plan was developed in tandem with the FEMA-mandated Disaster Preparedness and Planning Project or DP3, and two critical state-regulated city plans: the Solid Waste Management Plan, and Our Baltimore, a comprehensive land use plan. We thank and greatly appreciate all the input, perspective that contributed to each of these planning efforts, especially from our residents. Your voices enhanced the CAP actions, challenged us to be more ambitious, bolder and move the needle on climate actions that mitigate the impacts of climate change.

Progress is already underway. Baltimore continues to be a leader in urban sustainability, having earned the Leadership in Energy and Environmental Design (LEED) Gold certification for cities, the world's most widely used green building rating system, by the U.S. Green Building Council, making the Climate Disclosure Project's A-List of city's leading climate change issues, expanding to 100+ publicly available EV chargers, and always anchoring our climate work to racial, and economic justice. Yet, we know much more aggressive action is needed. We look forward to working across city, state and federal agencies, collaborating with different governments and working with you, the people of Baltimore, so that 10 years from now people around the country will think of Baltimore as an international leader in urban climate resilience.

Chris Ryer
Director, Department of Planning

Ava Richardson
Director of Sustainability

GUIDING PRINCIPLES

The Climate Action Plan Update and other public plans set clear, measurable, and realistic objectives to improve Baltimore's climate resilience and sustainability, however it is important that, as a city and community, we must consistently consider our activities, processes, and ways of operating to promote more sustainable, resilient practices. Implementation of Baltimore City's 2023 CAP will be centered on the following principles. We encourage all those pursuing climate work across Baltimore City to use these principles to plan, execute, and evaluate your work.

1. Center equity by addressing mitigating, or alleviating unequal environmental burdens placed on environmental justice communities.
2. Recognize that environmental, social, and economic well-being is interconnected and take advantage of the transition to sustainable practices and to protect both our communities and the natural environment.
3. Regard climate resilience and sustainability as fundamental to improving the health, safety, and quality of life of the people who live, work, and play in Baltimore.
4. Seek to create co-benefits for the people, economy, and environment in Baltimore through climate action.
5. Consider long-term impact and benefits rather than only first costs in policy development and financial decision making, including but not limited to achieving carbon neutrality goals, mitigating risk related to extreme weather and natural disasters, and expanding people-centric design for increased non-vehicular traffic or low or zero emission transit as well as nature-based solutions.
6. Understand that public participation is critical to achieving carbon neutrality and environmental justice goals and authentically, strategically, and meaningfully engage the public in climate resiliency planning and in climate action.
7. Foster inter-agency and cross sector collaboration and authentic, strategic, and meaningful public participation in climate resiliency planning and climate action.

8. Value, preserve, steward, and promote our assets including the waters, natural resources, green spaces, and recreational features in Baltimore's urban environment and ensure equitable access for future generations to clean, healthy, and protected natural spaces and water.
9. Redesign, reduce, reuse, recycle and compost and recirculate would-be wasted materials into the local economy.
10. Leverage City general funds, investments, infrastructure, or capital projects to reflect the above stated values in all City-led projects, development, and infrastructure upgrades, and in City operations.

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TABLES & FIGURES

ACRONYMS

BCRP: Baltimore City Recreation & Parks Department
BEPS: Building Energy Performance Standards
BGE: Baltimore Gas and Electric
BIPOC: Black, indigenous, and other people of color
CAP: Climate Action Plan
CO_2: Carbon dioxide
COVID-19: Coronavirus Disease of 2019
CSNA: Climate Solutions Now Act
DOE: U.S. Department of Energy
DOT: U.S. Department of Transportation
DP3: Disaster Preparedness and Planning Project
EPA: U.S. Department of Environmental Protection
EV: Electric vehicle
FEMA: Federal Emergency Management Agency
GGRA: Greenhouse Gas Reduction Act
GHG: Greenhouse gas
HUD: U.S. Department of Housing and Urban Development
IgCC: International Green Construction Code
LED: Light-emitting diode
MDE: Maryland Department of Environment
MDOT: Maryland Department of Transportation
MTA: Maryland Transit Administration
$MTCO_2e$: Metric Tons of Carbon Dioxide Equivalent
PPA: Power Purchase Agreement
SRECS: Solar Renewable Energy Certificate
SWMP: Solid Waste Management Plan
ZEV: Zero-emission vehicle

GLOSSARY

Key terms are defined below. Where these terms first appear in the document, the text is bolded to indicate that the term is defined in this glossary.

Baltimore Gas and Electric (BGE): a utility that provides service to more than 1.2 million electric customers and more than 650,000 natural gas/methane gas customers in central Maryland and is the primary service provider for Baltimore City.

Benchmarking: the practice of comparing the measured performance of a device, process, facility, or organization to itself, its peers, or established norms, with the goal of informing and motivating performance improvement. When applied to building energy use, benchmarking serves as a mechanism to measure energy performance of a single building over time, relative to other similar buildings, or to modeled simulations of a reference building built to a specific standard (such as an energy code).

Building Energy Performance Standards (BEPS)/ Building Performance Standards (BPS): policies that establish performance levels for buildings. These policies aim to reduce the carbon impact of the built environment by requiring existing buildings to meet energy and/or greenhouse gas (GHG) emissions-based performance targets. BEPS set a minimum threshold for energy performance for existing buildings. BPS are energy or emissions targets that existing buildings must meet over time to improve energy efficiency and reduce climate and human health impacts.

Car-free zone: a district where motor vehicles are prohibited. Residents and visitors rely on public transport, walking, cycling or other modes that do not involve single use vehicles for travel within the zone as opposed to motor vehicles.

Carbon dioxide (CO_2): a chemical compound with the chemical formula CO_2. It is made up of molecules that each have one carbon atom covalently double bonded to two oxygen atoms. In the air, CO_2 is transparent to visible light but absorbs infrared radiation, acting as a GHG.

Carbon neutral: there is no net release of GHGs to the atmosphere by balancing the GHG emissions we create with the GHG emissions we remove from the air (also known as net zero emissions).

Circular economy: an economy that keeps materials, products, and services in circulation for as long possible. A circular economy reduces material use; redesigns materials, products, and services to be less resource-intensive; and recaptures “waste” as a resource to manufacture new materials and products.

Clean energy: clean energy sources do not generate GHG emissions during the electricity generation process (e.g., sun, wind, geothermal, bioenergy, hydropower, biogas). Clean energy includes all renewable energy sources, but renewable energy does not include all clean energy sources.

Climate equity: The goal of recognizing and addressing the unequal burdens made worse by climate change, while ensuring that all people share the benefits of climate protection efforts. Achieving equity means that all people—regardless of their race, color, gender, age, sexuality, national origin, ability, or income—live in safe, healthy, fair communities.

Community land trust: a private, nonprofit organization that owns land on behalf of a community, promoting housing affordability and sustainable development and mitigating historical inequities in homeownership and wealth building.

Community leader: a person who represents, influences, and guides a community. A community leader may come from different sectors, such as government, nonprofit, or grassroots.

Community Solar: the U.S. Department of Energy (DOE) defines community solar as any solar project or purchasing program, within a geographic area, in which the benefits flow to multiple customers such as individuals, businesses, nonprofits, and other groups. In most cases, customers benefit from energy generated by solar panels at an off-site array.

COVID-19: Coronavirus disease of 2019 that created a global pandemic.

Electric vehicle (EV): a vehicle that uses electricity as a power source.

Energy audit: an examination of a building to find out how much energy is being used in it and if changes could be made to use less. It is an assessment of the energy efficiency of a building that identifies opportunities to save energy, reduce costs and improve the value of a property.

Energy burden: a measure of how affordable energy is for different households. It is determined by considering the percentage of household income spent on energy costs.

Environmental Justice Community: the U.S. Environmental Protection Agency defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. An environmental justice community is one that is overburdened and most impacted by environmental harms and risks.

Food rescue: the practice of gleaning edible food that would otherwise go to waste from places such as farms, produce markets, grocery stores, restaurants, or dining facilities and distributing it to people, not landfills or incinerators (also called food recovery, food salvage or surplus food redistribution)

Fossil fuels: fossil fuels are non-renewable resources that formed when prehistoric plants and animals died and were gradually buried by layers of rock. Fossil fuels include coal, oil, and natural gas. Fossil fuels produce large amounts of GHGs when burned.

Frontline or fence-line communities: areas in closest proximity to toxic, hazardous, or other harmful environmental exposures, thus on the front line of environmental injustices. These are often communities of color or low-income areas, whose neighborhoods often lack basic infrastructure to support them and who will be increasingly vulnerable as our climate deteriorates.

Greenhouse gases (GHGs): gases that trap heat. When fossil fuels are burned, they release GHGs into our atmosphere. The GHGs let the sun's heat through to the Earth and trap this heat around the Earth, causing climate change. Cities try to reduce the amount of GHGs they produce to fight climate change.

Green infrastructure: engineered solutions incorporating natural and built elements, such as rain gardens or green roofs.

Light-emitting diode (LED): a semiconductor device that emits light when an electric current flows through it. LED light bulbs are commonly used because they use less power than other options and they have long-lasting capabilities.

Low or no emission: low emission energy sources or vehicles/equipment produce fewer emissions than the average energy source or vehicle/equipment types. Low emission fuel sources typically include biodiesel, ethanol, natural gas/methane gas, or propane. No emission energy sources or equipment produce no GHG emissions when used. No emission vehicles (also known as zero-emission vehicles) are certified to produce zero emissions of any criteria pollutants.

Maryland Transit Administration (MTA): a division of the Maryland Department of Transportation, and one of the largest multi-modal transit systems in the United States. MTA operates Local Buses (CityLink and LocalLink), Commuter Buses, Light Rail, Metro Subway, Maryland Area Regional Commuter (MARC) Train Service, and a comprehensive Paratransit (MobilityLink) system. It operates Baltimore's transit systems, including local buses.

Methane gas: a fossil fuel energy source (also known as natural gas).

Metric Tons of Carbon Dioxide Equivalent ($MTCO_2e$): the common unit for reporting an amount of GHGs. CO_2e can be determined by multiplying each GHG by its respective global warming potential.

Micro-mobility: a form of transportation using lightweight vehicles such as bicycles or scooters, especially electric ones that may be borrowed as part of a self-service rental program in which people rent vehicles for short-term use within a town or city.

Natural gas: a fossil fuel energy source that will be referred to as methane gas in this document.

Natural infrastructure: existing or rehabilitated environments for resilience, such as restored wetlands or urban forests.

Nature-based solutions: sustainable planning, design, environmental management, and engineering practices that weave natural features or processes into the built environment to promote adaptation and resilience.

Net zero: there is no net release of GHGs to the atmosphere by balancing the GHG emissions we create with the GHG emissions we remove from the air (also known as carbon neutrality).

Paratransit: a transportation service that supplements larger public transit systems by providing individualized rides without fixed routes or timetables.

Power Purchase Agreement (PPA): a long-term contract between an electricity generator and a customer, usually a utility, government or company.

Procurement: government procurement is the process by which the government acquires the goods and services it needs by purchasing from commercial businesses. Since agencies of the government use taxpayer money, there are a number of regulations on how to use it properly and responsibly.

Renewable energy: renewable energy is any form of energy that is replenished by natural processes at a rate that equals or exceeds its rate of use (e.g., sun, wind, geothermal, hydropower).

Retro-commissioning: a systematic process to enhance a building's current performance by recognizing operational improvements to ultimately save on energy.

Shared parking agreement: a contract between two or more parties that agree to share a parking area for a pre-determined amount of time.

Solar Renewable Energy Certificate (SREC): a market-based instrument that represents the property rights to the environmental, social, and other non-power attributes of renewable electricity generation. SRECs are created for each megawatt-hour of electricity generated from solar energy systems.

Zero-Emission Vehicle (ZEV): a vehicle that does not emit exhaust gas or other pollutants from the onboard source of power.

SUMMARY

In January 2022, Baltimore Mayor Brandon Scott set the following **greenhouse gas** (GHG) reduction goals:

- Reduce emissions 30% by 2025 below 2007 levels;
- Reduce emissions 60% by 2030 below 2007 levels; and,
- Reach carbon neutrality in Baltimore by 2045.

Baltimore's carbon neutrality goal aligns with those set forth in the Paris Agreement, a promise made by nearly 200 countries around the world to work together to fight climate change and limit global warming to 1.5 degrees Celsius compared to pre-industrial levels. Each country decides what they can do to help reduce their GHG emissions. It is a global effort to keep our planet and people safe. Similarly, under the Climate Solutions Now Act of 2022, **the State of Maryland aims to reduce emissions 60% below 2006 level by 2031 and achieve carbon neutrality by 2045.**

What does it mean to be carbon neutral?

Being **carbon neutral** means balancing the GHG emissions we create with the GHG emissions we remove from the air. We emit GHGs by cooking, driving cars, heating our homes, and other daily tasks. Actions that remove GHGs from the atmosphere, include planting trees or other vegetation, enhancing soil carbon or other ways to absorb carbon.

For years, the City has taken proactive steps to fight climate change. Certified as a LEED Gold city by the U.S. Green Building Council, Baltimore has pioneered innovative programs including the Community Resiliency Hub program, an impactful, community-centered initiative that increases capacity to prepare for, withstand, and respond to natural hazard impacts and emergency situations. The Hubs have provided services and assistance to thousands of people to relieve burdens caused by climate change and to provide support during hazard events. Another City of Baltimore program, TreeBaltimore, provides resources, materials, training, and coordination to empower community-based organizations to annually plant and distribute thousands of trees. The Department of Public Work's GROW Centers are pop-up events in neighborhoods and community gathering places across Baltimore where materials, resources and information are distributed in neighborhoods that help people make their communities greener, improve water quality, and more.

The City has progressed impactful climate actions, planning, and resource development. As a recent example, the City's green building code was updated in 2020 to improve energy efficiency in new buildings. In 2021, the Baltimore Complete Streets Manual was developed as a guide to help design roads, streets and blocks that are easier and safer to walk on, bike through, or more easily connect to buses, trains, and other forms of public transit.

The 2023 CAP Update is a guide to how Baltimore will meet its ambitious and critical goal to reduce carbon emissions by 60% by 2030. Following requirements in Baltimore City Ordinance 22-131, this CAP Update considers concerns beyond GHG reduction, including key environmental justice and community benefits such as public health. The resulting plan is a roadmap for the City in making decisions that reduce GHG emissions and address environmental injustice as we work toward a more sustainable, equitable, and resilient future.

RELATION TO OTHER BALTIMORE CITY PLANS AND BROADER CLIMATE RESILIENCE ACTIONS

The CAP Update dovetails with other public plans that outline climate and resilience actions and goals. This enables us to focus the CAP Update on GHG emissions reductions while advancing other important climate change-related-activities. We conducted a thorough review of existing climate-related plans and coordinated with other planning efforts that were underway as the CAP Update was being developed (see **Appendix 1: Background Review**). Several key plans that complement the Climate Action Plan are summarized here.

SUSTAINABILITY PLAN (2019)

The Baltimore Sustainability Plan establishes priorities for how Baltimore can grow and prosper in ways that meet the current environmental, social, and economic needs of the community without compromising the ability of future generations to meet these needs. The Plan lays out a broad, inclusive, and community-responsive sustainability agenda to complement Baltimore's existing Comprehensive Master Plan. It uses an equity lens to improve planning, decision-making, and resource allocation leading to more racially equitable policies and programs.[1]

BICYCLE MASTER PLAN (2015)

The Bicycle Master Plan promotes and facilitates bicycling as a safe, convenient, and comfortable form of transportation and recreation in Baltimore. A plan to coordinate the formal integration of bicycles in existing infrastructure is necessary to improve safety and create a multi-modal transportation system friendly to the citizens of Baltimore. This plan guides Baltimore City in creating a lasting bicycle transportation program by[2]:

- Mapping out an integrated on-street and off-street bikeway network,
- Addressing bicycle parking and inter-modal bike/transit integration,
- Emphasizing safety education for motorists, bicyclists, and youths,
- Providing an action plan for biking encouragement and rules enforcement,
- Recommending transportation and development policy and program changes,

[1] City of Baltimore. 2019. "Baltimore Sustainability Plan" *City of Baltimore*. https://www.baltimoresustainability.org/wp-content/uploads/2019/01/SustainabilityPlan_Compressed_01-28-19.pdf

[2] City of Baltimore – Department of Planning. 2015. "Bicycle Master Plan." *City of Baltimore*. https://transportation.baltimorecity.gov/bicycle-plan

- Describing new bicycle facilities designs, and
- Detailing new roadway and trail maintenance management practices.

COMPLETE STREETS MANUAL (2021)

In 2018, Baltimore adopted a Complete Streets Ordinance that aims to change the local transportation landscape. The Complete Streets approach elevates the priority of pedestrians, bicyclists, and transit users in planning and roadway design to increase quality of life and mobility in Baltimore City. Major components of the Complete Streets Manual are[3]:

- Design standards for promoting safer streets, slower speeds, and increased walkability,
- Modal hierarchy for how the City government prioritizes different modes when planning and designing projects,
- Street typologies for classifying city streets and standardizing roadway layout,
- Project prioritization process that identifies and screens projects with an equity lens, and
- Community engagement policies centered around equity.

COMPREHENSIVE MASTER PLAN (2024)

The Department of Planning is developing an updated Comprehensive Master Plan for the City to direct economic growth and quality of life initiatives for the next 10 years. The new Comprehensive Master Plan, *Our Baltimore,* will be released in 2024 and will act as a comprehensive plan to guide the physical development of the city. The plan will be based on community input and values, with a focus on topics related to urban planning. It will identify what equitable neighborhood development looks like and map a concrete set of recommendations to move toward this goal.[4]

[3] City of Baltimore – Department of Transportation. 2021. "Baltimore Complete Streets." *City of Baltimore.* https://transportation.baltimorecity.gov/sites/default/files/Baltimore%20Complete%20Streets%20Manual%20Final%20March%2021-compressed.pdf

[4] City of Baltimore – Department of Planning. 2024. "Comprehensive Master Plan." *City of Baltimore.* https://planning.baltimorecity.gov/planning-master-plan

DISASTER PREPAREDNESS AND PLANNING PROJECT (DP3) (2023)

The DP3 is Baltimore's combined hazard mitigation plan and climate adaptation plan. It is updated every five years to detail the City's strategy to address existing and future local hazards due to intensifying climate change impacts. Risk is determined by quantifying hazard impacts on community assets, such as the population, built and natural environments, and the economy. The DP3 fulfills Federal Emergency Management Agency (FEMA) requirements to update Baltimore's Hazard Mitigation Plan every five years to maintain eligibility for certain pre-disaster mitigation and post-disaster recovery funds. This funding, in addition to other funding sources, supports implementation of the long-term mitigation strategy developed during the DP3's planning process.

SOLID WASTE MANAGEMENT PLAN (SWMP) (2023)

The Baltimore City 10 Year SWMP is a regulatory plan submitted to the Maryland Department of Environment (MDE) to map operational needs, constraints, and improvements for waste management within the City over 10 years. The plan consolidates goals for managing the City's solid waste stream and assesses the existing solid waste collection systems, current and future disposal capacity needs, and how zero waste strategies like reuse, recycling, and composting are to be implemented.[5]

In addition to the plans listed, forthcoming plans, such as those focused on forest management, offer opportunities to support carbon removal and other actions that will advance GHG emissions reductions.

[5] City of Baltimore.– Department of Public Works. 2023. "10-Year Solid Waste Management Plan." *City of Baltimore*. https://publicworks.baltimorecity.gov/pw-bureaus/solid-waste/plan

RELEVANT LEGISLATION AND GOVERNMENT INITIATIVES

Significant federal, state, and local legislation exists to govern how cities respond to climate change and to provide resources and assistance to help cities take climate action. While an exhaustive list would be too long to include in this plan, several recent laws and initiatives influence the CAP Update and provide some context to the actions and are summarized below.

The **Climate Solutions Now Act (CSNA),** adopted in 2022 by the Maryland General Assembly, makes broad changes to the State's approach to reducing statewide GHG emissions and addressing climate change. The CAP Update goal to reach carbon neutrality by 2045 aligns with the CSNA goals.

The federal **Carbon Reduction Program,** created by the Bipartisan Infrastructure Law (BIL), facilitates:

- Use of public transportation facilities, pedestrian facilities, bicycle facilities, and shared or carpooled trips to reduce vehicle miles traveled by single-occupancy operated vehicles;
- Use of vehicles or modes of travel that result in lower transportation emissions; and,
- Approaches to the material use and construction of transportation assets that lower transportation emissions.

The Maryland **Carbon Reduction Strategy,** developed in consultation with the metropolitan planning organizations in Maryland, outlines approaches, programs, and projects to address transportation sector emissions.

The **National Blueprint for Transportation Decarbonization,** resulting from a joint agreement among the U.S. Department of Energy (DOE), U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA), and U.S. Department of Housing and Urban Development (HUD), is a strategy for cutting all GHG emissions from the transportation sector by 2050. Locally, Maryland Department of Transportation (MDOT) will help lead and coordinate State and local action to implement the strategy. Maryland and Baltimore are also exploring future, expanded transit options through the revived Red Line Project led by the **Maryland Transit Administration (MTA)** and supported by the City's Department of Transportation.[6] The proposed Red Line is a 14-mile transit line that would provide service between the Woodlawn area of Baltimore County and the Johns Hopkins Bayview Medical Center. When complete, the Red Line will make it easier, faster, and cheaper to travel across the greater Baltimore area.

[6] Redline. 2023. "The Baltimore region deserves great transit." *Redline.* https://redlinemaryland.com/

Maryland's **Greenhouse Gas Reduction Act (GGRA)** (2016) requires the State to achieve a 40% reduction in GHG emissions from 2006 levels by 2030 across all economic sectors. In 2021, the Maryland Department of the Environment published the 2030 GGRA Plan containing strategies to reduce GHGs across sectors, including investments in energy efficiency, clean and **renewable energy** solutions, clean transportation projects, widespread adoption of electric vehicles, and improved management of forests and farms to absorb carbon. In 2023, Maryland's Climate Pathway Report was released, detailing an analysis of actions that can help achieve statewide GHG emissions reduction goals.

A bill (23-0385) titled **Study and Report – Baltimore City Climate Resilience Authority** was signed by Baltimore Mayor Scott in October 2023 and requires the Director of Finance, the City Solicitor, the Director of Transportation, the Director of Public Works, the Director of Planning, and the Director of Sustainability to submit a report detailing how Baltimore City may establish a local climate resilience authority. A resilience authority is one mechanism for Maryland jurisdictions to organize and manage funding structures for large-scale infrastructure projects specifically aimed at addressing the effects of climate.

AUTHENTIC, MEANINGFUL & INTENTIONAL ENGAGEMENT

The CAP Update would not have been possible without involvement and feedback from thousands of residents, **community leaders,** stakeholders, and collaborators across our great city. We worked diligently to provide everyone who lives, works, plays, learns, grows, and ages in Baltimore an opportunity to play a role in the development of this plan. We also used plan outreach as a chance to spread the word about the impacts of climate change, to learn more about community concerns that relate to climate action, and to identify ways to work together to take the actions outlined in the CAP Update. We asked for your opinions and collected your ideas over more than two years. In our outreach and engagement process, we sought input from communities too often left out of climate conversations, decisions, and planning: **frontline;** environmental justice; black, indigenous, and other people of color (BIPOC); and under served communities. These efforts aside, we acknowledge the limitations of our outreach resources and capacity during the plan engagement process. We thank everyone who took the time to push us to be bolder, challenged the scope or limits of actions, attended public events, completed surveys, and provided comments and thoughtful, constructive feedback. We owe special thanks to the CAP Resident Advisory and Technical Advisory Councils, two groups that helped significantly shape the plan. See **Chapter 1: The Purpose of Our Climate Action Plan** for more information about CAP Update outreach and engagement.

CAP UPDATE

This CAP Update will help the City take steps to address the issue of climate change by reducing its GHG emissions. The focus of this plan is meeting the 2030 target of reducing emissions by 60% compared to 2007 levels, with strategies and actions that will prepare the city to achieve their long-term carbon neutrality target. The plan identifies community-wide sources of GHGs, sets goals to reduce emissions, and centers climate equity in implementation. The climate actions within this plan are divided into: community-wide actions and municipal actions

- **Community-wide actions** focus on reducing community-wide GHG emissions and require broad participation.
- **Municipal actions** focus on reducing emissions produced by City government activities.

The CAP Update contains five focus areas described below that address electricity, buildings, transportation, waste, and **nature-based solutions** that remove carbon.

BUILDINGS

Baltimore's 2019 Sustainability Plan actions advance energy efficiency, decrease the use of **fossil fuels,** and promote programs to reduce energy burdens. In 2019, buildings and other facilities across Baltimore generated 64% of all GHGs emitted (electricity use generated 34% of total emissions while methane gas and heating oil use generated 30% of total emissions). Methane gas and home heating oil are burned in power heaters, stoves, and other equipment in buildings across the city.[7] Switching to all-electric options aligns with Baltimore's climate goals as a city and can improve indoor air quality, lower asthma risks, and reduce household toxins. In this section we focus on actions that can be taken in Baltimore to reduce GHG emissions from buildings by:

- Enhancing energy efficiency,
- Reducing the amount of energy used to heat, cool or light buildings, and
- Switching to equipment and appliances that are electric or use other **low or no emission** energy sources.

ELECTRICITY

Electricity can be generated from many different energy sources. These sources typically include fossil fuels, such as coal, methane gas, and oils that emit GHGs when burned to make electricity. Electricity can also be generated from clean energy sources such as solar, wind, or geothermal.

In Baltimore, 34% of electricity emissions were from residential homes and 66% were from industrial and commercial buildings likes restaurants, stores, and offices.

A primary reason that the city's electricity use produces such a large amount of GHGs is because over half of our electricity is generated by burning fossil fuels. We can reduce GHG emissions from electricity by using cleaner energy sources.

As we transition towards electric buildings and vehicles to reduce GHG emissions, it will be critical that we also switch our electric energy sources to **clean energy** sources in an equitable, thoughtful way.

[7] Natural gas is referred to as methane gas throughout this document.

This will help ensure that our electric infrastructure can reliably support the increased demand, that our electric grid improvements are centered in climate equity, and that new clean energy development is done in a way that protects natural habitats and migratory patterns. To reach our 2030 emission target of a 60% reduction, more buildings need to be powered by clean energy sources, meaning we will need more rooftop, **community solar,** and creative ways to capture solar energy such as solar canopies, solar trees, and solar in parks. In this section we focus on actions that:

- Promote the adoption of clean energy locally, and
- Improve the capacity and reliability of electric infrastructure

TRANSPORTATION

The Baltimore Complete Streets Manual, released in March 2021, commits the city to a "transportation network that is safe, accessible, and efficient for all users of all abilities." Complete Streets sets a "modal hierarchy" that first prioritizes walking; then cycling, public transit, and **micro-mobility;** followed by taxis, commercial transit, or shared vehicles. Gas-powered cars, trucks, or other single occupant vehicles are the least preferred method of transportation for people based on this hierarchy.

In Baltimore, transportation is a major source of GHGs, generating 23% of all community-wide emissions in 2019. Streets designed for people on foot (walking) or wheels (including wheelchairs, bikes, scooters, or other small wheels) to travel safely for school, work, shopping, or leisure is central to our shared sustainable and equitable futures. Baltimore's transportation inequities result in poor access to safe travel options – too often an added burden for Black, Latino, marginalized and low-income communities. Many of the same communities dealing with few accessible transit options must also deal with worse air quality due to heavy traffic or vehicle idling.

We can use Complete Streets guidelines to provide people-centered design that creates safer streets while addressing unequal or insufficient access to reliable transit modes and reducing GHG emissions.

Transportation actions will result in additional community benefits that will help reduce traffic and noise, make it easier and safer to get around, support better air quality by reducing local air pollutants, and foster more active lifestyles. Actions in the transportation section of the CAP Update aim to:

- Reimagine neighborhoods so that homes, workplaces, and shops are closer together,
- Make it easier to get around by biking, walking, and taking public transportation,
- Expand access to **electric vehicle** charging stations,
- Promote the use of electric vehicles, and
- Encourage and increase opportunities to conveniently carpool and vanpool to work.

WASTE

In the 2018 Food Waste Recovery Strategy, Baltimore set goals to reduce commercial food waste by 50% and divert 90% of City government food and organic waste and 80% of household waste from landfills or incineration by increasing composting and other strategies. In 2023, Baltimore's latest SWMP was also adopted to guide our path to a zero-waste future.[8]

Section 1.2 of the SWMP expresses Baltimore's "desire to move toward a **circular economy**, and [...] to prioritize reduction, reuse, recycling, and composting options wherever possible." A circular economy "keeps materials, products, and services in circulation for as long as possible" and "reduces material use, redesigns materials, products and services to be less resource intensive, and recaptures 'waste' as a resource to manufacture new materials and products."

Waste generates 13% of our GHG emissions, but the environmental burdens and health impacts of waste-related facilities are not equally shared across the city. For instance, South Baltimore residents, families, and children shoulder an unequal, unjust burden of living near waste facilities that pose public health threats. Preventing, diverting, and recirculating the value of waste items in our local economy is imperative to protecting the health and well-being of environmental justice communities and all people in Baltimore.

[8] City of Baltimore – Department of Sustainability. 2018. "Baltimore Food Waste & Recovery Strategy." *City of Baltimore*. https://www.baltimoresustainability.org/wp-content/uploads/2018/09/BaltimoreFoodWasteRecoveryStrategy_Sept2018_FINAL.pdf

Legislative, administrative, and programmatic goals across seven diversion programs are detailed in the SWMP's 10-year vision. In this section, we build on SWMP actions to identify additional actions with public health, environmental justice, and GHG reduction impacts, while elaborating on the actions climate partners across Baltimore can take to meet waste reduction goals, such as:

- Supporting local and state legislation that bans organics, single-use plastics, or other recyclable materials from landfilling and/or incineration,
- Improving education, outreach, and engagement related to waste prevention, reduction, diversion, zero waste planning, composting, and other organic waste reduction goals and pathways to a circular economy, and
- Supporting the City-mandated deconstruction policy to require construction and development projects to divert a certain percentage of their waste from disposal and encourage reuse of construction and demolition materials.

NATURE-BASED SOLUTIONS

People and wildlife in Baltimore benefit every day from existing natural resources, such as forests and street trees, that help us cope with increasing temperatures and store carbon. As a city with an iconic waterfront with two ports, a robust park and green space system, one of the largest urban forests in the country, and many other natural assets, many of our businesses, industries, community connections, and recreational opportunities are linked to our natural resources.

The CAP Update seeks to protect existing nature-based solutions through conservation, increase them through environmental restoration and, support sound land use and management policies. These solutions provide great community benefits such as cool spaces to enjoy on hot days and beautiful places for community gathering. **Green infrastructure** such as rain gardens attract pollinators and slow and filter stormwater before it pollutes our waterways. Vacant and underutilized spaces can be converted into land that serves community needs such as hyperlocal food production or play spaces where children can enhance their creativity and problem-solving skills. They can be home to native and migratory species and so much more.

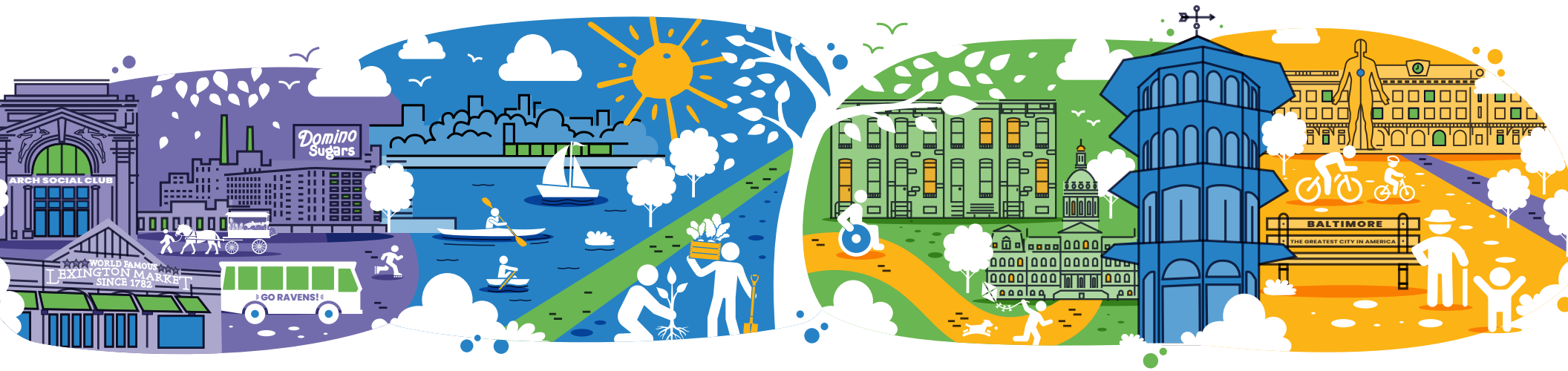
In this section of the CAP Update, we draw attention to the Sustainability Plan, as well as plans created by Baltimore Department of Recreation and Parks and others. We also call attention to efforts underway in communities led by

nonprofit organizations and other local champions of nature-based resilience solutions. Actions in this section aim to:

- Remove carbon from the atmosphere by expanding public and private green spaces, and
- Promote green and natural infrastructure that provides climate resiliency benefits.

To carry out this plan, we will monitor GHG emissions by conducting a GHG inventory every three years. The GHG inventory estimates the amount of GHGs Baltimore creates each year. It also shows the sources of GHGs, like from transportation or buildings. Updating the inventory keeps us on track to becoming carbon neutral by 2045.

To put this plan into action, we will partner with communities to find the tools and resources needed to secure the right solutions for each community, with priority given to frontline communities. We will work to empower and uplift young people, businesses, institutions, and other stakeholders to do their part in carrying out the actions in this plan. We will coordinate with the State and federal government and participate in international coalitions to secure resources and ideas for Baltimore to learn from and apply here at home. On a local level, City agencies will work together through an inter-agency Sustainability and Resiliency Subcabinet to implement the actions in the CAP Update, find opportunities to integrate resiliency into City activities and functions, and identify new ways to help us achieve the goal of reducing GHGs by 60% by 2030.



The Purpose of Our Climate Action Plan

- Background
- Focus on Equity & Climate Justice
- Getting Everyone Involved
- Community Feedback Highlights

BACKGROUND

We burn **fossil fuels,** such as coal, oil, and **natural gas** (referred to as **methane gas** in this document), to drive our cars, heat our homes, and make electricity. Fossil fuels create pollution and release **GHGs** that act like a blanket around our planet, trapping the sun's heat and making the Earth warmer. This warming effect contributes to **climate change,** which leads to extreme temperatures, flooding, storm surge, and drought. This negatively impacts human health, property, and the environment.

The U.S. EPA states that even a 1-2 degree Celsius (2-4 degrees Fahrenheit) change in temperature can result in dangerous shifts in weather and climate. The EPA also reports that the global average temperature increased by 1.8 degrees Celsius (3.2 degrees Fahrenheit) between 1901 and 2016.[9] People in Baltimore already live with the impacts of climate change. The National Oceanic and Atmospheric Administration's tidal gauge at Fort McHenry, as well as other official reports, show that relative sea level in the Harbor area has increased by 12 inches since 1900 and that high-tide flooding is now 300% to more than 900% more frequent along U.S. coastlines than it was 50 years ago. Flooding is becoming more common in Baltimore's waterfront areas, along streams, and even in neighborhoods. In addition to the risk to human lives, threats like sea level rise and flooding put businesses and infrastructure at risk, compromising jobs, economic prosperity, and overall livability.[10]

Air pollution and temperature extremes also pose public health risks. Summer days of extreme heat are more than just uncomfortable. They place people at risk of dangerous conditions such as heat stroke and heat exhaustion and can worsen many other health issues, particularly for children, older adults, and people with preexisting conditions. Extreme heat is expected to be one of the most common climate change-related health threats we all face. In 2023, Baltimore had seven code red days indicating that extreme heat is a great risk, especially for many of Baltimore's more vulnerable residents. Baltimoreans are dealing with climate change-related challenges that are expected to increase if we, as a community, do not take a more sustainable and equitable path forward. **Frontline, fence-line,** or **environmental justice communities** are more likely to be located near sources of pollution such as waste incinerators, coal-fired power plants, or other polluting industries; have poorer air quality, fewer trees, and less green space or foliage; and are more affected by extreme heat. BIPOC populations often live in environmental justice and

[9] US EPA. 2022. "Impacts of Climate Change." *US EPA*. www.epa.gov/climatechange-science/impacts-climate-change

[10] City of Baltimore – Department of Sustainability. 2020. "City of Baltimore Nuisance Flood Plan ." *City of Baltimore*. https://planning.baltimorecity.gov/sites/default/files/Nuisance%20Flood%20Plan_2020.pdf

[11] USGCRP. 2018. "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II". *U.S. Global Change Research Program,* Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

frontline communities, as race is the greatest predictor of unfair, unjust exposure to environmental toxins[11]. The EPA notes that "Black and African American individuals are 40% more likely than non-Black and non-African American individuals to currently live in areas with the highest projected increases in mortality rates due to climate-driven changes in extreme temperatures."[12] People in frontline communities are more likely to suffer negative health outcomes that result from climate change and more likely to lack the resources to mitigate the issues they face. In Baltimore's communities broadly, greater attention and resources must be given to frontline communities to create an equitable, resilient city. We identify frontline communities according to the EPA definition for Environmental Justice communities.

This CAP Update will help the City take steps to address the issue of climate change by reducing its GHG emissions. The focus of this plan is meeting the 2030 target of reducing emissions by 60% compared to 2007 levels, with strategies and actions that will prepare the city to achieve their long-term 2045 carbon neutrality target. **This plan shows where our GHGs come from, sets goals to emit less, and explores how to achieve these goals.** Read this plan to learn:

- How we made this plan,
- The origins of our GHG emissions,
- How we plan to emit less, and
- The actions we will take to put the plan into practice.

[12] EPA. 2021. "Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts. U.S. Environmental Protection Agency," *EPA 430-R-21-003.* https://www.epa.gov/cira/social-vulnerability-report

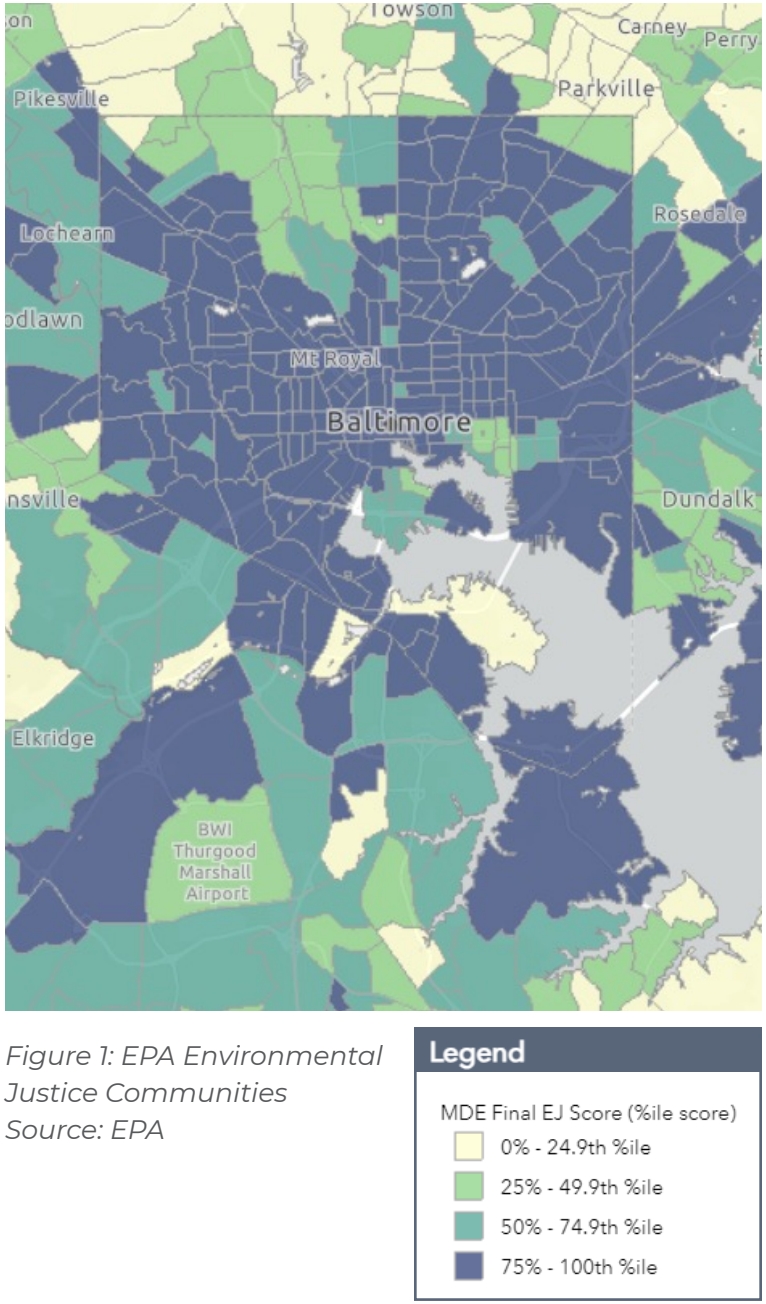


Figure 1: EPA Environmental Justice Communities Source: EPA

Key Terms

Fossil fuels are burned in cars, power plants, and other equipment to produce energy. According to the American Geosciences Institute, three fossil fuels—coal, methane gas, and petroleum—accounted for nearly 78% of energy production in the U.S. in 2017.[13] Petroleum, also known as oil, is made into gasoline and diesel, which powers most cars. Coal is often used in power plants to make electricity. Methane gas is often used in power plants and to heat our homes. Burning fossil fuels releases GHGs.

GHGs are gases that trap heat. When we burn fossil fuels, we release GHGs such as carbon dioxide, methane, and nitrous oxide into the atmosphere. The GHGs let the sun's heat through to the Earth and then trap this heat around the Earth, causing climate change. Cities try to reduce their GHG emissions, or the amount of GHGs they produce, to fight climate change.

Climate change describes how the Earth's temperature and weather is changing over time. Climate change causes many diverse issues. It can cause extreme heat *and* extreme cold. It can also lead to wildfires, droughts, storms, and floods. The climate has changed many times over the past millions of years, but now the climate is changing at an unprecedented pace because humans are releasing large amounts of GHGs.

Frontline or fence-line communities are those areas in closest proximity to toxic, hazardous, or other harmful environmental exposures, thus on the front line of environmental injustices. These are often communities of color or low-income areas, whose neighborhoods often lack basic infrastructure to support them and who will be increasingly vulnerable as our climate deteriorates.

Environmental justice communities The U.S. Environmental Protection Agency defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. An environmental justice community is one that is overburdened and most impacted by environmental harms and risks.

[13] American Geosciences Institute. 2018. "What Are the Major Sources and Users of Energy in the United States?" American Geosciences Institute, *American Geosciences Institute*, www.americangeosciences.org/critical-issues/faq/what-are-major-sources-and-users-energy-united-states

FOCUS ON ENVIRONMENTAL JUSTICE & CLIMATE EQUITY

Baltimore remains one of the most segregated cities in the United States, according to Census data. It is undeniable that historic policy and planning decisions created and exacerbated inequity and inequality in Baltimore. Policies to deliberately segregate white and black residents—such as restrictive covenants, the Federal Housing Administration's openly racist system for mortgage loan approval, urban renewal, redlining, and other policies—directly contributed to many of the environmental economic and social challenges Baltimore faces today. These challenges are often made more complex by climate change.

In the past and today, neighborhoods in Baltimore receive different levels of resources and investment. Climate change-related hazards have the potential to cause the most strain for low-income residents, who have fewer resources and face greater barriers to safety, adequate medical aid, and economic recovery after a climate event. Frontline, fence-line, or environmental justice communities face climate change challenges more than other neighborhoods. For example, frontline communities experience the following:

- Extreme heat made worse for environmental justice communities experiencing the urban heat island effect, which makes neighborhoods with fewer trees and green spaces hotter because heat becomes trapped in concrete and asphalt pavement. Little shade on very hot days to provide relief from the heat can lead to warmer temperatures compared to areas with more trees. As a result, people are more likely to experience health risks due to heat. Older homes in many environmental justice communities may not have air conditioners because retrofitting buildings is expensive or the extra energy required to operate them is cost-prohibitive, which are examples of energy poverty. Overall, extreme heat is typically more dangerous for people with lower incomes or social vulnerabilities. Climate change is causing more hot days, making this problem worse.
- In many Baltimore neighborhoods, the stormwater system is very old. As climate change causes more frequent and sudden rains, homes and streets are more likely to flood, particularly when neighborhoods have little green space, few trees, or other features to capture excess rainwater. This can place a great burden on any household, but the burden of expensive home repairs and replacement of possessions is likely to affect low-income households more. A house in a flood-prone area is likely to depreciate as more floods occur in the area, meaning that property values in flood-prone, frontline communities may decrease over time. Also, dampness and mold from flooding could worsen allergies, asthma, and other medical conditions if people are exposed to indoor flood damage.

- Much of the waste we throw out is burned or landfilled at facilities near the frontline community of Curtis Bay. The waste incinerator in south Baltimore is one of the city's highest single-point sources of toxic pollution and GHGs, responsible for roughly 10% of all city emissions. Nationally, more than 75% of waste incinerators are in environmental justice communities. A 2019 report published by the New School revealed that "distinct characteristics of garbage incinerators in the United States is that they are often sited in communities of color and low-income communities, also known as environmental justice (EJ) communities."[14] This reality gives new meaning to the act of throwing away trash, waste, or other unwanted materials, because nothing truly goes away.

This plan was developed using a lens of equity and climate justice. Through implementation of this plan and other plans, Baltimore is taking needed steps to fully integrate equity into GHG emissions and all-hazards mitigation, climate adaptation planning, and implementation to support our most climate-vulnerable residents. While creating this plan, we were careful to make choices that would help reduce problems for frontline and environmental justice communities and to balance our decisions with high-impact actions that will benefit everyone in Baltimore. We talked to thousands of people who live across Baltimore. We visited frontline communities and spoke with people to make sure their concerns were addressed in the CAP Update, and to hear about their ideas regarding how City government could help them and their neighbors better address climate change in their communities. In addition to developing the actions in this plan with community members, we added several actions in response to feedback during the public comment period, including a section on nature-based resilience solutions, to ensure the plan reflects community values and priorities.

What is Climate Equity?

EPA notes that **climate equity** is the goal of recognizing and addressing the unequal burdens made worse by climate change, while ensuring that all people share the benefits of climate protection efforts. Achieving equity means that all people—regardless of their race, color, gender, age, sexuality, national origin, ability, or income—live in safe, healthy, fair communities.[14]

[14] US EPA. 2023. "Climate Equity." *EPA*. https://www.epa.gov/climateimpacts/climate-equity#:~:text=Achieving%20equity%20means%20that%20all,safe%2C%20healthy%2C%20fair%20communities.

GETTING EVERYONE INVOLVED

We spent months receiving input from people around Baltimore with a focus on reaching frontline communities, including attending nearly 100 community events to seek input. Community members, representatives from local organizations, and technical experts were deeply engaged in the development of the plan, particularly through the Resident Advisory Council (RAC) and the Technical Advisory Council (TAC).

RESIDENT ADVISORY COUNCIL

A group of 14 residents, called the RAC, helped with every part of making this plan. Over 80 applications to join the RAC were received. Members were selected based on why they want to help Baltimore become sustainable. Careful consideration was given to the composition of the group to ensure members came from diverse backgrounds and neighborhoods. Of the 14 members, half of the members identified as African American, Hispanic, Latino, Latinx, Native American, Indigenous, or Mixed Race. Six members were 35-50 years of age, two were 51-64 years of age, two were over 65 years of age, two were 25-34 years of age, one was 18-24 years of age and one was under 18 years of age. Each member brought unique perspectives, knowledge, and interest to the group. Two RAC members were students who shared a youth perspective. Members of the City's Sustainability Commission joined the RAC. RAC members were also compensated for their time to remove any potential financial barriers to participating in RAC work.

TECHNICAL ADVISORY COUNCIL (TAC)

Twenty-eight technical experts met regularly for months to help shape the CAP Update. TAC members came from different fields of practice, backgrounds, and areas of focus to help us identify actions that are well-rounded, effective, ambitious, and achievable.

We also spoke with several other groups and conferred with regional and national experts in climate change and in specific fields referred to in the CAP Update. Examples of these groups included the Mayor's Sustainability and Resiliency Subcabinet, the Sustainability Commission, and Community Resiliency Hubs.

OUR COMMUNITIES

More importantly, we heard from you and your neighbors. Community members shared ideas and concerns so that we could craft a plan that elevates and addresses climate issues and sparks ideas that are important to people in Baltimore, especially frontline communities. We attended community events like farmer's markets, festivals, and GROW Center pop-ups. We held open houses where people shared their thoughts. We held in-person and virtual workshops to discuss what goes into this plan, to consider how actions in the CAP Update could have additional benefits, and to ensure the actions are well-considered and increase the overall well-being of the people, communities, businesses, and all others in Baltimore.

As part of the engagement process, the City circulated a community survey asking residents about a range of topics. We wanted to know how extreme weather affects you, the modes of transportation used across the city, if climate change impacts how Baltimoreans feel in their homes' and in their neighborhoods', and how our community wants Baltimore City to respond to climate

change. Over 500 people responded to the survey. Of these, 25% of identified as African American or black; 39% of respondents were between the age of 25 and 35. City leaders, RAC members, TAC members, and many others helped us spread the word about CAP Update events, meetings, and its public comment period. We sent promotional toolkits and emails to hundreds of neighborhood associations and community groups as well as to the offices of public officials and others and asked them to spread the word. We distributed fliers at events and local libraries. We posted on social media to help people share their ideas. We made the draft CAP Update available for comment online and provided presentations and tutorials to walk you through the CAP Update so you could share comments. To show our respect for the time people invested, we paid people to participate in public meetings.

Moving forward, we will continue to work with community members across Baltimore to co-create solutions and work together as we implement the actions in the CAP Update.

Read more about the CAP Update community engagement process in **Appendix 2A: Community Engagement Plan and Appendix 2B: Community Engagement Summary.**

> *"Thank you for all you're doing to bring residents into this process. I know it takes a lot of work from lots of different folks to make it happen!" I thought it was a very well-facilitated workshop.*

> *"I would love to learn more about how I can participate more actively to help Baltimore to become the greenest most-equitable city in the US. I believe that the city has so much potential and we are on the cusp of unlocking."*
>
> ***— Baltimore Residents***

500+ SURVEY RESPONSES

Individuals who participated in Baltimore's Climate Action Plan Public Survey

2400+ UNIQUE ENGAGEMENTS

Number of Individuals the Climate Action Plan team engaged throughout the Climate Action Plan process

400 SURVEYS DROPPED OFF AT 27 LOCATIONS

12 West Baltimore, 7 East Baltimore, 3 North Baltimore, 5 South Baltimore

475+ WORKSHOP SIGN-UPS

Individuals who expressed interested in engaging with Climate Action Plan workshops

13 RESIDENTS ADVISORY COUNCIL MEMBERS & 8 MEETINGS

AC members provide feedback on engagement process & plan to ensure we are meeting our goals

416 ORGANIZATIONS CONTACTED ONLINE

Baltimore City non-profits, community groups and more contacted via email

100+ CLIMATE ACTION PLAN EVENTS

Events the Climate Action Plan team attended

300+ WORKSHOP ATTENDEES

Individuals took part in in-person & online workshops in Spring 2022

Figure 2: People Engaged Through the Climate Action Plan Update Process

COMMUNITY FEEDBACK HIGHLIGHTS

Table 1 shows some of the feedback from community members collected at public meetings and through surveys.

Subject	Concerns/Challenges	Suggested Solutions
Overall	• Impact of environment on mental and physical health • Extreme heat and air pollution • Equity issues in access to resources, impact of City policies, etc. • Lack of community trust in City government	• Provide centralized guide on existing and new programs/incentives • Deliver education/outreach through trusted messengers • City should lead by example
Buildings & Electricity	• Aging/outdated buildings and electric infrastructure • Renters have little control over their buildings – building owner may pass upgrade costs onto renters • Misinformation and greenwashing of solutions • High energy costs	• Provide incentives for building upgrades • Focus on large property owners, landlords and low-income neighborhoods • Protect renters
Transportation	• High cost of car ownership • Reliability and accessibility of public transportation • Availability of bike lanes • Lack of electric vehicle infrastructure • Safety in all forms of transport	• Install more protected active transportation infrastructure (e.g., protected bike lanes) • Improve public transit options and service • Prioritize active/public transit options over electric vehicles
Waste	• Pollution from incinerator • Community cleanliness	• Provide more education/outreach on reducing and diverting waste • Promote composting and food recovery

Table 1: Summary of Community Member Feedback | Source: AECOM

Our Targets to Reduce GHGs

- Where Baltimore's GHGs Come From
- GHGs in 2045
- Pathway to Reduce GHGs
- Challenges of Getting to Carbon Neutrality

WHERE BALTIMORE'S GHGs COME FROM

The Department of Environmental Health and Engineering at Johns Hopkins University developed **GHG emissions inventories** for the City in 2007, 2017, 2018, 2019, and 2020 to account for the quantity of the city's GHG emissions from three emissions sectors: Buildings, Transportation, and Waste. The inventory follows the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) reporting framework that was developed by the World Resources Institute, C40 Cities Climate Leadership Group, and ICLEI – Local Governments for Sustainability. The GPC provides an accounting and reporting standard for tracking city-scale GHG emissions across primary emissions sectors.

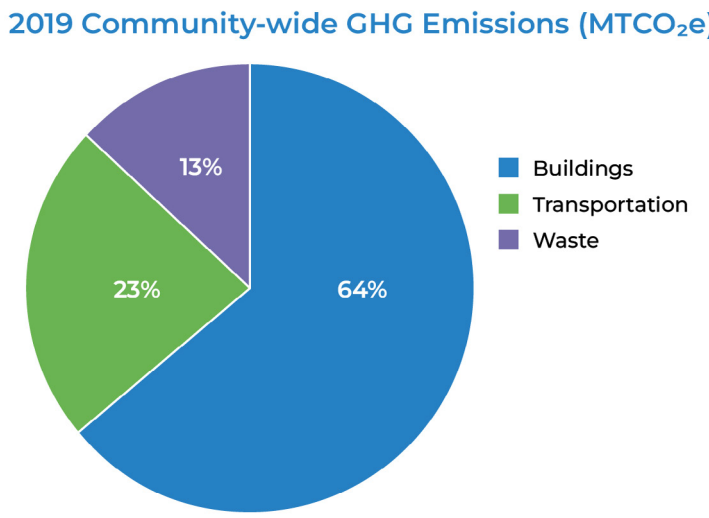


Figure 3: Community-wide Greenhouse Gas Emissions in 2019
Source: AECOM

The City government releases its community-wide inventories every three years and plans to move toward annual reporting. The last inventory conducted for the city was for calendar year 2020. Since this was the height of the **COVID-19** pandemic, 2020 is considered an abnormal year for emissions given the wide scale shutdowns and related reductions in vehicle emissions. Therefore, the 2019 emissions inventory is presented here as it provides the most recent, pre-pandemic emissions results. The GHG inventory, along with local growth indicators, helps us to predict how GHG emissions might change over time. In developing the CAP Update, we used information from the GHG inventory and explored technological strategies the City government, residents, and businesses could pursue to reduce GHG emissions to create a **GHG reduction pathway.** We also looked at challenges that may impact Baltimore's ability to be carbon neutral.

> *"I really think encouraging BOTH residents and commercial building owners/businesses/colleges to reduce energy will create a shared feeling of "we're in this together."*
>
> ***— Baltimore Residents at Community Workshop***

COMMUNITY-WIDE GHG INVENTORIES

The community-wide GHG inventories show that the largest sources of emissions in Baltimore include buildings, which require heating and cooling; transportation, such as driving cars and trucks; and waste, which emits GHGs when processed. Figure 3 shows that the City produced 7,740,773 **metric tons of carbon dioxide equivalent** (MTCO2e) in 2019. Buildings generate 64% of community-wide emissions by using electricity, methane gas, and heating oil. Electricity use alone generates 34% of community-wide emissions, from which 66% come from industrial and commercial buildings likes restaurants, stores, and offices and 34% come from residential homes. This is because most of the city's electricity is generated by burning methane gas and coal. Transportation generated 23% of total emissions. Treating wastewater and sending waste to incinerators and landfills produced 13% of total GHG emissions.

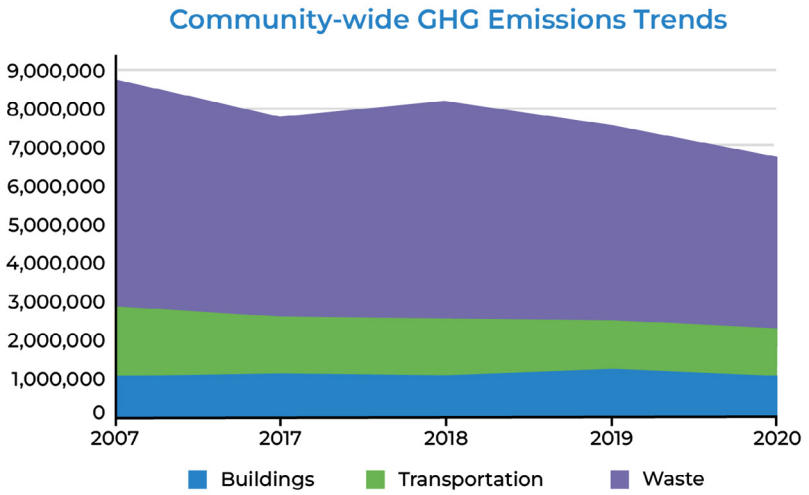


Figure 4: Community-wide Emission Trend | Source: AECOM

Overall, Baltimore reduced community-wide GHG emissions by 12% between its first GHG inventory in 2007 and 2019 (see Figure 4). In 2020, the city reduced community-wide GHG emissions by 23% compared to 2007. Some of that 2020 reduction came from COVID-19 restrictions, which have now ended.

MUNICIPAL GHG INVENTORIES

In addition to community-wide measurements, GHG emissions generated by City government activities were measured as well. City government GHG emissions are from activities such as operating government buildings like recreation centers and offices, driving vehicles to pick up trash and maintain infrastructure, and processing wastewater at treatment plants. Government activities generated 218,886 MTCO2e in 2019. This was only 3% of total community-wide emissions. Just like Baltimore as a whole, most of the government's GHG emissions (68%) resulted from electricity use (see **Appendix 3: Municipal Greenhouse Gas Inventory and & GHG Reduction Pathway for more information).**

GHGs IN 2045

A **GHG forecast** predicts how the amount of GHGs may change over time. Figure 5 shows that Baltimore's emissions could increase in the future if we do nothing, compared to what we need to do to reach our targets. If we took no further action to reduce emissions, GHGs may decline by 15% from 2007 levels by 2030 and 11% by 2045, meaning that we would not meet our GHG reduction goal. **Our targets are to achieve 60% lower GHG emissions by 2030 and carbon neutrality by 2045. To meet these goals, we need to take strong climate action right now.**

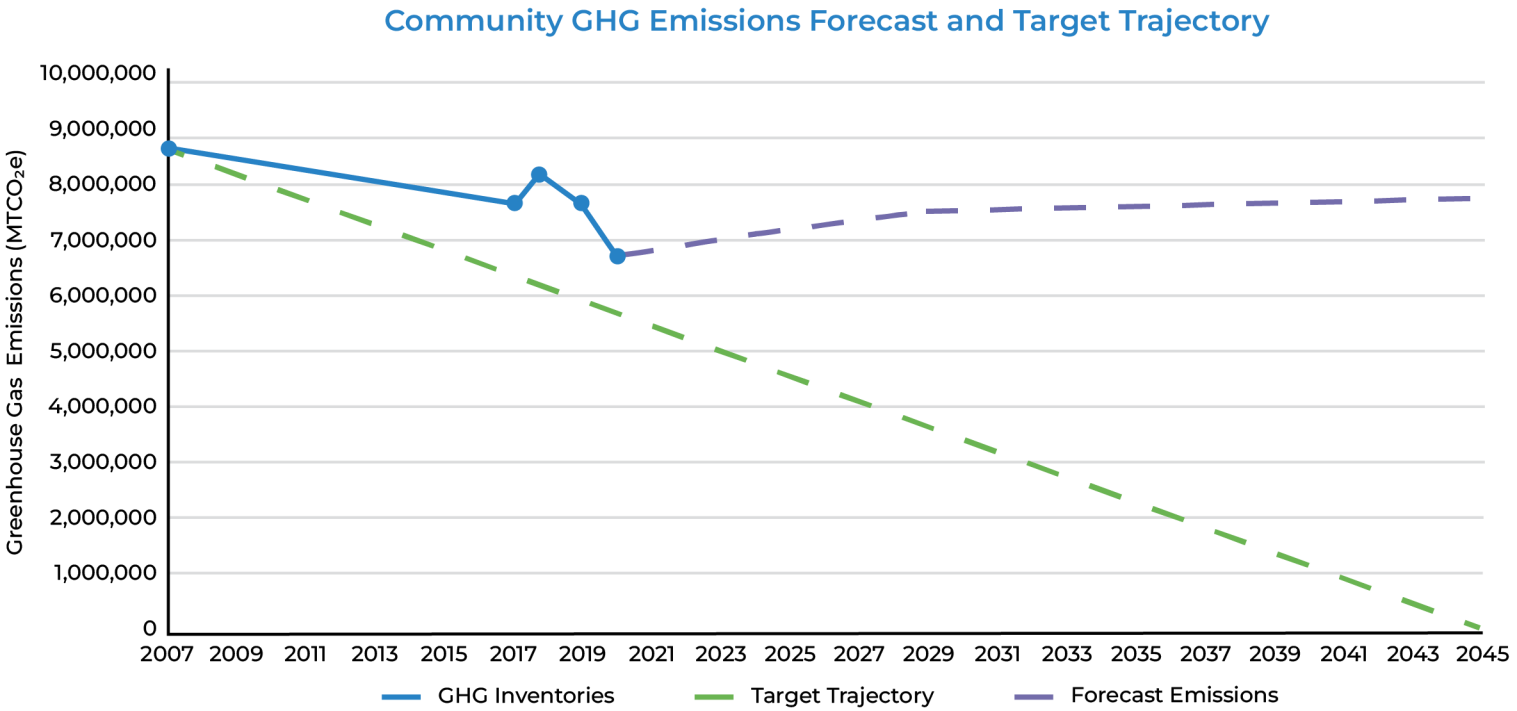


Figure 5: Community-wide GHG Emissions Forecast and Target Trajectory | Source: AECOM

PATHWAY TO REDUCE GHGs

To understand how to meet our targets, we developed a **GHG reduction pathway.** A GHG reduction pathway is made up of several **technological strategies** that help reduce GHGs. Technological strategies include increasing building energy efficiency, clean energy, and electric cars or other non-fossil fuel dependent technologies (see box below). The pathway shows what it will take for Baltimore to meet the 2030 and 2045 targets.

What are Technological Strategies?

Technological strategies are broad strategies that describe the technological shifts needed to reduce emissions in specific emission sectors. Each climate action in this CAP Update supports one or more of these broader strategies.

Decarbonize Electric Grid: Stop using electricity generated by burning fossil fuels. Switch to clean electricity sources such as wind and solar.

Building Efficiency and Fuel Switch: Design or upgrade buildings to use less energy. Use electricity instead of methane gas or heating oil to power buildings.

Vehicle Fuel Switch: Stop using cars and buses powered by fossil fuels. Instead, use vehicles powered by electricity or hydrogen fuel cells.

Travel Mode Shift: Stop driving in single-occupancy vehicles. Instead, walk, bike, and take public transportation.

Off-road Fuel Switch: Stop using fossil fuel-powered off-road vehicles and equipment, like cranes and tractors. Switch to vehicles that are not powered by low or no emission sources.

Waste Diversion: Reduce how much waste we send to the landfill or incinerator, especially organic waste such as food scraps and yard waste.

Wastewater Process Improvement: Improve how we clean and treat wastewater by using efficient processes.

Figure 6 shows Baltimore City's 2045 GHG reduction pathway.[15] In this graph, the GHG forecast is the top dotted line. The bottom dotted line shows what is needed to meet Baltimore's GHG reduction targets. The GHG reduction strategies are the colored wedges between those two lines. Each colored section shows the GHG reductions from using a different strategy.

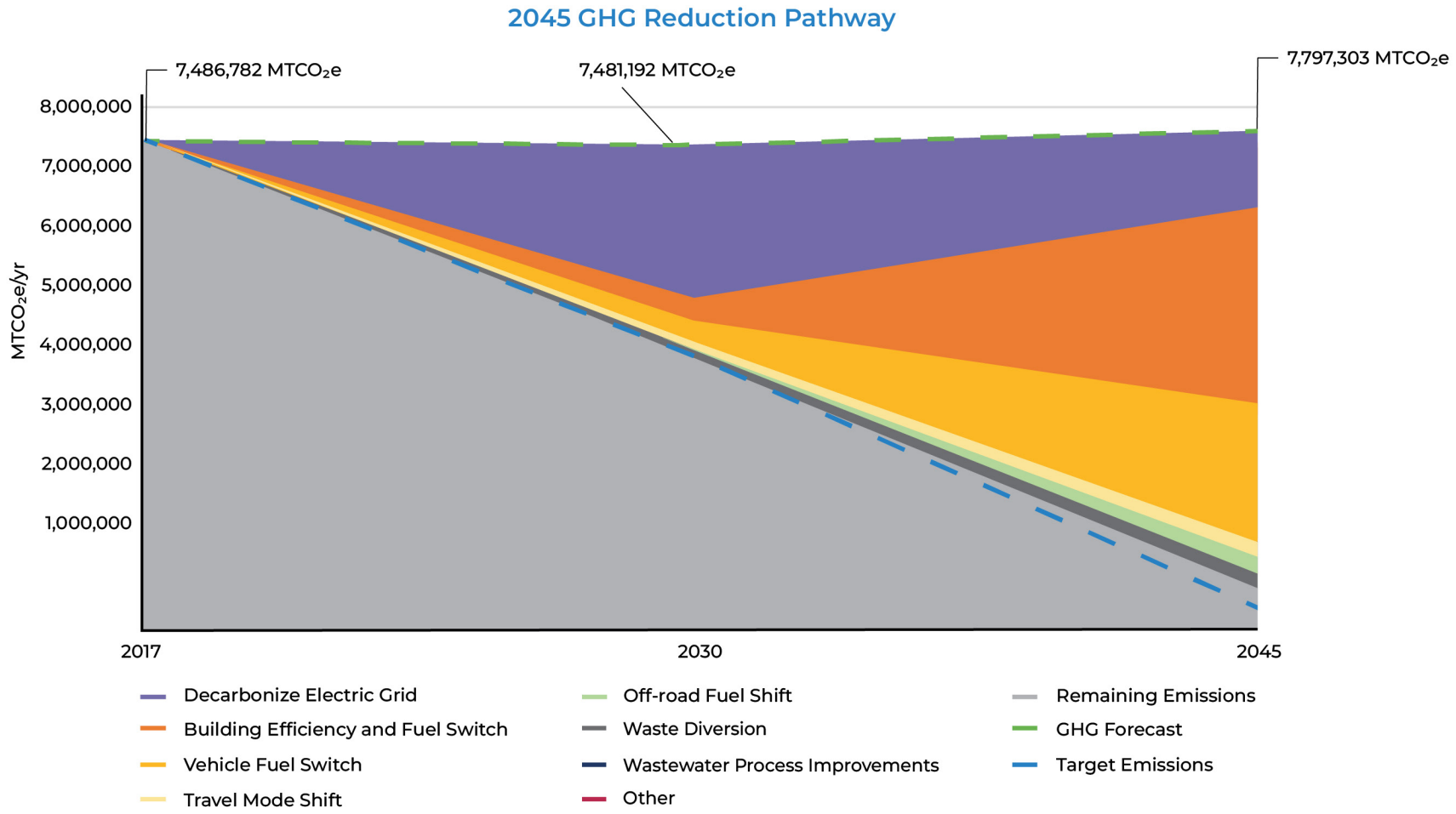


Figure 6: 2045 GHG Reduction Pathway | Source AECOM

[15] 2017 was used as a starting point in the GHG reduction pathway instead of 2019 because 2019 data was not available at the time of pathway development. The 2017 inventory was updated from 7,486,782 $MTCO_2e$ to 7,740,773 MTCO2e by the Johns Hopkins University team after this pathway was developed.

The CAP Update and GHG reduction strategies focus on attaining Baltimore's ambitious yet essential target of reducing emissions 60% by 2030. In Table 2, the column to the left shows the emissions source and the total GHG produced by that source. The column to the right describes the specific strategies that reduce GHGs from that source. Implementing these strategies now will be important steps to reach the 2045 goal.

Emissions Source and Percent of Total Emissions	Community-wide 2030 Greenhouse Gas Reduction Strategy (What it Will Take to Reach the 2030 Goal)
Buildings: 64% of 2019 Emissions	• 95% of the electricity used by the city is from clean energy sources.[16] • 25% of fossil fuel building equipment and appliances are converted to highly efficient fossil fuel free or electric options. This means that most current equipment will need to be replaced with efficient electric options at the end of its useful life (60% conversion at end of life).
Transportation: 23% of 2019 Emissions	• 22% of vehicles used in Baltimore are electric or produce zero emissions. This means that most current vehicles will need to be replaced with electric vehicles (EVs) or **zero-emission vehicles (ZEVs)** at the end of their useful life (43% conversion at end of life). • 10% of the total vehicle miles traveled in the city are reduced by switching to active or public transportation. • 15% of off-road equipment is electric or produces zero emissions.
Waste: 13% of 2019 Emissions	• 42% of waste generated in the city is diverted from landfill • 5% of waste generated in the city is reduced • 5% of wastewater emissions are reduced

Table 2: Greenhouse Gas Reduction Pathway Strategies That Help Reach The 2030 Target. | Source: AECOM

[16] Clean energy sources do not generate GHG emissions during the electricity generation process. Clean energy includes all renewable energy sources.

The **two most important strategies** are:

1. 95% of Baltimore's electricity is from clean energy sources, like solar.
2. 25% of fossil fuel equipment in buildings (like methane gas heaters) is converted to efficient fossil fuel free or electric options.

These two strategies will create 85% of the emissions reductions needed to meet the 2030 goal.

We also developed a separate GHG reduction pathway for City government activities, which has similar strategies to the community pathway. See **Appendix 3: Municipal Greenhouse Gas Inventory and Reduction Pathway** for more information.

The community-wide GHG reduction pathway shows **what it will take** to meet the GHG reduction targets. It also helps us decide on **climate actions** that show **what Baltimore can do** to reduce GHGs. The climate actions identified in this CAP Update contribute to achieving one or more of these GHG reduction strategies.

CHALLENGES OF GETTING TO CARBON NEUTRALITY

The CAP Update prioritizes actions that reduce GHGs from the largest emissions sources. We recognize Baltimore and all communities seeking to achieve carbon neutrality will face technological, legal, behavioral, and financial challenges that may hinder progress. For example, it may be difficult for all large vehicles in Baltimore to be electric or zero-emission by 2045. There may not be optimal vehicle options available, or the new vehicles may be too expensive. Without expansion and upgrades, the electric grid could not support the significantly increased use of electricity, and those upgrades are likely to be costly which could increase electric rates for customers. Significant consideration and assessment have been given to potential trade-offs as we worked with community members and experts to develop the CAP Update. We will continue working with them and anyone who wishes to be involved so that the best climate solutions are chosen without placing additional burden on residents.

How We Are Taking Action

- Baltimore's Climate Actions
- Understanding How Actions Were Selected
- How to Read the Action Tables
- Actions That Help Reduce GHGs

BALTIMORE'S CLIMATE ACTIONS

In this document, an **action** is a specific task or step that will prevent or reduce the emission of GHGs. When we combine many actions, we can make progress toward our bigger goal, which is carbon neutrality by 2045. An action outlines what needs to be done, when it should be completed, and how to do it.

In this chapter we provide details about the specific actions we will take to reduce GHG emissions from electricity, buildings, transportation, waste, and we outline some additional actions focused on nature-based solutions, research, outreach, education, and coordination.

CHOOSING THE RIGHT ACTIONS

Climate actions were first developed by identifying specific steps City government could take to achieve each GHG reduction strategy. However, to achieve Baltimore's GHG reduction targets, actions needed to align with the Equity Implementation Guidelines in the city's 2019 Sustainability Plan, and bring together different groups of people. Careful consideration was given to think through the possible effects of each action. We were careful to make choices that would not unfairly burden existing environmental justice or frontline communities. We openly discussed trade-offs and the potential impact of actions at public meetings and in other forums so we could hear from a broader audience about how people may be affected by the actions taken. We thought of ways these actions could help the people who need it the most, while also considering best practices and opportunities for innovation. See **Chapter 1 The Purpose of Our Climate Action Plan** to learn more about the outreach and engagement process followed to develop this plan.

UNDERSTANDING HOW ACTIONS WERE SELECTED

Most climate actions do not just reduce GHG emissions, but also enhance community livability by improving air quality, supporting the local economy, providing opportunities for people to come together, and even offering opportunities for job and workforce development. Some actions are more impactful, some more costly, some take longer than others to start or complete, and some may require several steps like planning, policy development, or legislation to occur before we can begin working on them. To create a logical and effective action plan, we worked with the RAC to choose eight evaluation criteria to help prioritize which actions should be included in the CAP Update (see Table 3). These evaluation criteria help us test each action to decide which are most important to the community and should be pursued first.

Evaluation Criteria	Definition
GHGs Reduction Potential	How much the action will likely help reduce GHGs.
Public Health	How the action might affect people's health. For example, some actions help people live healthier and longer by making the air cleaner.
Economic Prosperity	How the action could affect Baltimore's economy. For instance, some actions create new jobs or provide opportunities for workforce development programs to train residents for jobs in growing industries like solar panel installation and maintenance.
Savings to Residents and Businesses	How the action might help people and businesses save money. For example, some actions help us spend less on power bills, travel costs, or fixing equipment in the future.
Resilience	How the action could help us address climate change events like floods or wildfires.
Social Cohesion	How the action might help people get along better and build stronger connections.
City Authority to Implement	How much power, capacity, and ability the City government has to make the action happen.
Savings to City of Baltimore Government	Whether the action could help the City government and the broader community save money over time.

Table 3: Evaluation Criteria and Definitions | Source: AECOM

Each action was scored on these eight criteria using the Action Selection and Prioritization (ASAP) tool. This tool was created by the C40 Cities Climate Leadership Group to help cities select and prioritize climate actions through a comparison of benefits and challenges. The ASAP tool was used to evaluate the climate actions' GHG reduction potential and impact on the local evaluation criteria. The actions' GHG reduction potential was estimated by researching the impact of similar actions, while the actions' evaluation criteria impact was determined through discussions with City staff and other stakeholders.

Not every climate action can be taken immediately. Some actions require other actions, planning, or analysis to happen first to better inform decision making. To determine where to start, we used the ASAP tool results and community feedback to set a general **timeframe** for the actions and categorize them as near-, medium- and long-term (see Table 4). For actions categorized as medium- or long-term, action progress could potentially be made in the near-term, but actions may not be significantly advanced until later. To learn more about this process, see **Appendix 4: Action Prioritization.**

Timeframe*	Definition
Near-term	Actions will be advanced in 1-3 years
Medium-term	Actions will be advanced in 4-7 years
Long-term	Actions ill be advanced in 8-10 years

**Action timeframes marked with an asterisk are already underway or ongoing*

Table 4: Timeframe Level and Definitions | Source: AECOM

HOW TO READ THE ACTION TABLES

The actions are grouped by focus area:

- Buildings
- Electricity
- Transportation
- Waste
- Nature-Based Solutions
- Other Actions We Need to Take (these actions address multiple focus areas)

Each action is classified as a **community-wide action** or a **municipal** (City government) **action.** Community-wide actions reduce emissions across the entire community, while municipal actions reduce emissions from City government operations. Community-wide actions do not necessarily mean that community members will be in charge of enacting them—the City government will still have a leading role in action implementation, with community members serving a supporting role.

Most actions were evaluated for GHG reduction potential and community benefits. However, several actions were added in response to community feedback and were not part of the analysis that occurred before the CAP Update public comment period. Even though these actions did not undergo the same evaluation and selection process as other actions, they are important steps to take and are supported by the community and technical experts, so they were included in the CAP Update. These actions are included in the "Additional Actions" tables in each section.

The action tables show the action number, title, description, action type (community-wide or municipal), timeframe (near, medium, or long-term), GHG reduction potential (low, medium, high, or supporting), and community benefits (see Table 5).

Community Benefit	Public Health	Savings to Residents and Businesses	Economic Prosperity	Resilience	Social Cohesion
Symbol					

Gold Outline = Action has a very positive impact on the community benefit

Table 5: Community Benefits Symbols and Legend | Source: AECOM

BUILDINGS

A Story Set In 2030

*Keisha was excited for her family to rent their first ever **net zero** home! The home had LED bulbs that used very little energy and had solar panels on its roof. The windows had special coatings that kept the house warm in winter and cool in summer. Her family didn't need to run the heater or air conditioner as much. The appliances in the net zero home were super smart. The fridge, washing machine, and even the television were all chosen because they used less energy. And, the water heater was powered by the sun too, using a special solar water heater on the roof. Keisha didn't have to worry about high energy bills anymore. Their home's solar panels provided all the power her family needed.*

> *"We need better codes, and more stringent. It needs to be a mandate, it can't be an incentive or a suggestion or an outreach, it needs to be mandatory for everyone if we want to survive in cities like Baltimore."*
>
> ***— Baltimore Resident at Community Workshop***

In 2019, buildings and other facilities produced 64% of Baltimore's GHGs. We use electricity, methane gas, and heating oil to power our homes, office buildings, and retail spaces. While significant GHGs are emitted when we heat and cool homes, prepare food, and other daily actions, many older buildings lack heating, ventilation, and air-conditioning systems or other cooling mechanisms. As global temperatures rise, the risk of extreme heat grows along with the importance of energy efficient, zero-emission heating and cooling systems. As we make progress on emission reduction targets, we must also plan to prepare for more electricity use over time while transitioning to clean energy sources. This is an important consideration when thinking about reducing emissions from buildings. We can reduce GHG emissions from buildings by reducing the amount of energy used to heat or cool our buildings and we can switch to equipment and appliances that use electricity or produce low or no emissions. This helps keep energy bills low while protecting against temperature extremes. Baltimore residents will also benefit from having cleaner air inside our homes if we use equipment powered by electricity or low- or zero-emission sources instead of fossil fuels.

These climate actions will:

- Enhance energy efficiency,
- Reduce the amount of energy used to heat, cool, or light buildings, and
- Switch equipment and appliances from fossil fuels to clean energy options.

ACTIONS

Action # and Name	Description	Features
B1: Incentivize Energy Efficiency and Electrification Retrofits	Provide ongoing incentives and/or discounts to encourage existing building energy efficiency, electrification, and zero or low emission retrofits for all buildings, particularly those in environmental justice or frontline communities. Conduct outreach to owners, **community land trusts,** developers, landlords and other relevant audiences. Ensure maximum accessibility to lower income residents and emphasize the health benefits from improving indoor air quality due to reduced methane gas and oil use. Also, seek opportunities to streamline current permitting and inspection processes for retrofits.	**Action Scope:** Community-wide **Timeframe:** Near* **GHG Reduction Potential:** High **Community Benefits:** 
B2: Create Net Zero Plan for City Government Facilities	Evaluate how to transition City municipal buildings from fossil fuel energy to low or no emission energy sources and establish a maximum offset goal.	**Action Scope:** Municipal **Timeframe:** Near **GHG Reduction Potential:** Low **Community Benefits:** 
B3: Implement Energy **Benchmarking** for City Government Facilities	Collect and monitor data regarding municipal facility energy use to build on Maryland State performance standards for government facilities. This helps track the energy efficiency of City government buildings over time.	**Action Scope:** Municipal **Timeframe:** Near **GHG Reduction Potential:** Low

Table 6: Building Actions | Source: City of Baltimore

**Action timeframes marked with an asterisk are already underway or ongoing*

Action # and Name	Description	Features
B4: Implement **Energy Audits** and Retro-Commissioning for City Government Facilities	Standardize a process for routine energy audits and **retro-commissioning** programs for City-owned buildings and target buildings with opportunities for improvement.	**Action Scope:** Municipal **Timeframe:** Medium* **GHG Reduction Potential:** Low **Community Benefits:** 
B5: Evaluate Zoning Regulations and Integrate Climate-Informed Zoning Approaches	Review the existing zoning code to identify updates to better integrate climate action, climate adaptation, and resilience to climate hazards in future development. Climate-informed zoning updates may include encouraging density in areas at low risk to climate hazards, directing intense land uses away from flood-prone areas, incentivizing the use of green infrastructure, providing heat mitigation approaches, and creating public spaces.	**Action Scope:** Community-wide **Timeframe:** Medium* **GHG Reduction Potential:** Medium **Community Benefits:** 
B6: Require Fossil Fuel Free and Solar-Ready New Construction	Make a rule that new buildings cannot use fossil fuels for power and be solar-ready. This will be undertaken in concert with efforts by utilities and the State and federal government to ensure the electric grid is able to support the transition toward all-electric buildings. Solar-ready means that buildings are built to allow people to easily install solar panels at a future time. Requiring all-electric new buildings helps residents and businesses more easily transition away from fossil fuels, while requiring solar-ready buildings helps promote clean electricity sources.	**Action Scope:** Community-wide **Timeframe:** Medium **GHG Reduction Potential:** Medium **Community Benefits:** 

**Action timeframes marked with an asterisk are already underway or ongoing*

Action # and Name	Description	Features
B7: Require Fossil Fuel Free and Solar-Ready for New or Majorly Renovated City Government Facilities	Require all new construction or major renovation project to be solar-ready and adopt low or no emission standards while ensuring alignment with State policy and law. Evaluate existing roofs for additional solar opportunities.	**Action Scope:** Municipal **Timeframe:** Long **GHG Reduction Potential:** Low **Community Benefits:** 

ADDITIONAL ACTIONS

The following actions were added in response to community feedback after the initial actions were developed and evaluated.

Action # and Name	Description	Features
B8: Develop a Residential Energy Efficiency and Electrification Program	Enhance existing Weatherization Assistance Program (WAP) to advance transparency, awareness and literacy regarding energy efficiency, energy use, electrification, retrofitting and renewable energy adoption options for homeowners and landlords, with a focus on those with **high energy burdens.**	**Action Scope:** Community-wide **Timeframe:** Near*

Table 7: Additional Building Actions | Source: City of Baltimore
**Action timeframes marked with an asterisk are already underway or ongoing*

Action # and Name	Description	Features
B9: Enhance Education, Training, Compliance and Enforcement of the Existing International Green Construction Code (IgCC)	The Baltimore City Green Construction Code has been in place since April 2015 and is updated as new International Green Construction Code guidelines are adopted by the State of Maryland. The Code requires all design and construction to comply with the 2018 IgCC, as adopted by Ordinance 20-361, effective May 18, 2020, and subsequently amended. Enhanced capacity for enforcing the IgCC will be supported to better track how these codes are enforced and address training needs or other programming challenges.	**Action Scope:** Community-wide **Timeframe:** Long
B10: Explore Point of Sale/Lease Electrification Ordinance	Determine a course of action and potential resources for requiring home or building owners to replace fossil fuel equipment with electric, low or no emission options before a building is sold and/or new leases signed after tenant turnover in a manner that will not place a burden on renters or devalue buildings.	**Action Scope:** Community-wide **Timeframe:** Near
B11: Encourage and Incentivize the Use of Rooftop Technology and Techniques that Minimize the Effect of Extreme Heat	Use and promote techniques such as reflective paint and green roofs that minimize the effect of extreme heat for residential and commercial buildings. This will also reduce energy used for cooling.	**Action Scope:** Community-wide **Timeframe:** Near

ELECTRICITY

A Story Set In 2030

Rasheed was interested in installing solar panels on his roof to make clean energy and reduce his energy bill. At first, Rasheed was worried that solar would not work for him because his house is a quaint, old row home. He also was worried about the expense of installing solar panels. Rasheed's neighbor told him about a State and local program that gave him a grant to help pay for solar. A team of experts came to Rasheed's house to first improve its energy efficiency with air sealing and insulation, and then installed new solar panels that fit together perfectly like puzzle pieces. Rasheed watched with excitement as they finished the installation. He was even more excited when his electric bill showed that the weatherization and solar improvements saved him a lot of money.

> *"I'm happy that we can purchase our electric supply through a neighborhood solar option. I'm supportive of efforts to add solar panels to parking lots and other large public properties with good sun exposure."*
>
> ***— Baltimore Resident at Community Workshop***

In 2019, about 34% of the GHGs generated in Baltimore were from using electricity. As Baltimore shifts to using more electricity to power buildings, vehicles, and other items, it will be very important that we complement this transition with increased use of clean energy sources. It is also critical that we switch to clean energy sources in a responsible, intentional way to ensure we have reliable energy and do not overwhelm the electric grid. This requires a phased approach and close, thoughtful work with local utility providers, communities, and a broad coalition of partners. There are many local opportunities, such as **community solar,** that can be expanded in Baltimore. Emerging and new technologies may also provide more ways the city can transition from energy produced by fossil fuels to clean energy.

Residential buildings in Baltimore use 34% of community-wide electricity, which produces 12% of the city's total GHG emissions. The average Baltimore household uses 8,000 kWh a year, which produces roughly 3 $MTCO_2e$. Smaller households or apartment complexes typically use less electricity than larger, single-family households.

These actions will also have other benefits. For instance, our air will also be cleaner when we burn fewer fossil fuels. Also, installing solar panels with batteries for energy storage means that the connected buildings could still have power during blackouts and brownouts caused by storms and heat waves. Currently, solar panels with batteries are costly, but they could be used strategically in places that help community members respond to climate hazard events. A key example of this is our Community Resilience Hubs, many of which will be equipped with solar and battery backup in the coming years.

The Baltimore Sustainability Plan outlines several actions relevant to energy use reduction and transition to renewable or low or no emission energy sources. The CAP Update builds on the actions in the Baltimore Sustainability Plan to identify additional climate actions that will:

- Help more people install solar panels or use other low or zero emission energy sources in their homes
- Encourage community solar in Baltimore neighborhoods, and
- Improve the capacity and reliability of electric infrastructure.

ACTIONS

Action # and Name	Description	Features
E1: Promote Renewable Energy and Energy Efficiency Incentive Programs	Provide outreach and education on available solar and energy efficiency programs, and incentives (e.g., tax credits, rebates, net metering, **solar renewable energy certificates (SRECs)**, etc.) for residents, landlords, property managers, businesses, community land trusts and others, particularly those with properties in frontline communities. Encourage adoption of zero emission energy sources where possible and explore opportunities for legislation and policy changes to expand programs and incentives.	**Action Scope:** Community-wide **Timeframe:** Near* **GHG Reduction Potential:** High **Community Benefits:** 
E2: Purchase Clean Electricity for City Government Operations	Buy clean electricity to power the City's municipal buildings. This action will increase power purchase agreements (PPAs) by at least 10% by 2030 to promote creation of new, regional clean energy projects.	**Action Scope:** Municipal **Timeframe:** Long **GHG Reduction Potential:** High

Table 8: Electricity Actions | Source: City of Baltimore
**Action timeframes marked with an asterisk are already underway or ongoing*

ADDITIONAL ACTIONS

The following actions were added in response to community feedback after the initial actions were developed and evaluated.

Action # and Name	Description	Features
E3: Partner with Utilities and Relevant Government Entities and Others to Improve Electric Infrastructure	Work with **Baltimore Gas and Electric (BGE)**, the Maryland Public Service Commission, and others to develop electrification plans and implement the best energy transmission polices and development practices. This will help us understand future electrification and infrastructure needs and ensure the grid is positioned to meet or exceed future demand. Careful consideration and advocacy will be directed to ensuring infrastructure upgrades are prioritized in vulnerable communities and do not place an additional expense burden on customers, particularly people living in low-income households. Work with National Audubon of Baltimore and other topical experts to ensure protection of wildlife and important flyways for birds is considered while expanding electrical infrastructure.	**Action Scope:** Community-wide **Timeframe:** Near
E4: Coordinate with Partners to Advance Solar	Coordinate local communities, the Maryland Clean Energy Center, Climate Access Fund, community green space managers, and others to advance community solar initiatives in Baltimore. Consider how to use vacant or under-utilized land in Baltimore to advance community solar. Raise awareness about and coordinate funding opportunities and tax incentives with a focus on those geared toward high energy burden communities.	**Action Scope:** Community-wide **Timeframe:** Medium

Table 9: Additional Electricity Actions | Source: City of Baltimore

TRANSPORTATION

A Story Set In 2030

Alejandra is thrilled to have moved into this transit-oriented community. In this neighborhood, everything was designed to be conveniently accessible without a car. The streets have wide sidewalks, perfect for strolling or riding bikes. Each school day, she walks to the nearby public transit wearing her backpack and arrives at school in no time. On weekends, Alejandra's family explores the city together. They hop on a bus or train to visit local attractions like the zoo, the museum, the farmer's market, or even visit other nearby cities. It is so much fun to leave the car behind and still get everywhere they want to go without creating pollution. The cleaner air has reduced how much Alejandra needs to use her inhaler.

> *"I agree with the comment that was made that Baltimore is currently planned as a car-based city. I personally would love to move away from that toward a public transportation-based city but agree that safety and reliability are major concerns right now..."*
>
> ***— Baltimore Resident at Community Workshop***

In 2019, driving vehicles in Baltimore generated 23% of all GHG emissions. To reduce these emissions, we must drive less, choose vehicles that do not pollute, and use public transit, bikes, or walk. Many households spend a significant portion of their income on transportation, which is a burden for all but even more so for lower income households. In 2020, over 27% of Baltimore households did not own a vehicle.[17] According to a 2017 study by the Baltimore Education Research Consortium, nearly 60% of Baltimore City high school students use public transit to get to and from school and 68% of them require at least one transfer, making the average commute time over 36 minutes per student taking public transit.[18] Enhancing alternative forms of transportation such as public transit and active transportation infrastructure will not only help existing users, such as our youth and those without vehicles, but also encourage others to make the switch to more sustainable modes of transport.

[17] Baltimore Neighborhood Indicators Alliance. 2021. "Percent of Households with No Vehicle Available – City." *City of Baltimore*. https://data.baltimorecity.gov/datasets/bniajfi::percent-of-households-with-no-vehicle-available-city/about

[18] Stein, Marc L., Jeffrey Grigg, Curt Cronister, Celeste Chavis, and Faith Connolly. 2017. "Getting to High School in Baltimore: Student Commuting and Public Transportation." *Baltimore Education Research Consortium*. https://baltimore-berc.org/wp-content/uploads/2017/01/GettingtoHighSchoolinBaltimoreJanuary2017.pdf

Transportation actions help reduce air pollution, as well as traffic and noise, making it easier, safer, and quicker to get around Baltimore. These actions create opportunities to reduce or eliminate the use of individually owned vehicles, which can also reduce household expenses. Finally, many alternatives to cars, like walking and biking, help promote active lifestyles and improve public health.

These climate actions will:

- Reimagine neighborhoods so that homes, workplaces, and shops are closer together,
- Make it easier to get around by biking, walking, and taking the bus or train,
- Increase opportunities to charge and share EVs, and
- Encourage carpooling and vanpooling.

ACTIONS

Action # and Name	Description	Features
T1: Make Roads More Walkable and Bikeable	Implement the Bikeways and Complete Streets plan, Safe Routes to Schools projects, and other community plans to maintain and improve the safety and connectivity of active transportation infrastructure for non-vehicular and micro-mobility users such as pedestrians and bicyclists.	**Action Scope:** Community-wide **Timeframe:** Near* **GHG Reduction Potential:** Medium **Community Benefits:** 

Table 10: Transportation Actions | Source: City of Baltimore
**Action timeframes marked with an asterisk are already underway or ongoing*

Action # and Name	Description	Features
T2: Require or Incentivize Active Transport-Friendly Programs and Infrastructure	Create more pedestrian, bike and scooter friendly programs, and infrastructure throughout Baltimore, particularly in frontline communities.	**Action Scope:** Community-wide **Timeframe:** Near* **GHG Reduction Potential:** Low **Community Benefits:** 
T3: Support Transit-Oriented Communities	Encourage people-oriented development over vehicular-oriented development so more people have easy, safe access to transit options and can access amenities by active and transit modes.	**Action Scope:** Community-wide **Timeframe:** Near **GHG Reduction Potential:** Medium **Community Benefits:** 
T4: Incentivize Micro-mobility	Provide incentives for residents, particularly those in frontline communities, to purchase micro-mobility vehicles (e-scooters, e-bikes, bikes, etc.) and explore opportunities to incentivize rental of micro-mobility vehicles.	**Action Scope:** Community-wide **Timeframe:** Medium **GHG Reduction Potential:** Medium **Community Benefits:** 

**Action timeframes marked with an asterisk are already underway or ongoing*

Action # and Name	Description	Features
T5: Improve Transit for Low-Income Neighborhoods and Other Communities in Need of Transit Options	Continually monitor bus and train legislative and policy activities and work with State of Maryland to advocate for improvements to MTA bus and train frequency and reliability for all of Baltimore. Prioritize connections for historically disinvested neighborhoods and communities with larger numbers of school-aged students that rely on public transit to get to and from school. Actively collaborate to enact State plans to improve transit in Baltimore.	**Action Scope:** Community-wide **Timeframe:** Near* **GHG Reduction Potential:** Low **Community Benefits:** 
T6: Partner with Rideshares to Improve Paratransit to Augment MTA Mobility Programs	Partner with rideshare providers like Uber and Lyft to help make these services better for people who need special transportation because of disabilities and to promote carpooling options for people using their services.	**Action Scope:** Community-wide **Timeframe:** Medium **GHG Reduction Potential:** Low **Community Benefits:** 
T7: Promote Zero Emission Bus Transition	Encourage the transition to electric or zero-emission vehicles for the Charm City Circulator and support the electrification of MTA buses.	**Action Scope:** Community-wide **Timeframe:** Near **GHG Reduction Potential:** Medium **Community Benefits:** 

**Action timeframes marked with an asterisk are already underway or ongoing*

Action # and Name	Description	Features
T8: Promote EV Sharing	Encourage and support the creation of EV sharing programs at a hyper-local level to offer greater access to EVs to more community members.	**Action Scope:** Community-wide **Timeframe:** Medium **GHG Reduction Potential:** Medium **Community Benefits:** 
T9: Promote Electric Car Share and Ride Share	Promote and raise awareness of existing electric car and ride share programs and support the transition of ride share companies to using electric vehicles.	**Action Scope:** Community-wide **Timeframe:** Medium **GHG Reduction Potential:** Medium **Community Benefits:** 
T10: Expand Public EV Charging Network	With leadership from the Parking Authority of Baltimore, expand publicly accessible EV charging infrastructure for all, ensuring that resources are equitably distributed, available along main routes and in popular destinations, and near publicly owned properties such as City buildings and schools.	**Action Scope:** Community-wide **Timeframe:** Near **GHG Reduction Potential:** Medium **Community Benefits:** 

Action # and Name	Description	Features
T11: Work with Gas Stations to Install EV Chargers	Work with new or significantly renovated gas stations to add chargers for EVs.	**Action Scope:** Community-wide **Timeframe:** Medium **GHG Reduction Potential:** Low **Community Benefits:** 
T12: Establish Car-Free Areas	Define what car-free areas mean and how they are identified in Baltimore. Require inclusion of car-free areas within transit-oriented development areas and co-create opportunities to include car-free areas in other areas where possible and supported by the community.	**Action Scope:** Community-wide **Timeframe:** Long **GHG Reduction Potential:** Medium **Community Benefits:** 
T13: Implement Revised Parking Standards and Encourage Developers to Reduce Parking	Conduct a parking study and revise minimum parking standards and other parking policies to eliminate excess parking while providing adequate parking for residents including people with limited or impaired mobility. Promote **shared parking agreements** and prepare parking facilities for zero emission vehicle and non-vehicular needs to reduce off street parking and excess asphalt coverage, which contributes to the heat island effect.	**Action Scope:** Community-wide **Timeframe:** Medium **GHG Reduction Potential:** Medium **Community Benefits:** 

Action # and Name	Description	Features
T14: Promote and Expand Existing Commute Trip Reduction Programs	Encourage the use and growth of existing commute trip reduction programs available through the MTA and other programs in alignment with Maryland Department of Transportation (MDOT) strategies to reduce use of single-occupancy vehicles by commuters. Explore opportunities to incentivize new sustainable commuting programs, such as discounted transit passes, parking cash out programs, and incentives for biking and walking to work for City employees. Coordinate with the State of Maryland or federal efforts to promote and strengthen employer commuter incentive programs for state or federal government employees working in Baltimore.	**Action Scope:** Community-wide **Timeframe:** Near* **GHG Reduction Potential:** Medium **Community Benefits:** 
T15: Enhance Awareness of Alternative Transport for Baltimore City Employees	Raise City employee awareness of alternative transportation options (e.g., biking, walking, train, bus, water taxi) and explore feasibility of offering free or reduced transit for City employees.	**Action Scope:** Municipal **Timeframe:** Near **GHG Reduction Potential:** Low **Community Benefits:** 
T16: Transition to Zero or Low Emissions Municipal Fleet	Change the vehicles that the City government uses to ones that pollute less by expanding municipal EV charging infrastructure, transitioning the City fleet to zero or low emission vehicles, and proactively seeking other fleet efficiencies. This action will require training City maintenance crews to ensure they have the knowledge, skills and resources needed to maintain EVs.	**Action Scope:** Municipal **Timeframe:** Medium **GHG Reduction Potential:** Low **Community Benefits:** 

**Action timeframes marked with an asterisk are already underway or ongoing*

Action # and Name	Description	Features
T17: Develop a Plan to Transition City Government to Low or Zero Emission Off-Road Vehicles and Tools	Plan how to transition tools and off-road vehicles owned by the City and its contractors to low or zero emission options.	**Action Scope:** Municipal **Timeframe:** Near* **GHG Reduction Potential:** Low **Community Benefits:** 

**Action timeframes marked with an asterisk are already underway or ongoing*

ADDITIONAL ACTIONS

The following actions were added in response to community feedback after the initial actions were developed and evaluated.

Action # and Name	Description	Features
T18: Support State Public Transit Efforts	Support State of Maryland efforts to improve and expand public transit in Baltimore, particularly east-west connections through the Red Line Project. Explore providing community members with transit passes to incentivize using public transit.	**Action Scope:** Community-wide **Timeframe:** Near*
T19: Complete a Route Optimization Study Focused on Reducing Carbon Emissions for Routine Municipal Fleet Routes	Determine how to optimize routinely traveled routes for municipal vehicles such as City waste collection vehicles to reduce vehicle emissions and conduct assessments that optimize other facets of route management.	**Action Scope:** Municipal **Timeframe:** Medium

Table 11: Additional Transportation Actions | Source: City of Baltimore

**Action timeframes marked with an asterisk are already underway or ongoing*

WASTE

A Story Set In 2030

Camila was very glad Baltimore had its own composting program. City of Baltimore Department of Public Works had set up special bins in parks, schools, and neighborhoods where people could put their food waste. As her neighborhood's no-waste leader, Camila and a group of volunteers taught workshops and visited schools to show everyone how to compost. People learned that organic materials like banana peels, eggshells, and leaves can decompose and turn into something helpful for the environment. As time went on, the composting program became a way of life. People were amazed at how much less trash they were throwing away and how beautiful and healthy their community and gardens were.

> *"...I 100% support the initiative to continue expanding compost collection for residents. It would be great to eventually offer curbside collection!..."*
>
> ***— Baltimore Resident at Community Workshop***

In 2019, managing and processing trash and wastewater produced 13% of all Baltimore's GHG emissions. The City manages about one-third of the city-wide waste stream, most of which goes to landfill or is incinerated. Baltimore's SWMP outlines a zero waste strategy for trash that includes 9 Rs: rethink, refuse, reduce, reuse, refurbish, remanufacture, repurpose, recycle, and recover, as alternatives to disposal. To reduce GHG emissions, we must generate less trash and use less water, repurpose materials and reuse items instead of throwing them away, and divert waste from landfills or incinerators, among other actions.

As two-thirds of waste materials are managed by private service providers in Baltimore, sustainable materials management requires coordinated adoption of zero waste strategies by the public and private sectors. Single-use containers and packaging are a major source of litter in Baltimore, so reducing or reusing those materials will result in cleaner streets. Reducing trash and building a circular economy can reap benefits that lead to job creation and job training opportunities. Efforts to reduce water use and incorporate more energy efficient wastewater treatment processes can reduce water bills. Further, diverting biodegradable materials from landfills not only reduces landfill methane emissions but can help increase the amount of compost we produce and use in communities. Compost can be used locally to aid in plant growth and beautify neighborhoods, help with food production, improve habitat areas, and help soils absorb more carbon.

The climate actions in this section will:

- Support local and state legislation that bans organics, single-use plastics, or other recyclable materials from landfill and incineration,
- Improve education, outreach, and engagement related to waste prevention, reduction, diversion, zero waste planning, composting, and other organic waste reduction goals and pathways to a circular economy, and
- Support City-mandated deconstruction policies to require construction and development projects to divert a certain percentage of their waste from disposal and encourage reuse of construction and demolition materials.

ACTIONS

Action # and Name	Description	Features
W1: Introduce City-wide Composting	Plan and implement a city-wide organic waste composting program and provide compost for free to residents and businesses. Additionally, compost more of the yard waste currently collected by the City. Inform and educate people about how and why to compost.	**Action Scope:** Community-wide **Timeframe:** Long **GHG Reduction Potential:** Low **Community Benefits:** 
W2: Enhance Existing Organic Waste Diversion Policy Awareness, Compliance, and Enforcement of MD HB-264 – Organics Recycling and Waste Diversion Law	With leadership from Baltimore Department of Public Works, the Maryland Department of the Environment and other partners, coordinate actions and publicly communicate strategies being implemented to enhance existing organic waste diversion policy awareness, compliance and enforcement. Explore opportunities to improve the rules for separating and using organic waste, like food scraps.	**Action Scope:** Community-wide **Timeframe:** Near* **GHG Reduction Potential:** Low **Community Benefits:** 

Table 12: Waste Actions | Source: City of Baltimore
**Action timeframes marked with an asterisk are already underway or ongoing*

Action # and Name	Description	Features
W3: Coordinate City-wide **Food Rescue** Program	Save excess food from being wasted by implementing Baltimore's Food Waste and Recovery Strategy and pursuing Baltimore's Zero Waste Strategy identified in the Solid Waste Management Plan. Enhance the regional food rescue capacity and coordinate local nonprofits that have expertise in food rescue programs to better support a stronger food rescue system in Baltimore.	**Action Scope:** Community-wide **Timeframe:** Medium **GHG Reduction Potential:** Low **Community Benefits:** 
W4: Develop Waste Diversion Incentives	Encourage recycling and reuse over disposal of waste by developing incentives for reducing waste-derived emissions, increasing recycling, and diverting waste from landfills and incineration. Examples include save as you throw programs (an economic incentive-based program that would save residents and businesses money for producing less waste), recycling or organic waste bin capacity upgrades, and bottle return programs, among others.	**Action Scope:** Community-wide **Timeframe:** Medium **GHG Reduction Potential:** Low **Community Benefits:** 
W5: Establish Waste Community Leaders	Establish or expand programs where community members, students, green space site managers, faith-based institutions, nonprofit organizations, and others promote waste management at a neighborhood level through direct action and by educating the community on how to reduce waste.	**Action Scope:** Community-wide **Timeframe:** Medium* **GHG Reduction Potential:** Low **Community Benefits:** 

**Action timeframes marked with an asterisk are already underway or ongoing*

Action # and Name	Description	Features
W6: Promote and Partner with Circular-Economy Local Businesses	Promote and/or partner with local businesses that use local recycled materials, avoid single-use materials, or pursue other actions outlined in the Department of Public Works Solid Waste Management Plan (2023). Educate businesses on how to participate in a circular economy and use the Sustainable Business Guidelines to help them to use local materials and reuse service providers. Explore opportunities to help local businesses and local government pursue Environmentally Preferred Purchasing options.	**Action Scope:** Community-wide **Timeframe:** Medium **GHG Reduction Potential:** Low **Community Benefits:** 
W7: Establish Sustainable **Procurement** Protocol	Revise existing municipal procurement rules to add a sustainable procurement protocol and incentives to align contracts and agreements with the principles of the CAP Update. As feasible, adopt the Environmentally Preferable Purchasing Program.	**Action Scope:** Municipal **Timeframe:** Near **GHG Reduction Potential:** Low
W8: Encourage Water Savings Program	Create and promote a water conservation program in partnership with local nonprofit and community organizations. Possible activities include water collection and reuse or diversion and grey water reuse, among others.	**Action Scope:** Community-wide **Timeframe:** Near **GHG Reduction Potential:** Low **Community Benefits:** 

Action # and Name	Description	Features
W9: Establish Emissions Plan for Wastewater Facilities	Led by Baltimore Department of Public Works, develop and implement an emissions reduction plan for at least one of its wastewater treatment facilities.	**Action Scope:** Municipal **Timeframe:** Long **GHG Reduction Potential:** Low

ADDITIONAL ACTIONS

The following actions were added in response to community feedback after the initial actions were developed and evaluated.

Action # and Name	Description	Features
W10: Support Expansion of Waste Diversion and Reduction Programs	Support the implementation of the Solid Waste Management Plan, particularly actions focused on waste diversion and reduction programs that will reduce or eliminate municipal dependence on waste incineration and develop pathways to address construction and demolition diversion that promote the use of recycled or reused salvaged materials in new construction.	**Action Scope:** Municipal **Timeframe:** Near

Table 13: Additional Waste Actions | Source: City of Baltimore

Action # and Name	Description	Features
W11: Require Plans for New Buildings to Provide Sufficient Indoor and Outdoor Space for Recycling, Composting, and Materials Reuse	Require all new building plans to have designated space indoors and outdoors to collect recycling to advance the Solid Waste Management Plan goal of reaching 35% recycling in Baltimore businesses.	**Action Scope:** Community-wide **Timeframe:** Near
W12: Ensure New Waste Disposal Facilities Processing Municipally Generated Waste Comply with Carbon Neutrality Goals	Support a moratorium or other measures that would require any new waste disposal facilities processing municipally generated waste to comply with carbon neutrality goals.	**Action Scope:** Municipal **Timeframe:** Medium
W13: Collect Data to Help Reduce Pollutants Generated from Waste Processing Facilities	Partner with universities to monitor air quality and track pollutants from waste processing facilities, including waste incinerators. Work with waste processing facilities to require reporting of the source and destination of all waste haulers using Baltimore-based facilities and recommend zero-emission targets for their fleets.	**Action Scope:** Community-wide **Timeframe:** Medium
W14: Support and Expand upon Legislation that Bans Recyclable Materials from Landfill and Incineration	Support legislation that bans recyclable materials from landfill and incineration. Consider how this legislation may be expanded in Baltimore to include compostable materials.	**Action Scope:** Community-wide **Timeframe:** Medium*
W15: Explore Reducing Energy Use at Wastewater Facilities	Proactively pilot projects and explore ways to reduce energy use or effectively recover energy sources at wastewater facilities.	**Action Scope:** Municipal **Timeframe:** Near*

**Action timeframes marked with an asterisk are already underway or ongoing*

NATURE-BASED SOLUTIONS

A Story Set In 2030

Malik is a community steward with a vision for transforming the neighborhood through the power of green infrastructure. The first step was to convert the vacant lots and underutilized spaces into vibrant green pockets. Malik and his team collaborated with local landscape architects to design rain gardens and permeable pavement installations. These green spaces not only added a touch of natural beauty to the urban surroundings but also served as innovative solutions to manage stormwater. To address the persistent issue of flooding on the streets, Malik and his team collaborated with the City to implement a network of tree-lined bioswales. These carefully designed channels ran alongside the roads, capturing and redirecting stormwater. The impact was profound. During the next heavy rainfall, the community witnessed the effectiveness of their green infrastructure. The rain gardens absorbed water like sponges, the bioswales directed runoff away from the streets, and the entire neighborhood became a model for sustainable stormwater management.

> *"The suggestions on using trees and natural barriers to protect bike lanes and the electric zip cars were particularly interesting..."*
>
> ***— Baltimore Residents at Community Workshop***

Nature-based solutions are sustainable planning, design, environmental management, and engineering practices that weave natural features or processes into the built environment to promote carbon removal, adaptation, and resilience.

Nature-based solutions are an important part of a CAP because they help remove carbon from the atmosphere while preserving or increasing the number of trees and area of wetlands, forests, green spaces, and natural landscapes, which can also improve public health and quality of life for residents. In addition to being an important component to sustainable climate action, nature-based solutions are important to people in Baltimore and many community-based initiatives that involve nature-based solutions exist throughout the city. In Baltimore, 45% of land is covered in impervious surfaces, or surfaces that do not allow fluid to pass through.[19] Impervious surfaces generate higher

[19] City of Baltimore – Department of Planning. 2009. "Stormwater RunOff/Non-Point Pollution Prevention."*City of Baltimore*. https://planning.baltimorecity.gov/planning-master-plan/water/stormwater#:~:text=Under%20the%20City%E2%80%99s%20permit%20the%20Department%20of%20Public,of%20the%20total%2051%2C790%20acreage%20of%20the%20City.

volumes of stormwater runoff that can pollute water, contribute to local flooding during large rain events, and raise temperatures in neighborhoods because they absorb heat. Trees, native plants, forests, and other green spaces provide pervious surfaces that help slow and treat stormwater. They also remove carbon from the atmosphere, lowering the total amount of GHG emissions, and provide cooling, which can reduce the need for air conditioning. Strategically located green spaces, wetlands or marshes, and other naturally occurring riparian areas can help buffer people, communities, critical infrastructure, and cultural assets from sea level rise. This is especially important in Baltimore because sea level rise is occurring at a faster pace in the Chesapeake Bay region than compared to the rest of the country.

While most nature-based solutions provide a GHG emissions reduction benefit, nature-based solutions can also act to protect people and property, or even mitigate the risk of hazards such as sea level rise, flash floods and extreme heat. Two common types of nature-based solutions focused on resilience are:

- **Green Infrastructure:** engineered solutions incorporating natural and built elements, such as rain gardens or green roofs, and
- **Natural Infrastructure:** existing or rehabilitated environments to build resilience, such as restored wetlands or urban forests.

Many people, organizations and businesses already contribute to creating and protecting nature-based solutions in Baltimore. For example, floating wetlands were installed in the Inner Harbor by the National Aquarium. The emerging Reimagine Middle Branch Plan includes ambitious and robust nature-based resilience solutions including marshland restoration that can help improve water quality, buffer neighborhoods from rising waters, and provide important habitat in South Baltimore.

Thoughtful investment in nature-based solutions will improve quality of life for people who live, work, play, learn, and age in Baltimore and provide opportunities to engage people in climate action in shared neighborhood spaces, improve habitat, and promote the recreational and aesthetic value of the city. Actions in this section aim to:

- Remove carbon by expanding public and private green spaces, and
- Promote green and natural infrastructure that provides climate resiliency benefits.

ACTIONS

Action # and Name	Description	Features[20]
N1: Accelerate the Achievement of Baltimore's Tree Canopy Goal to Reach 40% Tree Canopy by 2037	With leadership from Baltimore City Recreation & Parks Department (BCRP) Forestry Division, grow the urban tree canopy with street trees, open space trees, expanded forest patches, and forests. Safeguard the current tree canopy on both public and private property through the creation and enforcement of additional tree regulations in Baltimore City codes related to natural resources.	**Action Scope:** Community-wide **Timeframe:** Near* **Community Benefits:** 
N2: Assess City Parklands to Identify Opportunities to Enhance or Expand Natural Features	Support BCRP comprehensive planning and BCRP Playbook actions to assess the conditions of parkland assets and amenities to support effective maintenance. Use the information to identify opportunities to enhance or create new natural features within City parks.	**Action Scope:** Community-wide **Timeframe:** Medium **Community Benefits:** 
N3: Create and Maintain More Public Green Spaces	Advance goals set forth in the Baltimore Comprehensive Master Plan, the Green Network Plan, and other plans to increase the number of maintained public green spaces that can remove carbon. Doing so can also connect communities to nature, provide more opportunities for habitat and stormwater treatment, reduce the heat island effect, and increase safety in neighborhoods.	**Action Scope:** Community-wide **Timeframe:** Medium* **Community Benefits:** 

Table 14: Nature-base Actions | Source: City of Baltimore

**Action timeframes marked with an asterisk are already underway or ongoing*

[20] The carbon removal potential of the nature-based solutions actions was not evaluated

Action # and Name	Description	Features[20]
N4: Increase Green Stormwater Infrastructure	Use the Nuisance Flood Plan and other relevant planning processes to identify flood-prone locations that would benefit from the installation of green infrastructure, particularly in flood-prone and frontline communities. Encourage best practices that include use of native plants and high-quality soil to improve carbon removal potential. Review existing policies and identify opportunities to reduce impervious surfaces in redevelopment and transportation infrastructure.	**Action Scope:** Community-wide **Timeframe:** Near* **Community Benefits:** 
N5: Partner with Community-Based Groups to Increase Neighborhood Nature-Based Solutions and Educate Communities About Climate Resilience	Seek opportunities to partner with existing green space stewards, urban farms, and other nonprofit and community-based groups to advance local understanding of climate resilience, climate-friendly techniques, and interventions such as installing native plants and soils and encourage the installation and maintenance of more nature-based solutions in Baltimore neighborhoods.	**Action Scope:** Community-wide **Timeframe:** Near **Community Benefits:** 
N6: Analyze Potential Solar or Renewable Energy Farm Locations	Look for opportunities to increase community solar in coordination with potential tree planting locations to optimize land use.	**Action Scope:** Community-wide **Timeframe:** Medium **Community Benefits:** 

**Action timeframes marked with an asterisk are already underway or ongoing*

OTHER ACTIONS

A Story Set In 2030

Aaliyah was happy to live next to a "cool zone," which featured a block of streets treated with reflective surfaces to combat extreme heat and cool her entire community. She also has easy access to one of the hundreds of Community Resiliency Hubs across the city where she can go to pick up additional materials to keep cool at home. People gathered at their local Resiliency Hub during the summer's hottest hours of the day. Libraries, community centers, and even some shopping malls opened their doors to give everyone a cool place to relax. Over the past seven years, the City helped people plant new trees and provided resources to paint rooftops, strategically adding more "cool zones" city-wide. Aaliyah noticed that the air felt fresher, and the neighborhood felt more comfortable to live in compared to 2023.

> *"...To get people involved in communities, local communities, communities of color in particular, also means that the job opportunities have to be localized in those communities as well..."*
>
> ***— Baltimore Resident at Community Workshop***

This section lists actions that apply across multiple areas. Many of these actions help improve communication between the Baltimore City government and the community.

ACTIONS

Action # and Name	Description	Features
O1: Develop Centralized Tool for Climate Actions	Create a centralized tool to help everyone understand what climate actions are underway and how they can get involved. The tool will include a process guide and resources on how residents and businesses can acquire building energy efficiency upgrades, electrification options, solar installation options, community solar options, and green power purchasing options.	**Action Scope:** Community-wide **Timeframe:** Near* **GHG Reduction Potential:** Supporting

Table 15: Other Actions | Source: City of Baltimore

**Action timeframes marked with an asterisk are already underway or ongoing*

Action # and Name	Description	Features[20]
O2: Create an Education and Outreach Program	Develop a comprehensive promotion strategy to advance all Climate Action Plan Update priority actions and provide resources to help people take action.	**Action Scope:** Community-wide **Timeframe:** Near* **GHG Reduction Potential:** Supporting **Community Benefits:** 

**Action timeframes marked with an asterisk are already underway or ongoing*

ADDITIONAL ACTIONS

The following actions were added in response to community feedback after the initial actions were developed and evaluated.

Action # and Name	Description	Features
O3: Create a Heat Management Plan	Develop a comprehensive plan to reduce the risk of extreme heat to people in Baltimore and hire a Heat Mitigation Officer.	**Action Scope:** Community-wide **Timeframe:** Medium
O4: Improve Distribution of Climate-Relevant Data	Ensure everyone can get important information about climate change in Baltimore by improving the collection and circulation of climate relevant data. Partner with local colleges, universities, and research institutions to better track and share environmental data and research.	**Action Scope:** Community-wide **Timeframe:** Medium

Table 16: Additional Other Actions | Source: City of Baltimore

Action # and Name	Description	Features
O5: Partner with Institutions to Inform Climate Action Plan Update Implementation	Work with universities and research collaboratives to undertake research that will inform Climate Action Plan Update implementation.	**Action Scope:** Community-wide **Timeframe:** Near*
O6: Connect and Convene Communities, Individuals, Organizations, Businesses, Researchers, Agencies, and Others Working to Advance CAP Update Actions	Seek opportunities to bring together, coordinate, and uplift the network of climate champions in Baltimore, and coordinate across jurisdictions where beneficial for progressing Baltimore's ability to achieve its carbon neutrality goal.	**Action Scope:** Community-wide **Timeframe:** Near*

**Action timeframes marked with an asterisk are already underway or ongoing*

Carrying Out Our Plan

- Working with Partners
- Implementation
- Fulfilling Our Promise
- Paying for Climate Actions
- How You Can Help

WORKING WITH PARTNERS

To put this plan in action, we will work with communities, particularly frontline and environmental justice communities who are most directly affected by climate change, to address community climate priorities while also working on broader, city-wide strategies. We will also make sure that the City government keeps its commitments. Through our actions, we seek to build trust, accountability, and track implementation progress as guided by our Equity Implementation Framing in the 2019 Sustainability Plan.

In particular, we seek to co-create local solutions with frontline and environmental justice communities who face the greatest challenges from climate change.

BALTIMORE SOCIAL-ENVIRONMENTAL COLLABORATIVE (BSEC)

BSEC is a 5-year research effort in Baltimore funded by the Department of Energy, aiming to generate the climate science needed to inform equitable climate action in Baltimore. It is a research collaborative that includes Johns Hopkins University, Morgan State University, Pennsylvania State University, University of Maryland Baltimore County, additional research institutions, Baltimore City government, and community partner organizations. This collaboration among researchers, community, and City government provides a team that can co-generate climate action ideas and ensure robust evaluation of climate actions as they are implemented.

BSEC's goals are to:

- Understand how Baltimore experiences climate change, with a focus on partnering with Baltimore communities. Specific neighborhoods – especially those currently under served by climate measurements – will host sensors to measure heat, water, gases, pollutants, wind, and more. There will also be opportunities for community-engaged science. Collecting this data is an urgent scientific contribution because climate change in cities is not well understood.
- Collaborate with communities to identify climate action strategies that achieve residents' goals in alignment with the city's 2023 Climate Action Plan, as informed by local priorities and place-based knowledge. Climate strategies need to be suited to specific neighborhoods. Improving equity is a key focus.
- Design and evaluate ways to integrate community members into the research process.

- Design and evaluate a decision support tool, the “Equitable Pathways” process, that analyzes many possible interventions and identifies promising solutions that can be evaluated by the community and researchers.
- Ensure that the community is always benefiting from the science being done.

BUILDING CLIMATE LEADERSHIP

Baltimore benefits greatly from the work of many climate leaders, including nonprofit organizations, leading international research institutions, cross-sector partnerships, individuals, and community-based groups who educate and mobilize their neighbors to take action. The Office of Sustainability and other City agencies commit to partnering with climate leaders to implement this ambitious plan that we developed together.

Youth in Baltimore have taken a major role in advocating for more climate-friendly practices. For example, students took action that helped eliminate the use of Styrofoam trays in Baltimore City Public School System cafeterias. Youth engagement will be a focus of the CAP Update’s implementation strategy for building climate leaders. The Office of Sustainability plans to hire a Community & Youth Engagement Coordinator to help connect youth to opportunities to learn about and act to address climate change.

Because there is a great deal of climate action already underway in Baltimore, in addition to finding new partners and promoting more climate leaders, we will seek opportunities to coordinate with existing coalitions and groups to ensure a good flow of information, identify opportunities and resources, and better connect climate leaders to strengthen a cohesive climate action community working to meet Baltimore’s carbon neutrality goal.

COORDINATING ACROSS AGENCIES

We will keep working across agencies, governments, and partners as we put this plan into action. We will continue to work with existing partner organizations, seek new partners, and collaborate with communities on local initiatives to improve climate action.

Importantly, we will continue working with key municipal, regional, national, and international groups and collaborators and through public-private partnerships to advance Baltimore's carbon neutrality goal. A few examples of key efforts include:

- **Baltimore Commission on Sustainability:** The Commission oversees the implementation of the Baltimore Sustainability Plan and monitors and reports progress annually. This 21-member body represents environmental groups, community organizations, labor unions, public health and environmental justice interests, and private industry. Twenty members are appointed by the Mayor and one City Council representative member is appointed by the City Council President.
- **The Mayor's Sustainability and Resiliency Subcabinet:** An interagency group that works to advance implementation of the 2019 Sustainability Plan and other related plans, improve interagency collaboration, and fully embed sustainability and resiliency into government practices so Baltimore can achieve a more ambitious sustainability and resiliency agenda.
- **Community Resiliency Hubs:** Trusted, service-based, non-profit community organizations (including faith-based) with strong leadership located in under-resourced neighborhoods. Through this program, they develop public and private partnerships coordinated by the Baltimore Office of Sustainability to provide essential resources and community-based support during times of crisis. Currently, 18 Resiliency Hub partner organizations participate in the program.

IMPLEMENTATION

Through the CAP Update and other plans that advance climate action, Baltimore is committed to working toward climate justice while transitioning from an extractive economy to a living, circular economy within a safer, more vibrant city. As stated in the 2019 Baltimore Sustainability Plan, the Commission on Sustainability and the Office of Sustainability commit to more intentionally address implicit bias and remove barriers for racial and other marginalized groups as climate actions are pursued. Our goal is to help eliminate the forces that create and sustain institutional and structural racism and other entrenched inequities in Baltimore while addressing the great challenge of achieving carbon neutrality and resilience for all people who live, play, work, learn, and age in Baltimore.

An equity lens brings racial equity analysis to the foreground to ensure that the impacts of institutional racism are considered. Equity considerations and the equity framework that was followed when developing the CAP Update will continue to be utilized during CAP implementation and are available in **Chapter 6 of the Baltimore Sustainability Plan.**

When creating this plan, we selected ten complex climate actions that are priorities for the City government to receive additional guidance in the form of **implementation roadmaps.** The implementation roadmaps show how to approach these actions in the next ten years. Representatives of different City departments talked about the steps to make each action happen, including who is responsible, what partners are needed to accomplish the action, how to measure the success of the action, how to stay on track with action implementation, and funds and other support needed to complete the action. Careful consideration was given to ensure the implementation roadmaps can help those who need it the most. **Read Appendix 5: Implementation Roadmaps** to learn more.

FULFILLING OUR PROMISE

To make sure we are transparent about the work the City government undertakes to put this plan into action, we will continue to publish our Sustainability Annual Report and periodically share progress made toward climate actions. We will continue to routinely monitor Baltimore's GHG levels and emission sources and update the GHG emissions inventory that estimates the amount of GHGs Baltimore creates each year. Updating the inventory indicates if we are on track to becoming carbon neutral by 2045 and allows us to adjust actions and strategies as needed to keep us on track to achieving our goal. Also, several actions in the CAP Update will help us to capture more and better data and to increase outreach to better inform the public on the progress made and challenges encountered as we work to reach carbon neutrality by 2045.

PAYING FOR CLIMATE ACTIONS

We will be thoughtful about how we spend money to implement our climate actions. In addition to City investment, we will look for different sources of funding to pay for climate actions, such as grants and partnerships. Some of the plan's actions identify methods to work across sectors to achieve the climate actions.

We Took a Deep Dive to Determine the Costs and Cost Savings to Implement Three Actions for Municipal Activities:

B2: Create Net-Zero Plan for City Government Facilities

B7: Require Fossil Fuel Free and Solar-Ready for New or Majorly Renovated City Government Facilities (only the solar-ready portion of this action was evaluated)

T17: Develop a Plan to Transition City Government to Low- or Zero-Emission Off-Road Vehicles and Tools

Read **Appendix 6: Fiscal Analysis of Selected Municipal Actions** to learn more.

HOW YOU CAN HELP

Everyone in Baltimore plays a role in creating a more resilient, safer, and healthier city through climate action. Each of us can take big and small actions daily to produce fewer GHG emissions. We can reduce, reuse, and recycle. We can walk, bike, or use buses and trains instead of driving alone. We can support local farms and grow and maintain native plants. We can help maintain forests and use compost we make in our gardens. When we move to a different home or buy a car, we can pick electric and efficient options. All these things make a big difference and show others how they can help, too.

Baltimore's climate change goals require significant change. All of us, as a community, play an important role in making things better. Here are some ways you can help make the Baltimore Climate Action Plan happen:

- **Make sure of Baltimore government fulfills its promises.** Go to City Council meetings or talk to your City Council member. Tell them that fighting climate change is important to you. Ask them to set aside money for climate actions.
- **Get in touch with groups in your community that work to address climate change.** Support actions to help the environment, make homes people can afford, stop using fossil fuels, and improve buses and trains.
- **Have conversations with your friends, family, and neighbors about climate change.** Talk about how it affects Baltimore, your life, and what we can do to help. Help more people do something to stop climate change.

As we work to fulfill our promise, we also welcome opportunities to promote the incredible climate action occurring in communities. Please share information with sustainability@baltimorecity.gov and visit the Baltimore Office of Sustainability website to sign up to receive updates about how we, as the Baltimore community, are building a more resilient, healthy, safe, and vibrant city.

Explore Further: The Appendices

- Appendix 1: Background Review
- Appendix 2A: Community Engagement Plan
- Appendix 2B: Community Engagement Summary
- Appendix 3: Municipal Greenhouse Gas Inventory and Reduction Pathway
- Appendix 4: Action Prioritization
- Appendix 5: Implementation Roadmaps
- Appendix 6: Fiscal Analysis of Selected Municipal Actions

NOTE: *Action numbers and titles have changed since the creation of the appendices. Therefore, the actions listed in the appendices will not exactly match what is in the CAP Update.*

Report Prepared By AECOM, *with the support of Assedo Consulting, in collaboration with the Baltimore Office of Sustainability, and many other contributors.*

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