CITY OF ROCKVILLE
CLIMATE ACTION PLAN

November 15, 2021
DRAFT

City of Rockville Climate Action Plan
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I. Executive Summary

Rockville's first Climate Action Plan (CAP) provides overall priority strategies to reduce greenhouse gas (GHG) emissions and prepare the community to adapt to a changing climate. These actions are needed to set the City on a path to meet 50% emissions reductions (from 2005) by 2030, approach carbon neutrality by 2050, and protect the community from climate-related effects. Actions are also designed to highlight City leadership and promote established community values. Many actions provide multiple benefits in the areas of environmental quality, economic vitality, safety, health, and equity. Implementing the plan will involve many City programs and departments. The plan intends to leverage existing partnerships and resources where possible, but many actions require additional staff and funding to be implemented. To help offset costs, the plan will remain flexible to enable the City to take advantage of new opportunities as they arise. Investing in Rockville's clean energy future and climate resilient future will provide benefits for generations to come.

Rockville's Climate Commitments and Progress

Rockville joined many other governments and organizations around the world in supporting the goals of the Paris Climate Agreement. This plan will help facilitate the City's progress. Although this is the City's first Climate Action Plan, many projects, programs, and policies have been implemented over the past decade and more are in the works. The City has robust green building codes, bicycle and pedestrian infrastructure, and many environmental incentive and volunteer programs. The Rockville community has been excelling in clean energy with over 750 solar installations, 87 million kilowatt-hours of green power purchased, and over 2,000 electric vehicles registered in the City. City facilities have made incremental progress, with one renewable energy installation at Thomas Farm Community Center (geothermal), one electric and one hybrid fleet vehicle, and energy efficiency upgrades at nine facilities. Further, Rockville purchases renewable energy credits for 100% of municipal electricity use. All these accomplishments are significant, yet to reach 50% reduction by 2030, more actions are needed. This plan helps provide a framework.

How the Plan Was Developed

The Climate Action Plan development process included a background and process presentation to the Mayor and Council and several boards and commissions in 2020, and public engagement consisting of two surveys with over 500 responses and 15 virtual events. Feedback reflected strong overall support for this initiative and many thoughtful comments. A consultant conducted a climate projections analysis and cost-benefit analysis for select measures. Additional climate resilience and equity data was compiled. Staff from multiple departments were invited to provide feedback to shape actions and implementation. Additional public comment and Mayor and Council instruction is expected to guide the plan to adoption in early 2022. Implementation will occur through 2030 as the actions are provided the necessary resources.

Rockville Greenhouse Gas Emissions

Rockville's community greenhouse gas inventory illustrates the global-warming gases produced by activities within the city limits as well as emissions resulting from electricity use within the jurisdiction. The inventory does not include emissions from purchased goods that are manufactured outside the City due to data limitations. Rockville's total emissions fell by more than 20% since 2005 due to more efficient buildings and electric generation switching from coal to natural gas and renewable energy sources. Over 58% of emissions are generated from buildings, 36% from transportation, and the remainder from other fugitive sources. Municipal emissions generate about 1% of the total emissions, from the energy used by City facilities, water and wastewater services, fleets, and street and traffic lights.

Greenhouse Gas Reduction Goals

Rockville's greenhouse gas reduction goal mirrors the State of Maryland and the Council of Governments' goal of a 50% greenhouse gas reduction below 2005 levels by 2030. This will position the City to strive to be carbon neutral towards mid-century as recommended by international scientists and policy analysts at the United Nations in line with Paris Agreement goals. Additionally, Montgomery County is working toward a more ambitious goal and the City can leverage partnerships to further advance the long-term goal of carbon neutrality.

Greenhouse Gas Reduction Pathway

With the assistance of a technical consultant, Cadmus, the City defined a potential pathway to achieving a 50% emissions reduction from 2005 baseline by 2030 – an emissions reduction of about 300,000 metric tons carbon dioxide equivalent -- and identified levels of implementation needed from each sector.

Rockville's emission reduction potential in the short term is mainly associated with a few of the most impactful actions, such as a cleaner grid, solar electricity generation, cleaner cars, energy efficiency and Federal hydrofluorocarbon (HFC[1]) and methane reduction measures. Two-thirds of the reductions rely on cleaning the electricity grid through more ambitious Maryland Renewable Portfolio Standards and account holders purchasing renewable energy through an electricity provider. Rockville has at least some advocacy influence over these areas. Other beneficial actions include land use policy in the Comprehensive Plan, transportation, bicycle, and pedestrian improvements, planting trees, encouraging and incentivizing residential and commercial energy upgrades and solar systems, reducing waste, encouraging and facilitating electric vehicle adoption, and upgrading Rockville's own fleet, facilities, and streetlights. The table below summarizes the emissions reduction action levels and their percent contribution towards the 2030 goal.

Strategy	Percent contribution to 2030 goal
Increasing the Renewable Portfolio Standard to 50% renewable	41%
Additional community green power purchases (27%)	27%
Commercial energy upgrades (400 retrofits)	8%
Increasing federal HFC reductions	7%
Electric vehicle conversions (2,000 vehicles)	7%
Additional solar installations (1,800 installations)	5%
Residential energy upgrades (4,000 retrofits)	2%
Land use and transportation (2,000 new households near transit)	2%
Municipal actions (13 facility upgrades, 50 fleet EV conversions, 2,500 streetlights, and solar installations)	1%
Tree and forest management (3,000 trees planted)	0.1%
Waste reduction (180 tons)	0.02%

Climate Impacts, Resilience, and Equity

Changes in climate and weather patterns are already occurring globally and in Rockville. These effects have potential infrastructure, ecosystems, and health and equity implications. Reducing greenhouse gas

[1] Hydrofluorocarbons (HFCs) are a powerful greenhouse gas emitted incidentally ('fugitive emissions') through use of certain refrigerants.

emissions heads off the worst climate change impacts in the long-term, but some effects are inevitable in the short term. Maryland communities are already experiencing more frequent flooding, severe storm damage, and health effects from increased temperatures, poor air quality, and shifts in vector-borne diseases that pose economic, health and environmental challenges. Assessing these impacts helps the City better prepare, adapt, and recover from both everyday changes and extreme events.

Climate projections typically include two future scenarios, one for high global greenhouse gas emissions and one for low emissions which provide a sense of the difference that reducing emissions can make. An evaluation of studies found the following are the most prominent direct climate changes of concern in the region near Rockville. Ranges shown reflect the modeled low emissions to high emissions projections.

Rising temperatures

- The number of days per summer with a heat index over 95°F is projected to double in coming decades and could triple to a range of 77 to 106 days each summer by 2100.
- The average number and length of heat waves could double.

Concentrated precipitation

- Historical data shows that the amount of precipitation falling in the heaviest 1% of events has increased 71% in about the last 50 years.
- Today's 100-year 24-hour rain event (8 inches) could contain 10 to 16 inches of precipitation by the end of the century.

Drought

- Moderate to severe water supply shortages are expected during severe droughts due to climate changes and increased demand by 2050 unless water supply enhancements, including the Travilah Quarry, are developed.

Wind and storm events

- Generally, with a warmer atmosphere fueling storms and holding more moisture, the number and severity of extreme weather events is projected to increase (e.g., more concentrated rainfall events, high winds, hurricanes, nor'easters, hail, tornados, thunderstorms, ice storms, and other storm-related conditions).

Sea level rise

- Although not a direct impact to Rockville, sea level could increase by 1.5 to 6.5 feet or more by 2100, which is an additional concern in Maryland and the broader DC metro region of which Rockville is a part.

Vulnerability Assessment for Buildings, Infrastructure, City Services, Ecosystems, and Health

Rockville compiled climate data and analyzed local and national studies, including Montgomery County's Climate Action Plan, to build local knowledge of what climate change means for our community and to identify potential gaps in preparedness.

Buildings, infrastructure, and City services are already observing the impacts of extreme precipitation. Buildings, the power grid, transportation systems, water treatment, and stormwater facilities are expected to be increasingly stressed by summer heat, local inland drainage flooding and stream flooding, debris

from storms, energy costs from increased cooling needs, moisture, and drainage problems near buildings. Many planning assumptions rely on historic weather data which is no longer a prediction for the future. For example, stormwater facilities are designed using historic rainfall patterns. Current FEMA floodplains do not include future flood risk. Further, FEMA's studies do not evaluate inland drainage or smaller stream flooding risks. Outdoor parks and recreation programs and services may also need to adjust operations for higher temperatures and extended heat waves. Rockville will need to continue to work with community partners to evaluate climate impacts, prepare for hazards and continuity of operations, and protect critical infrastructure, stormwater and drainage infrastructure, and utilities. Monitoring supply chain and other beyond-the-boundary disruptions will be part of ensuring the region's overall preparedness.

Ecosystems and the environment are affected by climate change-worsened stressors in the form of increased heat, pests, storms, and wind. These changes affect forests, streams, and urban trees. Ecosystem health and biodiversity is important not only for economic, recreational, stress-relieving benefits, but also for its role in buffering weather and development impacts in urban, suburban, and rural areas. Trees and vegetation provide shade to reduce heat impacts, absorb carbon dioxide, filter water and air pollutants, buffer the wind, and reduce cooling bills for nearby properties. However, urban parks need to be managed to increase their value to the City. A holistic strategy to protect the health of natural assets can increase resilience for all species residing in Rockville.

Climate change has many implications for public health. It is expected to increase the frequency of heat related illnesses and injuries, including heat exhaustion and heat stroke, respiratory illness, and cardiovascular illness which are worsened by heat waves, reduced air quality, and increased allergens including weeds and mold. Vector-borne diseases and foodborne illness are also expected to increase in occurrence. Any public health impacts will likely disproportionately affect more vulnerable community members including the elderly, children, people with disabilities or pre-existing conditions, outdoor workers, and low-income households. Outdoor workers must be protected from weather hazards and employers and human resources need proper training, planning, and preparedness to ensure worker safety in extreme heat. As heat waves intensify and persist, training is needed to identify prevention strategies and warning signs for heat illness and other associated heat-related health issues. The City can ensure adequate emergency services and mitigation measures are in place such as improving access to affordable air conditioning, increasing shading, ensuring adequate access to cooling centers to help protect the community from the impacts extreme heat and other health-related impacts.

Social Vulnerability and Racial Equity

Climate change affects everyone but tends to have outsized impacts on some of the same communities that have suffered disproportionate health and economic impacts from the COVID-19 pandemic – low-income groups, communities of color, the elderly, and people with disabilities. Racial inequities that have been instituted, wittingly or not, across a broad range of national and local policies have caused health, income, education, wealth, and food access disparities and left many Rockville residents particularly more vulnerable to climate change. Although some historic disparities have improved over time, others have only worsened due to increased income inequality and the pandemic. Other cultural differences (such as immigration status, LGBTQIA identity, language) can cause barriers to health and access to services. Although vulnerable populations are dispersed throughout the City, neighborhoods to the south and east are particularly vulnerable. The City must work with its partners to prepare to assist vulnerable populations, especially in extreme events and emergencies. Incorporating these equity considerations is an important part of the plan.

Strategies that seek to bolster infrastructure performance, support ecosystem services, improve operations, protect the health of employees and residents alike, and provide adequate emergency management services are critical to increasing Rockville's resilience to climate change.

Rockville Climate Actions

Rockville utilized best practices, consultant's projections, and community values to develop a suite of 42 climate actions. These actions address the main GHG sources identified in the community inventory, strengthen community resiliency, promote equity, and guide CAP public involvement and oversight. Some actions are low or no cost, but several require additional City investments in funding and staff resources for implementation. Once established, the plan will require ongoing resources for implementation. While the City is working with regional partners on several actions, the following highlights some of the main climate actions, by name and Action ID (C=community action; M=municipal action), that require City leadership, investment and oversight to create or expand programs, projects or plans to support greenhouse gas reduction, resiliency, and equity goals.

Energy Efficiency

- Expand low-moderate income homeowner program for weatherization, resiliency, and renewable energy (C-02)
- Expand home energy efficiency outreach program (C-05)
- Implement energy audits and develop Strategic Energy Plan for City facilities (M-01)
- Convert City-owned streetlights to energy efficiency LED (M-02)

Renewable Energy

- Facilitate and promote private solar and geothermal installations (C-09)
- Identify and install feasible solar systems on City facilities (M-04)

Transportation

- Develop a Rockville Community Electric Vehicle Readiness Plan (C-11)
- Promote an Electric Vehicle Purchasing Cooperative (C-13)
- Implement Bicycle Master Plan and Vision Zero Plan (C-14)
- Adopt and implement a Pedestrian Master Plan (C-15)
- Convert the City fleet to cleaner fuel sources (M-06)
- Create a Capital Improvement Project to expand electric vehicle charging infrastructure (M-07)

Land Management

- Implement the Comprehensive Plan to foster transit-oriented development and conserve natural areas (C-16)
- Expand education and incentives for tree planting and maintenance, environmental landscaping, and invasive plant removal on private property (C-17)
- Develop a Green Space Management Plan (M-09)

Materials and Waste

- Develop a food waste compost drop-off program (C-18)
- Expand recycling and waste reduction outreach programs (C-19)
- Develop a City Sustainable Procurement Policy (M-10)

Resiliency

- Incorporate climate resilient building and infrastructure design features in new buildings and retrofits (C-20)
- Ensure adequate cooling centers, resilience hubs, hazard mitigation and emergency management services (C-22)
- Increase tree planting, green and cool roofs, and cool pavements (C-24)
- Assess vulnerability of Rockville critical infrastructure, facilities and services and prioritize improvements; including updates to the City's Emergency Operations Plan (EOP) and Continuity of Operations Plan (COOP) (M-11)
- Assess Rockville's risk of flooding and develop a Flood Mitigation Plan (M-13)
- Develop and implement Heat Illness Prevention Plans (M-14)

Public Education and Oversight

- Conduct an inclusive public engagement campaign to reduce emissions and adapt to climate change (C-25)
- Develop performance indicators for action progress (C-26)
- Incorporate climate considerations into City's budget process (M-15)
- Develop interdepartmental climate action team (M-16)

Plan Implementation

Implementation requires fostering community engagement, multidepartment coordination, a budget process that appropriates necessary resources, metrics to monitor and communicate progress, and a system for plan oversight, reassessment and updates to meet continually evolving conditions. This plan was preceded by the City's active sustainability program. The plan builds upon many of the projects and activities that are already underway, which will continue in tandem with plan finalization. The actions listed are a starting point to set in motion the programs, plans, and projects that reduce emissions and foster resilience. This plan is meant to be flexible to take advantage of new technologies and other opportunities as they arise. Many actions are under the City's authority yet achieving this goal will require everyone's involvement. Additional actions at the federal, state, and county level should be leveraged to support the plan's successful implementation.

II. Introduction

Purpose and Guiding Principles

Cities play a pivotal role in addressing climate change. Half the world's population lives in urban areas, and cities often serve as first responders to the extreme weather associated with climate change. According to the United Nations, cities consume more than two-thirds of the world's energy and account for more than 70 percent of global carbon emissions—which means they also play a critical role in cutting emissions.[2] While the City of Rockville's share of global emissions is relatively small, community leadership is a powerful force when multiplied across cities throughout the world.

Rockville's first Climate Action Plan (CAP) prioritizes strategies to reduce greenhouse gas (GHG) emissions and prepare the community to adapt to a changing climate. Building on past achievements, the plan will guide future City policies, programs, projects, plans and investments over the next five to ten years. The plan seeks to advance Rockville toward being both climate-friendly and climate-ready by implementing a variety of strategies:

- ***Mitigation (climate friendly)*** - mitigation strategies including conservation, renewable energy, storage, and sequestration that slow the pace and lessen the severity of climate change by reducing or offsetting greenhouse gas emissions from local government and community-wide activities; and
- ***Resiliency (climate ready)*** - resiliency strategies including hazard mitigation, emergency preparedness, and environmental management that protect infrastructure, buildings, services, ecosystems, public health, and quality of life from the impacts of climate change by reducing community vulnerability and increasing the capacity to recover from a disturbance and/or adapt to new conditions.

The Climate Action Plan contains a variety actions; several are low cost or could be integrated into current programs and absorbed into existing budgets, while others require funding and staff resources to be implemented. The plan sets out foundational strategies based on best practices and local research, with strategies to target emissions and climate resilience that are within the City's influence. Actions will require focused efforts across many programs and departments. Many are also interdependent with Montgomery County, State, regional and federal activities. Rockville's Climate Action Plan intends to:

- Focus on cost-effective, fair, equitable and reasonable actions that reduce greenhouse gases quickly and foster community resilience;
- Ensure that benefits and savings are accessible to those who need it most;
- Leverage available resources, partnerships, financing, and incentives to maximize impact;
- Reflect community values and create environmental, safety, and economic benefits for a thriving Rockville;
- Demonstrate City leadership;
- Advocate for advancements at the county, state, regional, and federal level; and
- Evolve over time and be flexible to respond to new priorities and opportunities.

[2] United Nations Human Settlements Programme, World Cities Report 2020. https://unhabitat.org/sites/default/files/2020/10/wcr_2020_report.pdf

During the planning process, the City emphasized coordination with the goals and strategies of other jurisdictions in the region to maximize impacts and benefits. The CAP aligns with the following plans and seeks to leverage group action to complement local programs to best serve Rockville:

- Montgomery County Climate Action Plan
- Metropolitan Washington Council of Governments (COG) 2030 Climate and Energy Action Plan
- Maryland 2030 Greenhouse Gas Emissions Reduction Act Plan

Rockville's Climate Commitments and Progress

Rockville's elected officials adopted several climate commitments over the last decade and agreed that the next critical step was to engage with community partners to develop and adopt a Climate Action Plan (Figure 1).

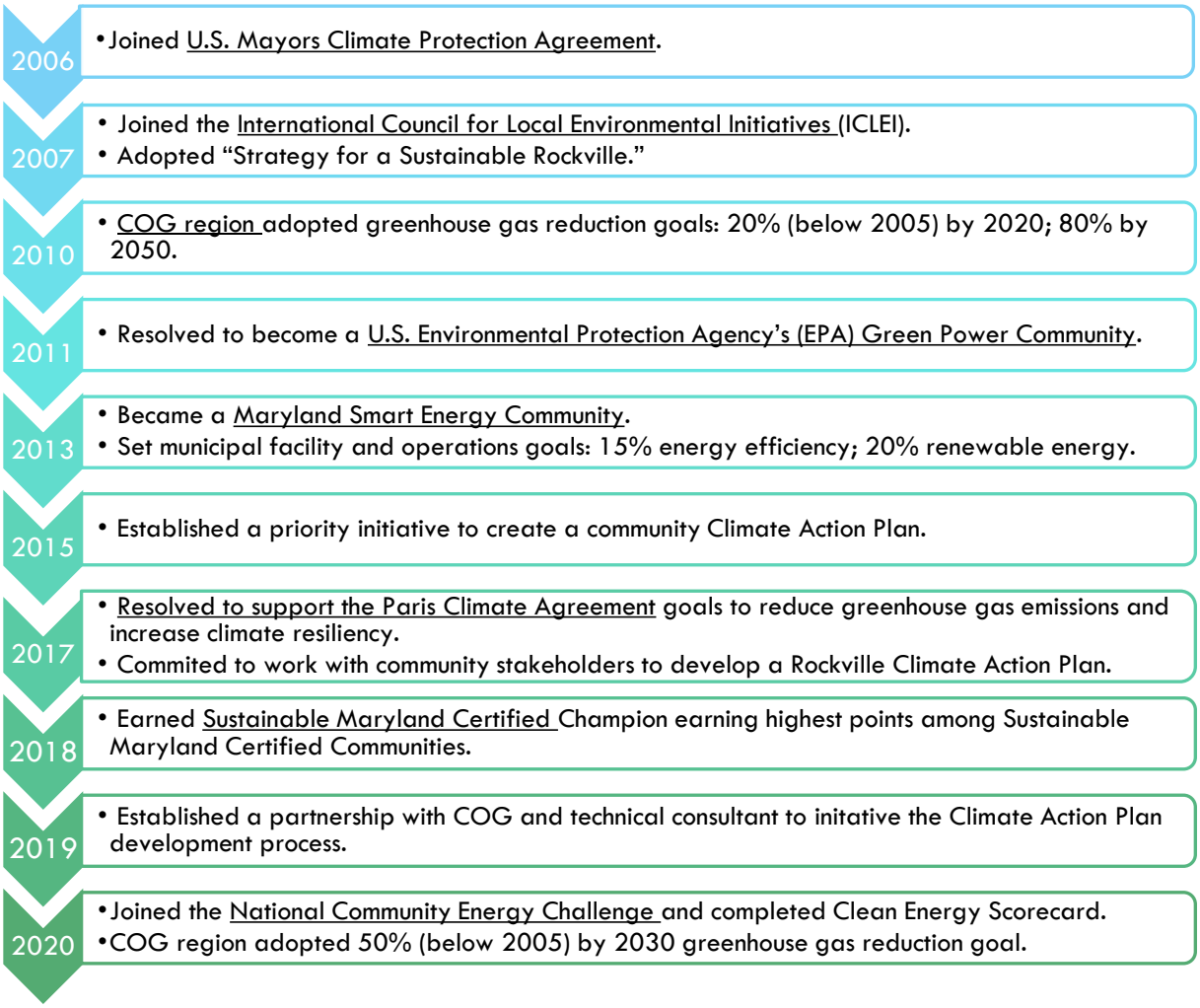


Figure 1: Rockville Climate Commitments

Since 2006, Rockville has made progress towards these commitments, including, but not limited to:

- green building and energy efficiency codes,
- extensive bicycle and pedestrian programs,
- energy benchmarking requirements for commercial buildings,
- RainScapes Rewards incentive program for environmentally friendly landscape practices,
- municipal facility energy upgrades,
- residential solar co-op program,
- robust volunteer Weed Warrior and stream clean-up programs,
- electric and hybrid fleet vehicles and electric vehicle charging stations,
- residential recycling programs for single-stream materials, yard waste, metal, and electronics, and
- annual tree and native seed giveaways.

These programs contributed to Rockville's earning:

- Sustainable Maryland Certification through the Maryland Municipal League and the University of Maryland Environmental Finance Center;
- Tree City USA certification for 32 years from the Arbor Day Foundation;
- Community Wildlife Habitat certification from the National, Wildlife Federation; and
- Bike Friendly Community designation from the League of American Bicyclists.

Rockville's climate initiatives continue to evolve. Concurrent with CAP planning efforts, the City is coordinating with the Maryland Energy Administration to assess 6 Taft Court, a 55,350 square feet office building purchased in 2019, for solar and microgrid feasibility and to assess the municipal fleet for electrification opportunities. The City is also working with Pepco on installations of public electric vehicle charging stations along municipal right-of-way, planning light-emitting diode (LED) streetlight retrofits, and collaborating with community partners to implement energy audits and weatherization improvements for low-to-moderate income homes. These actions contribute to energy efficiency, renewable energy, sustainability, and climate resilience while also meeting other community goals like safety, accessibility, and environmental quality.

The City can build upon the success of our programs (summarized Figure 2); however, more needs to be done to meet the City's climate goals and address equity challenges. Additional resources, investment and leadership will be needed to further advance climate initiatives to bring about the rapid and far-reaching changes needed for the plan's success and to protect future generations in Rockville.

764 solar permits issued

45% residential recycling rate

34 miles shared-use paths

12 public EVcharging stations and 2,279 electric vehicles registered in Rockville.

City Fleet has 1 electric, 1 hybrid and 1 charging station.

22 energy audits and improvements for low to moderate income homes.

The City completed 9 energy efficiency projects.

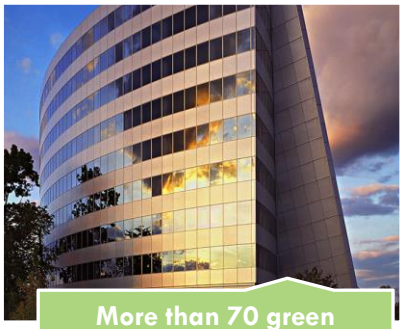
More than 87 million kilawatt hours of green power purchases in 2020; The City purchased wind renewable energy certificates for 100% of municpal electricity

200 buildings report energy benchmarking data.

The City tracks energy use for all 150 municipal accounts.

32 years Tree City USA 28,000 street trees

300 trees distributed in annual tree giveaways



More than 70 green buildings and 55 ENERGY STAR buildings

Figure 2: Rockville Progress (as of 2020)

How the Climate Action Plan was Developed

Work on elements of the Climate Action Plan began in 2015 when the Mayor and Council first designated the plan as a priority. Initial work included developing greenhouse gas inventories and reviewing best practices, climate change impacts, and City actions to date. Rockville's Comprehensive Plan update involved extensive community engagement sessions between 2015 and 2021 and provided an opportunity for Rockville to integrate greenhouse gas mitigation and climate resiliency into the comprehensive plan for the first time.[3] Adopted in August 2021, Rockville's Comprehensive Plan establishes broad sets of goals, policies, and actions to reduce greenhouse gas emissions and increase resiliency to climate change. The CAP provides a deeper analysis of these goals and outlines specific actions and implementation measures to achieve the goals.

As illustrated in Figure 3, CAP stakeholder engagement launched in the fall of 2020. The planning roadmap was presented to the Mayor and Council in September for discussion and instruction on the plan development process. Throughout the fall and winter of 2020 and 2021, staff engaged with various boards, commissions, and community groups to provide an overview of the climate action process and seek feedback on local concerns, strategies, and barriers to action. Due to the pandemic these engagement sessions were conducted virtually. After reviewing stakeholder input, staff worked with a technical consultant, Cadmus, to develop a reduction pathway and a cost benefit assessment. A community open house was held in July 2021 to update the community on the draft plan goals, greenhouse gas reduction pathway, and draft list of actions. Following the session, community feedback was sought to assess support for the goals and draft action list. The actions were further refined and incorporated into the draft plan presentation to the Mayor and Council in November of 2021. Following public comments and discussion and instruction, plan adoption is anticipated in early 2022. Implementation would then be phased-in through changes in current policies and programs or upon budget appropriation for actions that require additional resources.

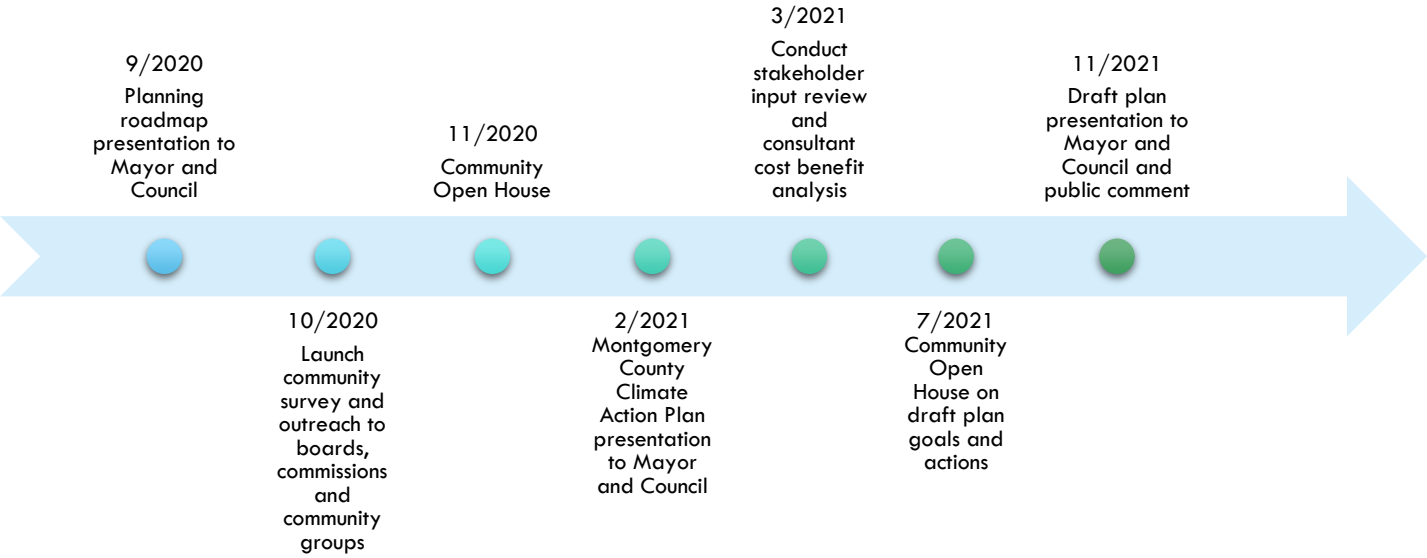


Figure 3: Climate Action Planning Timeline

[3] The Environmental Trends Report provided background and included the recommendation to incorporate climate change in the Comprehensive Plan.

Throughout the Climate Action Plan development process, the City connected with more than **180 participants** during **15 virtual events** and received **525 survey responses (summarized below)** and **50 feedback forms** on the draft list of actions (Figure 4). Due to the pandemic restrictions in place while the plan was being developed (fall 2020 through fall 2021), the City worked creatively to engage the community online through social media and newsletters. The City engaged with 11 commissions, committees, and community groups. Virtual office hours were held so that the public could have more in-depth conversations with staff. Rockville's Climate Change Survey was open to the public from September 2020 to February 2021. The survey was widely promoted and was translated into Chinese and Spanish. A plan update open house event was held in summer 2021 to gather feedback on proposed climate mitigation goals and the draft action list. Attendees and others following the process (including previous participants) and the public were invited to submit their comments on a Feedback Form which received **over 50 responses.**

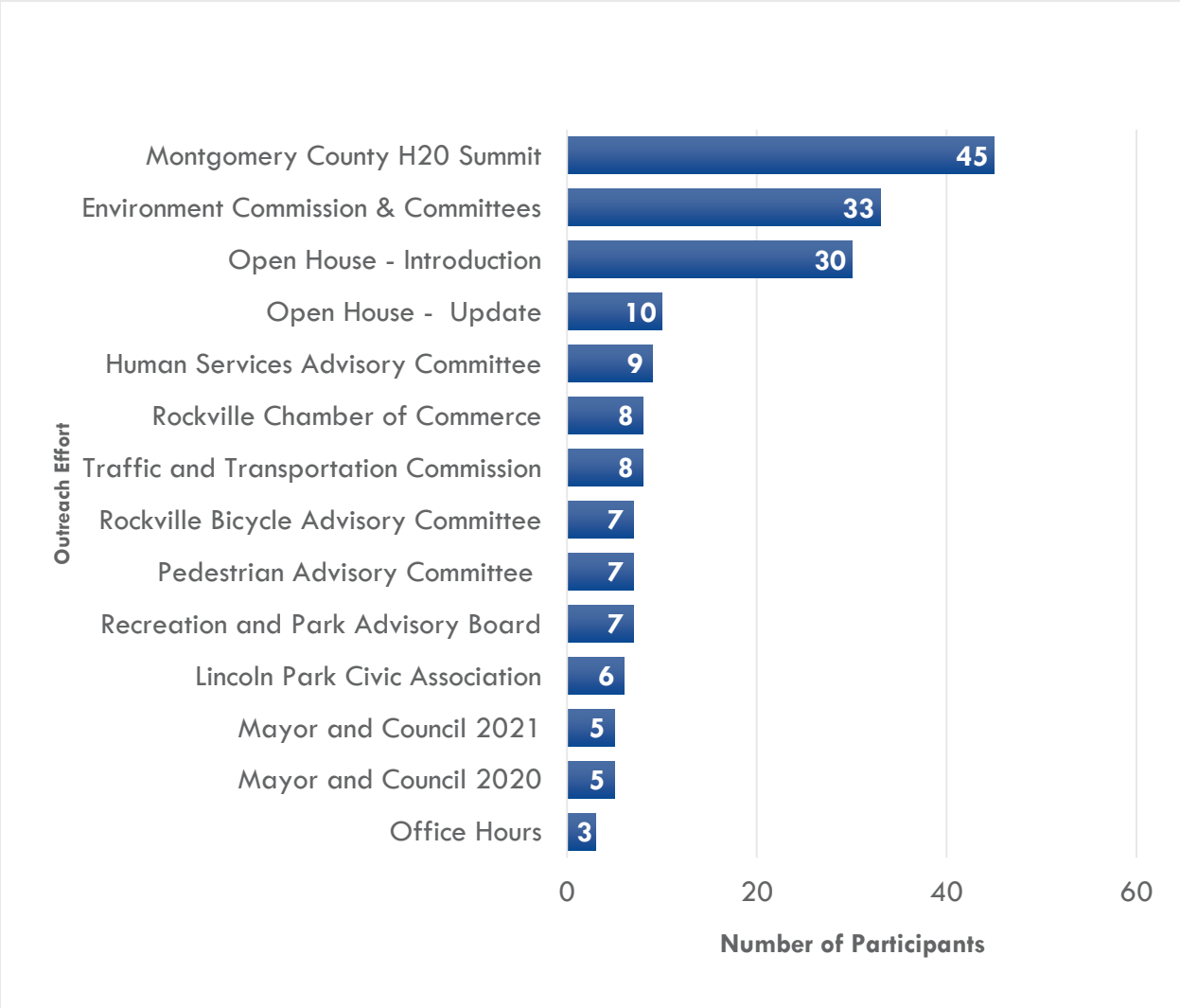


Figure 4: Climate Action Planning Meeting Participation

Public Feedback Summary

Rockville Climate Change Survey Highlights

Rockville's Climate Change Survey involved 525 respondents providing feedback on multiple choice questions and submitting more than 700 comments (Figure 6). Survey highlights include:

- About 89 percent rated global warming as very or extremely important to them personally.
- Respondents revealed concerns for a variety of climate change risks for Rockville; 82 to 87 percent were concerned/very concerned with impacts on air quality, infrastructure, natural areas, vulnerable people, heat waves, stronger storms, increased pests, and urban drainage.
- Respondents wanted to see Rockville prioritize actions that reduce GHGs fastest, consider equity considerations and benefit historically disadvantaged groups, and provide co-benefits such as job creation, health, and environmental quality. They placed less priority on actions that have lower costs, although Rockville is still taking cost into consideration.
- Respondents indicated the individual actions they were most interested in pursuing in the CAP: recycling/reducing waste, planting trees/protecting forests, reducing food waste/composting, taking more non-auto trips, building energy retrofits, gardening, and purchasing green electricity.
- Barriers to participation that should be factored into the CAP include being a renter, living in multi-family homes, lack of information, cost, or level of difficulty in pursuing the action.
- More that 76 percent indicated moderate or strong support for the City implementing all the following actions in the CAP (Figure 5).

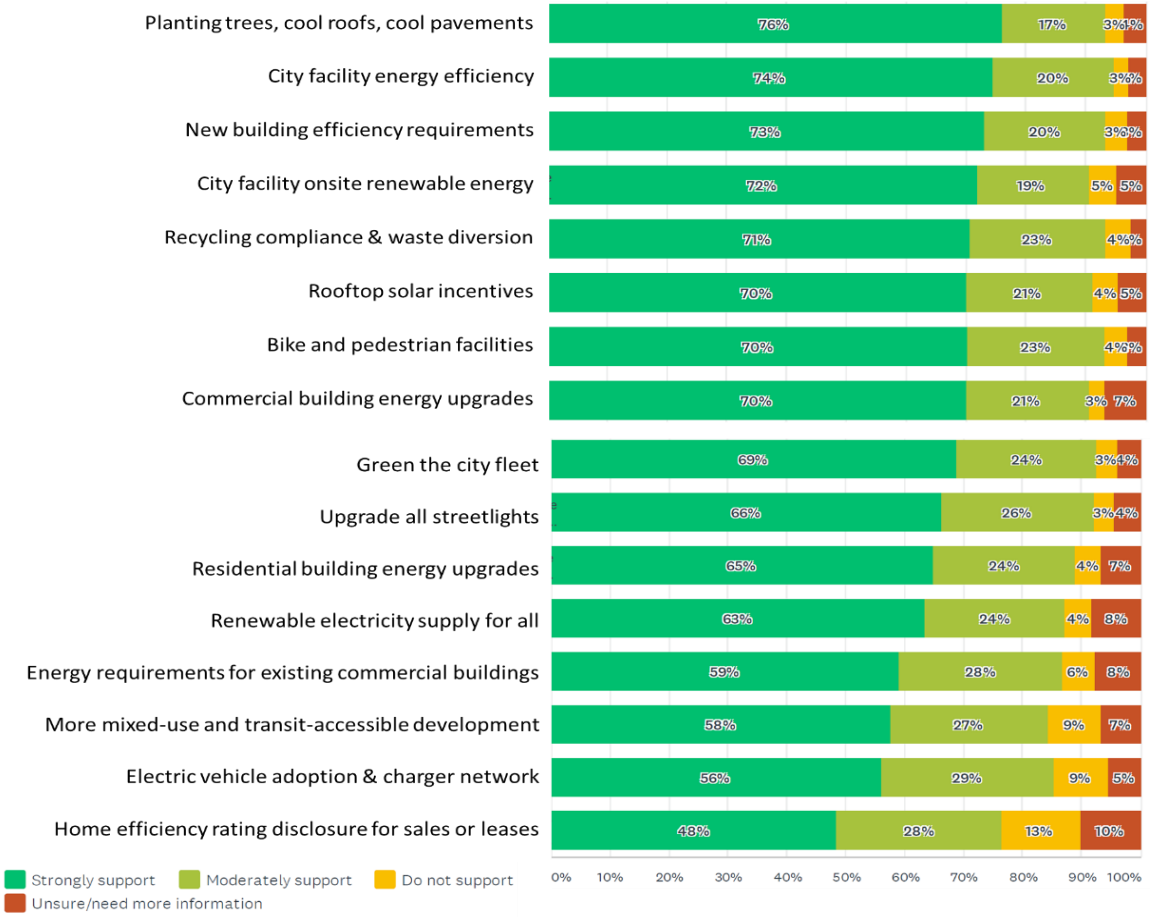


Figure 5: Rockville Climate Survey Response Ratings for Actions the City Should Implement

"As a young person, I know that my friends and my entire future depend on whether we can get greenhouse gas emissions under control and implement a just transition in the next ten years."

"I'd like to see Rockville be a leader in this space, and a model for other cities."

"I would focus first on the actions that decrease negative economic and social pressures on people who are marginalized, like energy efficiency programs, discounted renewable energy programs, and support for public transit."

"Regardless of the state of international agreements to address climate change, local governments and individuals all need to do their part to address the issue as quickly as possible to better ensure our efforts will be effective. We need to reduce emissions and increase energy efficiency across the board while also increasing carbon sequestration by protecting our forests, city trees, and planting & caring for more trees to eliminate heat islands in developed areas. Carbon emissions, energy efficiency, and carbon sequestration in Rockville should be quantified (estimated), using the best available science, and used to set our goals and measure our progress in the future."

"All of the actions to be taken must be done within a responsible financial framework and in coordination with Montgomery County."

"We are living the effects daily. Record hot weather this summer has increased our AC bills, and it is too hot to walk to errands on streets that don't have big shade trees."

Figure 6: Rockville's Climate Change Survey – Community Comments

Public Feedback on Draft Climate Actions List

Public survey input and the consultant analysis fed into the development of goals and a draft list of climate actions presented at a virtual open house on July 22, 2021. The public was again invited to comment on the measures in a feedback form and 50 respondents evaluated the suite of actions within each CAP category according to the following ratings:

- **Actions About Right for Rockville**: For all seven categories, a majority, 57 percent or more or respondents, rated the actions as "about right for Rockville." Actions within Resiliency (69%) and Public Engagement and Oversight (67%) accrued the highest approval.
- **Actions Not Ambitious Enough for Rockville/Actions are Missing**: About 20 to 30 percent of respondents indicated that the sets of draft actions were not ambitious enough for Rockville or that some major actions were missing. Land Management Actions (33%) and Sustainable Transportation Actions (35%) had the most respondents wanting to see actions go further with stronger provisions for protecting open space and mature trees, creating safe pedestrian areas, and separated biking opportunities, and accelerating electric vehicles. Action descriptions in Section V were designed to provide leadership with opportunities to pursue basic or enhanced levels of service in these areas.
- **Actions are Too Ambitious or Unfeasible for Rockville**: A few respondents, 2 to 4 percent, indicated the sets of draft actions were too ambitious or unfeasible for Rockville. Land Management, Transportation, Renewable Energy, and Energy Efficiency all received 4 percent of respondents rating actions in this category. Many survey respondents noted that many of these measures involved areas outside of local control and relied on several levels of systematic change. For example, respondents indicated that electric vehicle GHG emissions reductions would only occur when investments were made in a cleaner, robust, and reliable electric grid.

This initial feedback indicated the action list is moving in the right direction and that if additional resources were available, some members of the public support more ambitious actions but also wanted to see measured results. A few examples of the range of the public comments on CAP actions are in Figure 7.

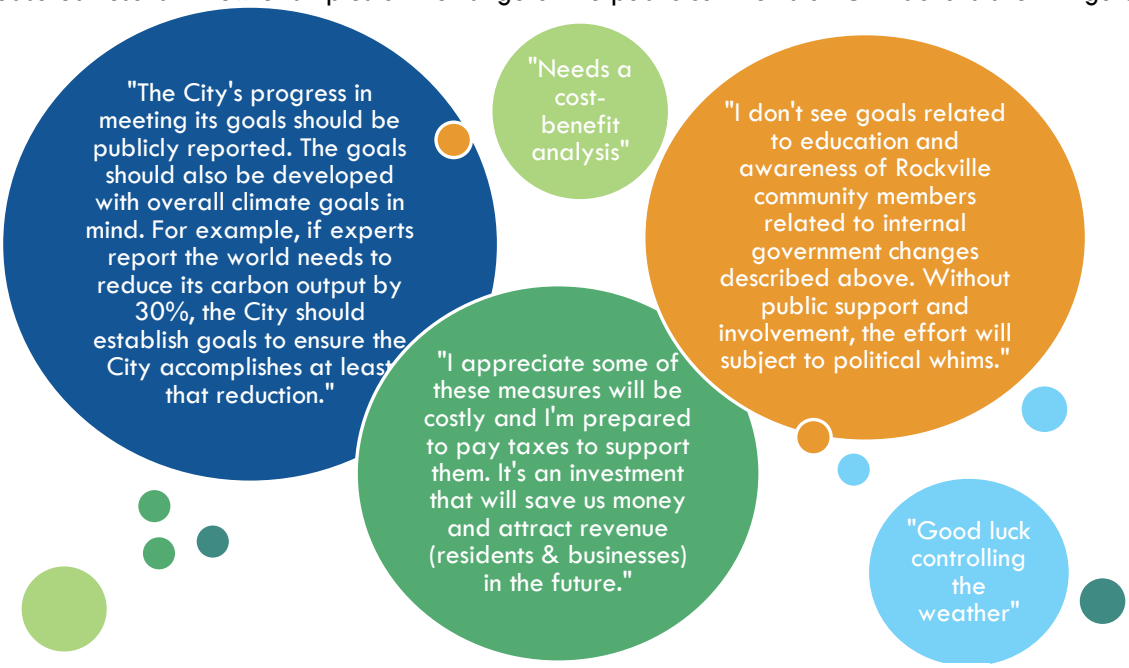


Figure 7. Public Feedback on Rockville's climate actions

III. Greenhouse Gas Emissions

A community greenhouse gas (GHG) inventory represents the total emissions produced by all activities within the city limits as well as emissions resulting from electricity use within the jurisdiction, even if the electricity is generated elsewhere. A municipal GHG inventory is a subset of the community emissions and only includes the emissions associated by city government facilities and operations. To estimate baseline emissions and track progress, global warming potential values are used to combine emissions of various greenhouse gases into a single weighted value for emissions, commonly referenced as metric tons of carbon dioxide equivalent (MTCO2e) (Figure 8).

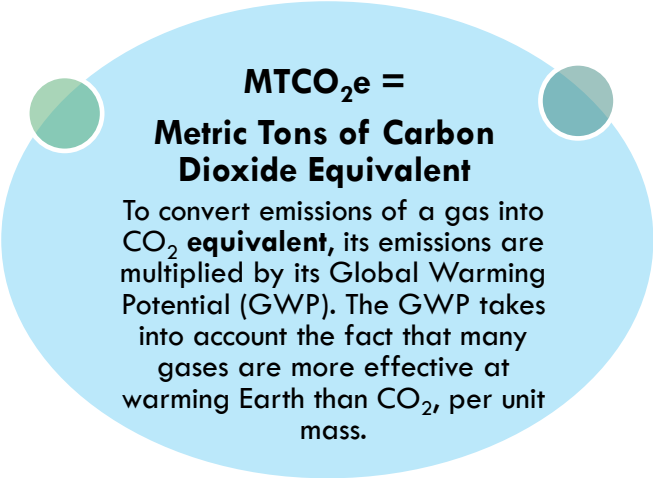
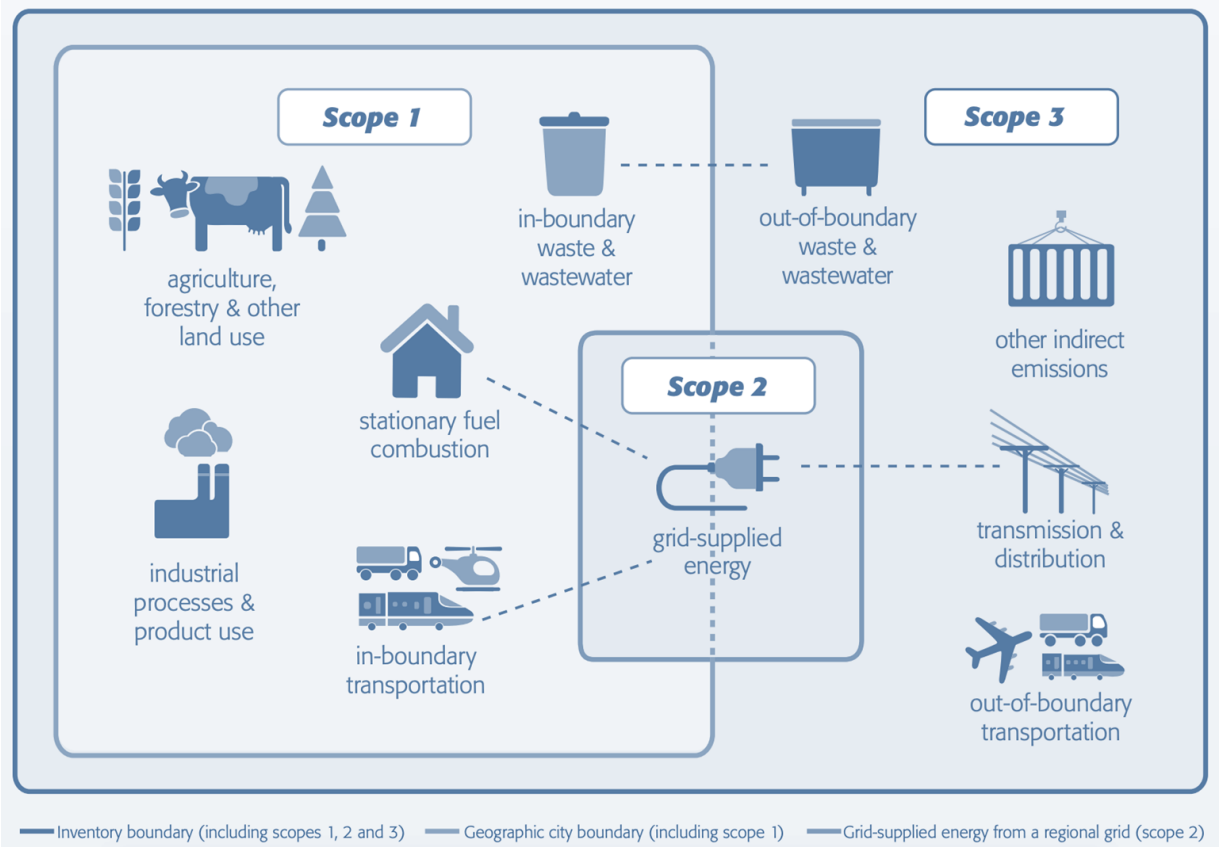


Figure 8: Quantifying Greenhouse Gas (GHG) Emissions

Rockville is a member of the Metropolitan Washington Council of Governments (COG), an independent, nonprofit association that brings area leaders together to address major regional issues in the District of Columbia, suburban Maryland, and Northern Virginia. COG has taken a leadership role in developing community greenhouse gas inventories for member jurisdictions, hosting regional climate impacts and resiliency planning workshops, and developing Regional Climate and Energy Action Plans (2017-2020 and 2030) that offer a variety of voluntary and flexible options for local governments to implement to support regional GHG emissions reduction goals. Rockville partnered with COG to develop inventories for 2005, 2012, 2015 and 2018 that have been verified as compliant with national and global protocols for GHG accounting. COG follows the U.S. Communities Protocol as the methodology for these inventories which describes three GHG emission scopes (Figure 9):

- **Scope 1**: Emissions from direct activities located within a jurisdiction's geographic boundary (for example, on-site fuel combustion of natural gas or home heating oil and in-boundary travel by gasoline or diesel-powered vehicles). Scope 1 includes on-site emissions from industry, agriculture, waste, and wastewater.
- **Scope 2**: Emissions from the generation of purchased electricity consumed within a jurisdiction's geographic boundary, regardless of the location of the generation.
- **Scope 3**: All other emissions that occur outside a jurisdiction's geographic boundary as a result of activities taking place within the jurisdiction or by the jurisdiction's residents (for example, emissions associated air or rail travel or with the production of goods produced outside of the jurisdiction but consumed by the jurisdiction's residents or businesses).



(Source: Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories)

Figure 9: Scopes of GHG Emissions

Rockville's GHG inventories and climate actions primarily address Scope 1 and Scope 2 emissions in the following subsectors: residential energy; commercial energy; transportation and mobile sources; water and wastewater; solid waste; process and fugitive emissions (leaks from natural gas infrastructure and cooling systems); and agriculture, forestry, and other land uses. Rockville's share of air and rail travel is included under its Scope 3 emissions. As is typical for a community-wide GHG inventory, the inventory does not account for other Scope 3 emissions (such as the emissions from purchased goods produced outside of the jurisdiction).

Greenhouse Gas Emissions Inventory

Rockville's community GHG emissions inventory was developed by COG to be consistent with regional and jurisdiction inventories and is based on the ICLEI U.S. Community Protocol and ClearPath tool. To track progress, COG calculated jurisdiction and regional GHG estimates for 2005, 2012 and 2015, and 2018 Figure 10 shows the results which are grouped by sector rather than scope for the convenience of local planning efforts.

Rockville generated 1,032,529 metric tons of carbon dioxide equivalent (MT CO2e) greenhouse gas emissions in 2005, and in 2018, generated about 816,868 MT CO2e. Despite Rockville's 17% population growth between 2005 to 2018, GHG emissions decreased 21 percent (this is slightly higher than the overall Metropolitan Washington region which reduced emissions by 13 percent from 2005 to 2018). Over this period, Rockville's per capita emissions decreased from 17.3 to 11.7 MTCO2e per person. Rockville surpassed COG's 2020 emissions reduction goals, demonstrating that GHG reductions are possible even as the population and economy grows. Efficiency and switching to cleaner sources for electricity production (natural gas and renewable energy) better fuel standards, reduced vehicle miles traveled, and tightening green building standards contributed to these reductions.

Between 2012 and 2018, total emissions have remained flat despite the concurrent growth in commercial space and population. Still, the rate of reductions has slowed as the economy rebounded, vehicle fuels became cheaper, and as federal standards involving emissions reductions were relaxed or reversed.

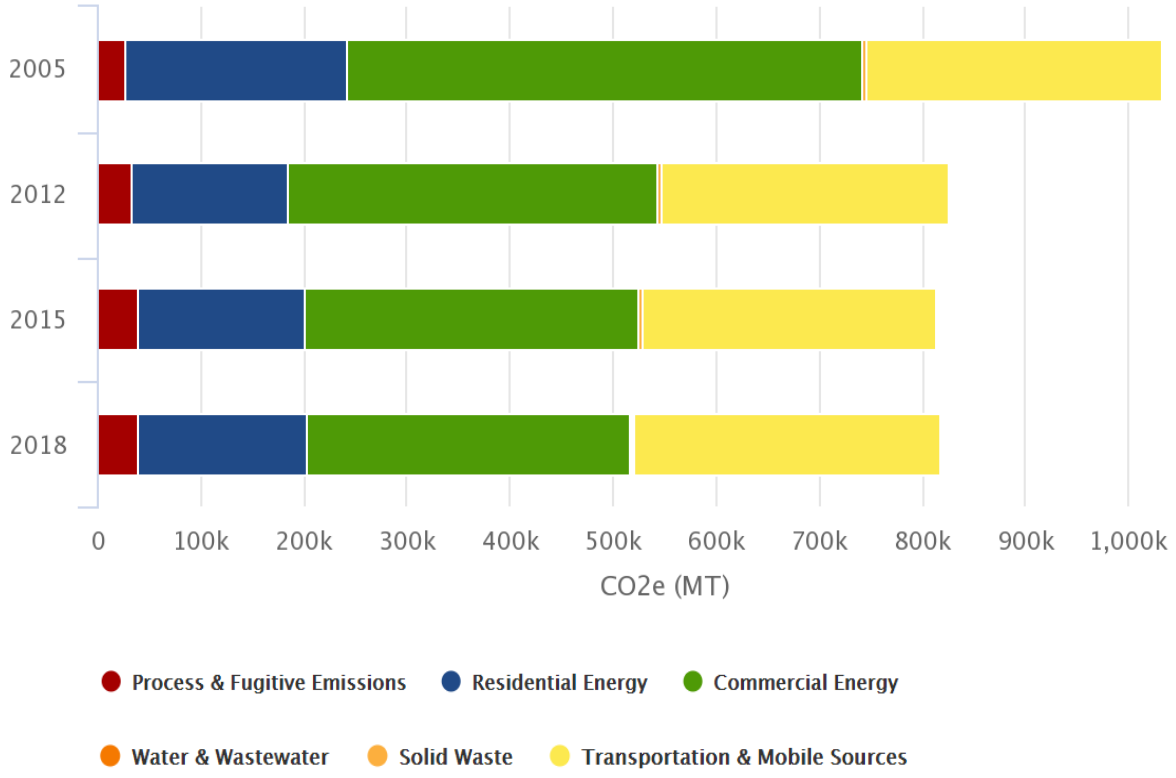


Figure 10: Rockville Greenhouse Gas Emissions Trends Chart

Community and Municipal Emissions Overview

The largest emissions contributors in the most recent inventory are commercial building energy consumption (38%), transportation (36%) and residential building energy consumption (20%) (Figure 11). GHG emissions from Rockville government operations contributed approximately one percent of Rockville's total community emissions[4].

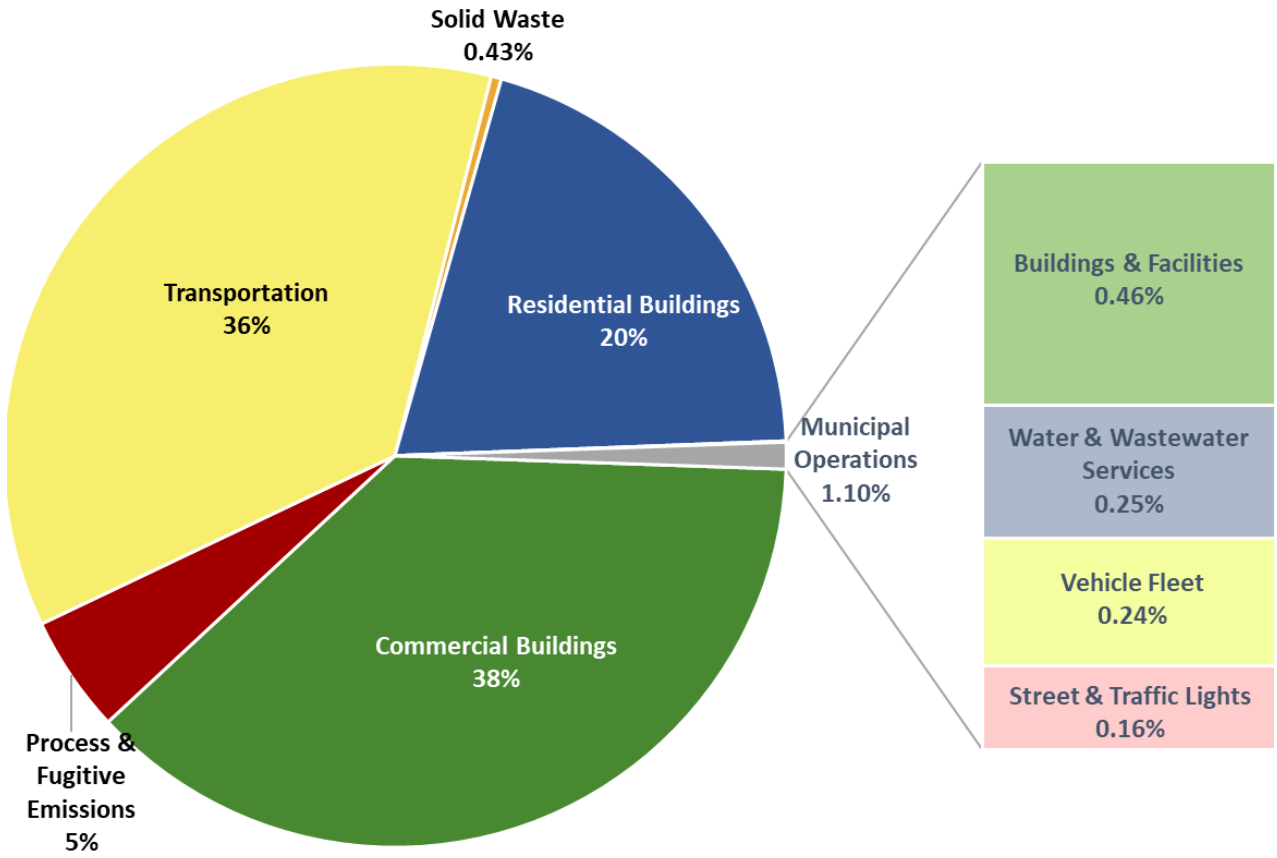


Figure 11: 2018 Rockville Greenhouse Gas Emissions by Sector
(Community Total: 816,868 MT CO2e; Municipal Total: 8,994 MT CO2e)

[4] Municipal emissions are estimated based on Fiscal Year 2016 data.

Community Emissions by Sector

Sectors contributing to overall community emissions include:

- **Buildings (58%):** The electricity, natural gas and fuel oil used in all buildings account for the majority of Rockville's GHG emissions. Commercial buildings generated approximately 38% of emissions, 28% from electricity and 10% from natural gas. Residential buildings account for approximately 20% of emissions, with 10% from electricity, 10% from natural gas, and < 1% from home heating fuels.
- **Transportation (36%):** The transportation sector, including on-road passenger vehicles, aviation, rail, and off-road vehicles, generated approximately 36% of community emissions. The majority of transportation emissions, approximately 31% of total emissions, were generated by diesel and gasoline fuel consumed by on-road mobile sources, such passenger vehicles, buses and commercial vehicles. Off road mobile vehicles, aviation travel and rail transportation account for the remaining 5% of emissions.
- **Process and Fugitive Emissions (5%):** Process and fugitive emissions are derived from national figures to account for leaking natural gas infrastructure and cooling systems.
- **Other sources:** Emissions from solid waste (landfill waste and the combustion of solid waste), agriculture, and wastewater treatment (sewer system emissions and effluent discharges) make up the remaining 1% of community emissions.

Municipal Emissions by Sector

Rockville used ICLEI's ClearPath tool to estimate GHG emissions generated from municipal facilities and operations for fiscal year 2016 (July 1, 2015 through June 30, 2016) (Figure 11). The government analysis data was sorted into buildings/facilities, street and traffic lights, water and wastewater services and vehicle fleet. Data on employee commutes, process and fugitive emissions, and waste from City facilities was not available. While GHG emissions from local government operations represent approximately one percent of Rockville's total community emissions (8,994 MT CO2e), the City has direct influence over these sources and the ability to 'lead by example'. Sectors contributing to municipal emissions include:

- **Buildings and facilities (0.46%):** City buildings, facilities, and parks are the largest source of municipal GHG emissions through their use of electricity, natural gas and fuel oil for heating, cooling, lighting, and other purposes. City facilities include City Hall, Swim and Fitness Center, Senior Center, Police Station, Civic Center Complex, Public Works and Parks Maintenance Complex, and several community centers.
- **Water and sewer services (0.25%):** The City provides drinking water treatment and distribution services and sewer collection services to 70 percent of the city. Approximately 0.25% of emissions are associated with electricity-intensive water treatment and pumping operations.
- **Fleet (0.24%):** Fuel (diesel and gasoline) consumed by a fleet of approximately 294 on-road vehicles and equipment accounted for approximately 0.24% of emissions. Police vehicles and refuse and recycling trucks account for most municipal fuel consumption.
- **Street and traffic signals (0.16%):** The electricity used to power approximately 6,573 streetlights (owned by the City and Pepco) and 46 traffic signals accounts for 0.16% of emissions.

Community Emissions by Source

Rockville's greenhouse gas emissions come from three primary sources: electricity use (38%), natural gas use in buildings (21%), on-road transportation fuels including gasoline and diesel (31%), jet fuel and non-road mobile sources (5%), and hydrofluorocarbon (HFC) and refrigerant emissions (4%) (Figure 12).

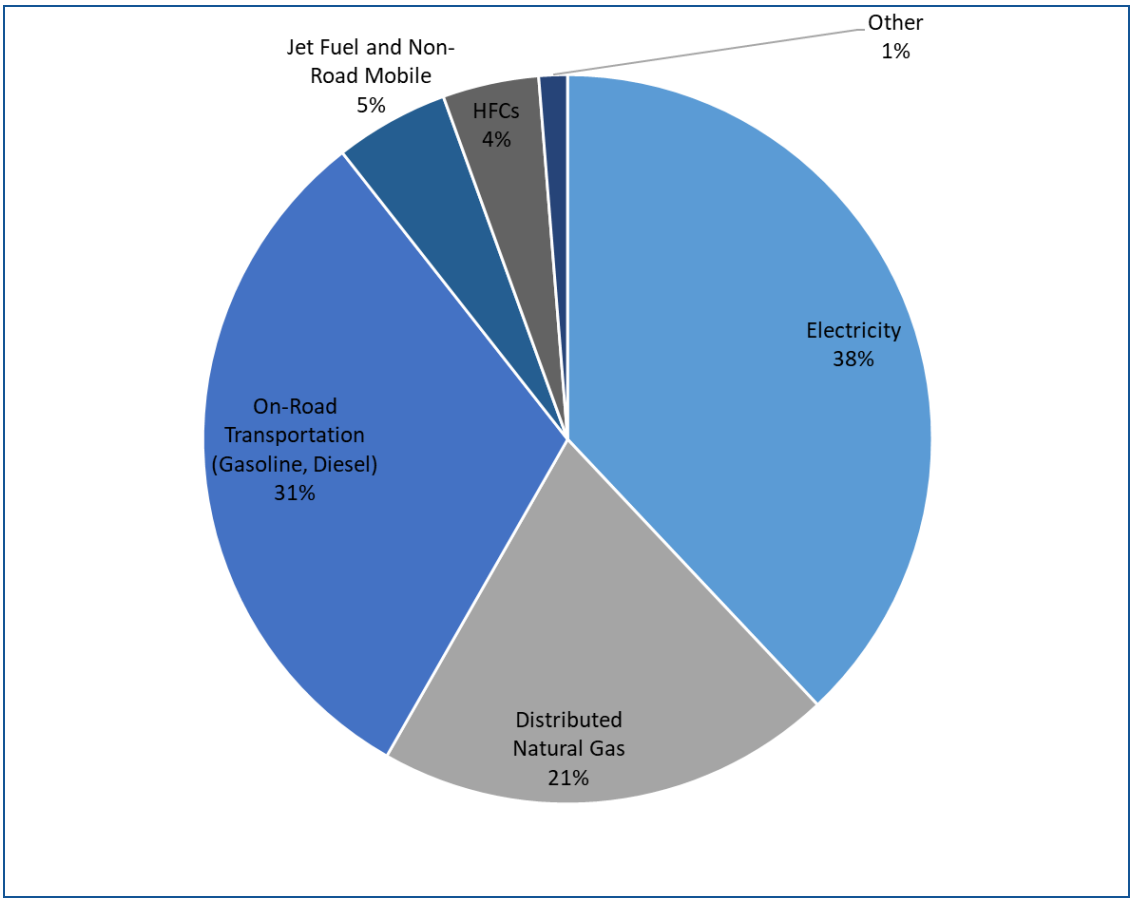


Figure 12: Community Emissions by Source

Most electricity-related greenhouse gases are emitted through generation by coal (12% of electricity generation on the grid serving Rockville) and natural gas-fired plants (46% of electricity generation).

The other low emissions sources of electricity generation including nuclear (37%) and renewable energy (5%).[5]

[5] For more information on the electricity fuel mix that was used in the greenhouse gas inventory, see: https://www.epa.gov/egrid/power-profiler#/RFCE

Greenhouse Gas Emissions Reduction Goal

Many CAP survey respondents commented that they needed more detailed analysis and research to better understand that the money invested in climate actions would bring about true change. Therefore, Rockville worked with the technical consultants at Cadmus to model a greenhouse gas emissions reduction pathway for Rockville and develop a cost benefit analysis of a handful of actions to better guide action selection.

The first step for this effort involved establishing a greenhouse gas emissions reduction goal to define what the City is aiming to achieve. Establishing short-term and long-term goals help communities set a path for planning, investment and assessing progress. Local governments must carefully consider where to set greenhouse gas reduction goals because it is a long-term goal against which progress will be measured for many years. Goals are usually expressed in terms of a percent reduction in greenhouse gas emissions by a certain year compared to a baseline. The goals may evolve over time to account for changes in science, technology, and US public policy.

To help identify a reduction goal, Rockville charted historic greenhouse gas emissions and potential future reduction scenarios illustrated in Figure 13. Using 2005 as the baseline with a little over one million metric tons of carbon dioxide equivalents (CO2e), the black line shows Rockville's historical emissions that met COG's 20% reduction goal by 2020 in 2012. A variety of global, state and regional greenhouse gas reduction goals for 2030 and beyond were evaluated. Four future GHG emissions scenarios were modeled to meet the different reduction goals of: 1) the Intergovernmental Panel on Climate Change (IPCC) in the UN Paris Agreement; 2) Maryland 2030 Plan; 3) Metropolitan Washington Council of Government (COG); and 4) Montgomery County's Climate Action Plan.

- **The Intergovernmental Panel on Climate Change (IPCC)**, a body of the United Nations that assesses the science related to climate change, noted the world is already experiencing the impacts of 1 degree Celsius of global warming above pre-industrial levels. Additionally, the IPCC notes that more severe climate impacts could be avoided if global warming is limited to 1.5 degrees Celsius. Globally, emissions need to fall by 45 percent from 2010 levels by 2030 and achieve carbon neutral by 2050 to limit global warming to 1.5 degrees Celsius. The IPCC acknowledges rapid and far-reaching transitions are needed world-wide. The light blue line illustrates the United Nation's Paris Agreement long term target to be net zero by 2050 to keep warming below 1.5 degree Celsius.
- **Maryland's Greenhouse Gas Emission Reduction Act** set a reduction goal of 40 percent below a 2006 baseline by 2030 and required the Maryland Department of the Environment (MDE) to develop a plan to achieve climate goals. MDE developed Maryland's 2030 Greenhouse Gas Reduction Action Plan that outlines a pathway to pursue a more ambitious goal that is more aligned with the IPCC recommendations – a 50 percent reduction by 2030 and net zero by 2045 (purple line).
- **The Metropolitan Washington Council of Governments (COG)** established a regional goal of a 50 percent reduction in GHG emissions below 2005 baseline levels by 2030 (green line).
- **Montgomery County** set more ambitious goals. They established a mid-term target (80 percent reduction by 2027) and a long-term aspiration goal of reducing emissions 100 percent by 2035 (red line).

Rockville's Climate Action Plan is devised to work within this framework and collaborate with county, state and regional efforts to leverage limited resources to yield greater benefits. **The plan outlines near-term strategies for Rockville to meet Maryland's and COG's goals of 50 percent emissions reduction from the 2005 baseline by 2030 (purple line).** These foundational actions will put Rockville on track to aim for aspirational long-term reductions –i.e., **carbon neutrality by 2045/2050** – and be positioned to take advantage of county, state, regional and federal programs and opportunities as they ramp up.

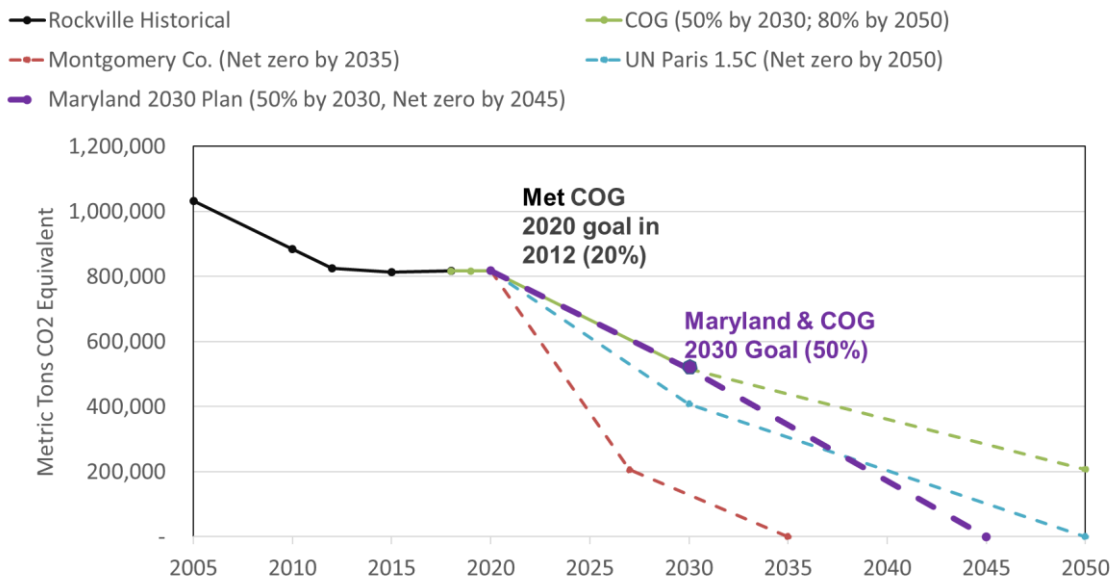


Figure 13: Greenhouse Gas Emissions Reduction Goals

Greenhouse Gas Emissions Reduction Pathway

Rockville worked with a consultant, Cadmus, to determine a pathway to meet the 50 percent greenhouse gas reduction goal by 2030. Cadmus utilized COG's business-as-usual (BAU) projections for Rockville's future GHG emissions with no additional actions. The BAU projections account for population, housing, and commercial growth as well as policies and practices that have been in place and implemented to-date to reduce GHG emissions. The region's anticipated BAU emissions projected to 2030 remain fairly flat – the expected growth is offset by energy, building, and transportation policies.[6]

Then Cadmus developed a 2030 scenario with strategies to reduce emissions 50 percent below 2005 levels by 2030. Since historical emissions already decreased 21% from 2005 to 2018, only approximately 300,790 MT CO2e of additional reductions would be needed to meet this goal. The consultant developed a simple model showing the strategies needed to reach a 50% reduction below 2005 emissions by 2030. Reductions will not occur along straight lines as shown in the following model but the visual is helpful to show relative orders of magnitude. It is not a predictive model, but rather shows the scale of adoption needed from different high impact actions. If any of the emissions from one strategy are not fully realized, greater reductions must be achieved from other strategies to make up the difference.

[6] Metropolitan Washington 2030 Climate and Energy Action Plan, 2020.

With federal, state and regional strategies as a starting point, Rockville's GHG pathway between now and 2030 considers the emission reduction factors associated with a variety of strategies (Figure 14). The analysis factored in the emissions reduction potential of a cleaner grid (e.g., renewable portfolio standard (RPS), solar energy installations, green power purchases), more efficient commercial and residential buildings, electric vehicles, land use and mobility amenities that reduce vehicle miles traveled (VMT), tree and forest management, solid waste, municipal operations, and other greenhouse reduction policies. The "wedges" show each strategy's potential to reduce emissions from BAU to the 50% reduction target in 2030.

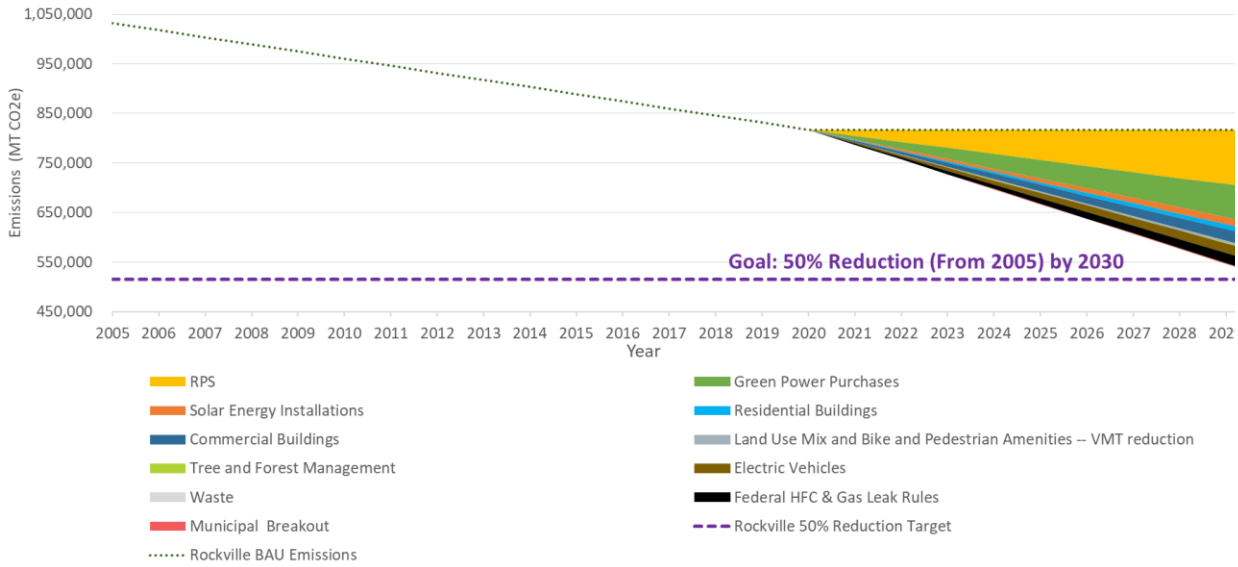


Figure 14: Emissions Reduction Pathway to Meet Rockville's Emissions Reductions Goal

Figure 15 presents a closer examination of the 50% reduction pathway to 2030, illustrating that Rockville's emission reduction potential is mainly associated with a few of the most impactful actions, such as a cleaner grid, solar electricity generation, cleaner cars, energy efficiency and Federal HFC and methane reduction measures. The analysis includes conservative assumptions for the percentages and number of actions taken to get to the 50% reduction target. A large portion of reductions will come from utilities meeting Maryland's renewable portfolio standard (RPS) goal and electrification of buildings and vehicles in combination with renewable sources of energy. As Rockville coordinates with Montgomery County on programs designed to achieve a more ambitious reduction target, there is potential to make further progress toward net zero emissions.

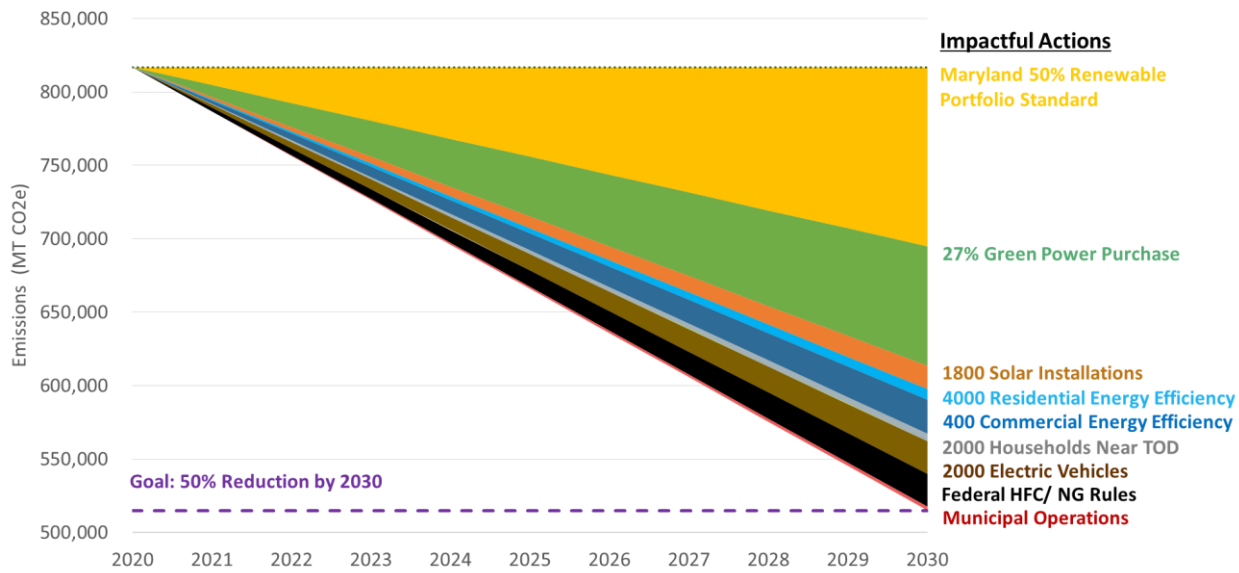


Figure 15: Emission Reductions Pathway Implementation Levels

Assumptions used in the emissions model and the resulting 2030 reductions and percent contribution to the 50% reduction goal are summarized in Table 1.

Improvements to all sectors are needed to support these emissions reductions and provide ancillary benefits. Cleaning the grid requires significant investment and a systemic shift in the energy sector, which is primarily beyond Rockville's control. However, it has the potential to contribute to 41% of the GHG reductions goals. Investments in more efficient residential and commercial buildings are influenced at the local level and are needed to offset increased demand for clean power generation from building and vehicle electrification strategies. To contribute to the 8% and 2% GHG reductions, the model assumes approximately 400 commercial and 4,000 residential electrical and natural gas saving retrofits are implemented respectively. Additionally, coordinating with regional partners on land use and mobility improvement to reduce vehicle miles traveled have other benefits to public safety, health, and improved air quality. The model assumes that the replacement of 2,000 electric vehicles will result in 7% of the reduction goal. Additional tree planting and forest preservation measures sequester only a small amount of carbon (0.1%) compared to the amount of GHGs generated by Rockville's urban development; however, they provide many supplementary benefits such as shade, cleaner air, and other ecosystem benefits. Finally, while GHG emissions from Rockville's municipal operations represent approximately one percent of Rockville's total community emissions, the City has direct influence over these sources and the ability to 'lead by example' through actions that contribute 0.8% towards the goal.

Cadmus provided additional analysis of a few specific strategies to inform the costs and staffing resources associated with programs that were new or did not have existing information to draw on. This information is summarized in Section V, Climate Actions.

This analysis provides some guideposts for the level of effort needed to achieve 50% below 2005 levels by 2030. The Actions in this plan in Section V focus on what Rockville can do under its authority to support the strategies below, acting alone or with partners.

Table 1: Rockville Greenhouse Gas Reduction Strategies Modeled to Meet 50% Reduction Goal by 2030

	Strategy	Quantity or Target Implemented by 2030 (Assumptions in Emissions Model)	2030 Reduction Metric Tons (CO2e)	% Contribution to 50% Reduction Goal
1	**Maryland Renewable Energy Portfolio Standard**	Increasing to 50% renewable-sourced electricity target	-121,989	41%
2	**Green Power Purchases**	Residents and businesses purchase 27% more green power	-73,936	27%
3	**Commercial Building Energy Retrofits**	400 electric and natural gas building upgrades	-26,621	8%
4	**Federal HFC/Natural Gas Emissions Reduction Actions**	Increasing to 75% HFC emissions reduction	-22,214	7%
5	**Electric Vehicles**	2,000 additional electric vehicle swaps	-21,782	7%
6	**Solar Energy Installations**	1,800 additional single family, townhouse, and commercial installations	-15,887	5%
7	**Residential Building Energy Retrofits**	4,000 electric and natural gas building upgrades	-10,636	2%
8	**Land Use Mix + Bike/Pedestrian Amenities**	2,000 households redirected to TODs/reduce VMT	-4,983	1.7%
9	**Municipal Actions**	13 facility upgrades, 50 fleet conversions, 2,500 streetlights, 10 solar systems	-2,533	0.8%
10	**Tree and Forest Management**	3,000 trees planted	-180	0.1%
11	**Waste**	180 metric tons of waste diverted over 10 years through compost drop-off program	-62	0.02%
	Total		**-300,790**	**100%**

IV. Climate Impacts, Resilience, and Equity Analysis

It is important to assess the types of climate change hazards and impacts that Rockville will continue to experience when planning for 2030 and beyond. Understanding the climate projections for our area also helps to identify potential infrastructure, ecosystems, and health and equity implications. This initial high-level overview provides 1) a closer examination of what the City can do to be better prepared locally, and 2) additional localized evidence that rapidly reducing global emissions – an effort in which cities play a key part – can make a significant difference in heading off the worst of the long-term risks to human health, infrastructure, buildings, services, and the environment. This section describes an overview of climate changes and their effects.

Climate Projections for Washington D.C. and Vicinity

With 3,100 miles of shoreline, Maryland is highly vulnerable to climate change and sea-level rise. While Rockville is not directly threatened by rising tides, the City is not immune to many other effects.[7] According to the National Oceanic and Atmospheric Administration's (NOAA) historic records of temperature and precipitation, climate change has already begun to impact Maryland residents, businesses and visitors through higher, prolonged summer temperatures and increased precipitation variability. Several Maryland communities are already experiencing more frequent flooding, severe storm damage, and health effects from increased temperatures, poor air quality, and shifts in vector-borne diseases that pose economic, health and environmental challenges.

An evaluation of studies from the District of Columbia[8], Maryland[9], Montgomery County[10], and the US National Climate Assessment[11] shows that the following are the most prominent climate change impacts of concern in Rockville and are the focus of the data summaries below:

- Rising temperatures and more frequent and intense heat waves;
- Concentrated heavy rainfall;
- Drought;
- Increased frequency and severity of wind and storm events; and
- Sea level rise (while not a direct impact to Rockville, it is included in the discussion as an indirect impact due to Rockville's social, economic, and infrastructure connections to the broader region).

Temperature increase

This summer, July 2021, was the hottest month on record globally. July of 2020 was the hottest July on record for Maryland. Heat domes that brought record highs in the Northwest US and Canada in 2021 are illustrative of the types of extreme weather patterns that are expected to occur more frequently in the Mid-Atlantic.[12] The climate change models that project temperature trends have been consistently reliable in predicting the direction and overall magnitude of temperature trends.

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[7] Sea-level Rise: Projections for Maryland 2018. https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Documents/Sea-LevelRiseProjectionsMaryland2018.pdf

[8] District of Columbia Climate Projections, 2015. https://doee.dc.gov/node/1110407

[9] Maryland Climate Change https://mde.maryland.gov/programs/Air/ClimateChange/Pages/index.aspx

[10] Montgomery County Climate Action Plan https://www.montgomerycountymd.gov/green/climate/index.html

[11] Fourth National Climate Assessment, 2018 https://nca2018.globalchange.gov/

[12] USA Today, based on National Oceanic and Atmospheric Administration data. https://www.usatoday.com/story/money/2019/06/22/50-hottest-cities-in-america/39599939/

The District of Columbia's locally downscaled climate projections findings are applicable to the entire DC metro area. According to this study, average summer daytime highs could be about 6 degrees higher by mid-century, and up to 10 degrees higher (up to 97°F, which is the current mid-summer average high of San Antonio, Texas[13]) towards the end of the century under a high emissions scenario (see Figure 16). These numbers are consistent with Montgomery County's Climate Action Plan findings.

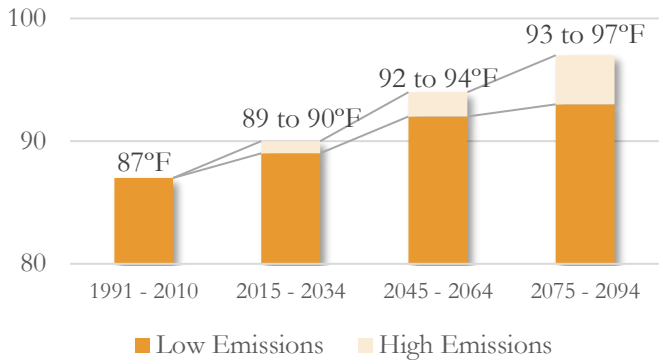

Figure 16: Average Summer Daytime Highs Projected for the District of Columbia And Vicinity

Another measure of summer daytime heat is the Heat Index, which combines the temperature with humidity to reflect the actual human experience and physiological effects of these combined factors due to the body's lowered ability to self-cool from perspiration. The number of days per summer with a heat index over 95°F is projected to double in coming decades and could triple by 2100[14] (Figure 17).

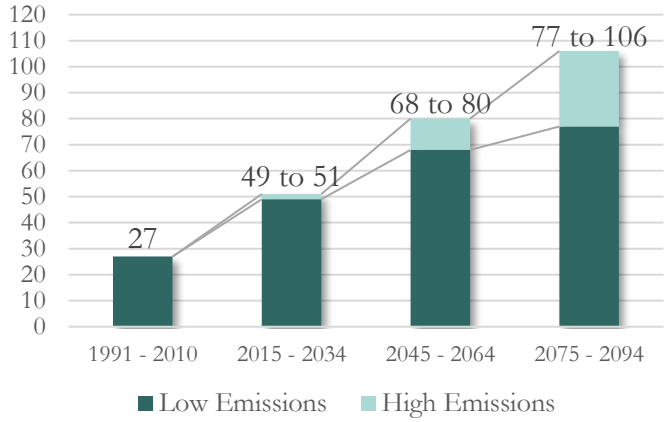

Figure 17: Days per Year with Heat Index Over 95F

The current annual number of heat waves (4) and length of average heat waves (5 days) could also double by 2100 according to local projections.[15] Length of heat waves has important implications for human health because the stress on our physiology builds up over a period of days and becomes more dangerous the longer the heat wave continues without the respite of cooler dryer weather. Nighttime lows are also increasing, reducing the chance for overnight cool-off periods.

Increased heat has important implications for public health and emergency preparedness. It also effects infrastructure performance.[16] For example, several consecutive days of extreme heat caused Metrorail tracks to buckle and a train derailment in 2012. At the City's Water Treatment Plant, increased heat affects the source water quality, increasing the time and resources needed to complete treatment process. Changing temperatures have implications for the types of plants and vegetation that can thrive in natural areas and landscaped areas and irrigation patterns. Warmer temperatures increase evapotranspiration, which increases chances for droughts to have more severe effects.

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[13] Current Results https://www.currentresults.com/Weather/US/average-city-temperatures-in-july.php

[14] *District of Columbia Climate Projections, 2015.* https://doee.dc.gov/node/1110407

[15] *District of Columbia Climate Projections, 2015.* https://doee.dc.gov/node/1110407

[16] Building a Climate Resilient National Capital Region, 2014. www.mwcog.org/file.aspx?D=VQMQ9tbAok8gQhTzsijBCm6Z79cY%2Bdwgnge4ndnbN7A%3D&A=htCELkVvMl4jTLPCWRRMGkkSN0gO2fExx01YTzXvDF4%3D

Precipitation Intensity

Precipitation patterns vary more widely than temperature and are more challenging to model with precision. Still, important trends have already been observed and projected that affect infrastructure, people, and ecosystems. The key trend observed and modeled in the mid-Atlantic is that more precipitation is tending to fall in heavy events and less in lighter events. Warmer air can hold more moisture and fuel stronger storms, releasing more precipitation per event.[17] Recent record events confirm these findings – for example, Ellicott City, Maryland experienced 6 inches of rain in 2 hours in 2016, and two years later, witnessed 8 inches of rain in 2 hours from cloudbursts associated with thunderstorms. Montgomery County has experienced similar localized flash floods, some necessitating water rescues.

According to the National Climate Assessment, the amount of precipitation falling in the heaviest 1% of events has increased 71% from 1958 to 2012 in the Northeast region of which Maryland is a part. Today's 100-year rain event may increase by several inches. The District of Columbia's analysis found the 100-year event would occur every nearly every 15 years (see Figure 18).[18] The true 100-year event could increase from 8 inches to 10 to 16 inches (low and high emissions). The County's Climate Action Plan reported a similar increase from 8.3 up to 11 inches, both by the end of the century under a high emissions scenario. Understanding precipitation dynamics at smaller time scales than the 24-hour storm will be important to infrastructure planning. The 24-hour timescale does not capture trends in peak intensities such as what the City experienced from the remnants of Hurricane Ida.

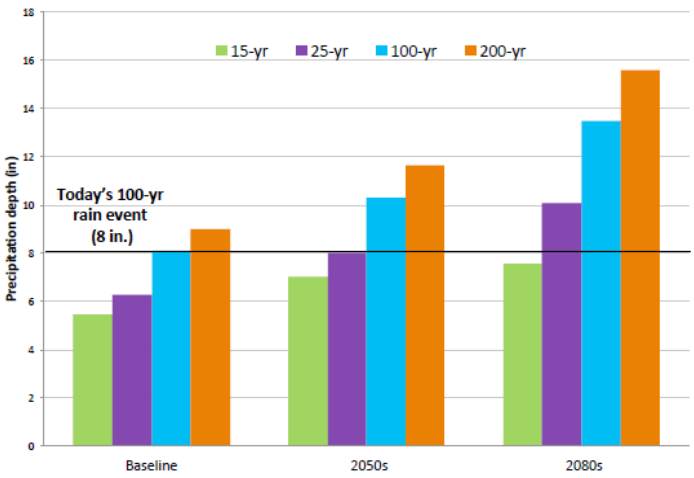

Figure 18: Extreme Rain Events

Winters and springs are projected to be slightly wetter (10-20%) over the next several decades under a high emissions scenario according to the National Climate Assessment.[19] Summer and fall are predicted to remain about the same.

Drought

The City's water supply depends on Potomac River flow. The City's water treatment plant serves about 90 percent of the City and draws from the Potomac River. The remaining population is served by Washington Suburban Sanitary Commission (WSSC) which also draws most of its water from the Potomac. The Interstate Commission on the Potomac River Basin (ICPRB) evaluates water supply system performance based on the ability to meet demand and flow-by water level requirements.[20] ICPRB modeled nine future climate scenarios to project water system performance under a range of future conditions through 2050. The model examined a range of global climate model predictions of increasing evapotranspiration from increased temperatures due to climate change and forecasted water demand and considered the

[17] Fourth National Climate Assessment https://nca2018.globalchange.gov/
[18] District of Columbia Climate Projections, 2015. https://doee.dc.gov/node/1110407
[19] Fourth National Climate Assessment https://nca2018.globalchange.gov/
[20] Interstate Commission on the Potomac River Basin (ICPRB), 2020. https://www.potomacriver.org/wp-content/uploads/2020/10/2020-WMA-Water-Supply-study-FINAL-September-2020.pdf

requirement to maintain a minimum Potomac River water flow at Little Falls. Without the addition of water supply enhancements, seven of the nine scenarios predicted moderate to severe water supply shortages during severe droughts by 2050. Even with the development of additional reservoirs such as the one planned for Travilah Quarry in Montgomery County, under two of the scenarios the water system is not able to meet demand and Little Falls flow-by requirements in a severe drought.

Similarly, the County's analysis found that in the long term, drought becomes a concern for the region especially under a high emissions scenario. The County examined drought effects on agricultural lands and landscaping (not water supply). Figure 19 shows Montgomery County's climate projections for drought under an intermediate representative concentration pathway (RCP 4.5) and a high representative concentration pathway (RCP 8.5) for 2035, 2050 and 2100. The RCP is used to model different scenarios of future greenhouse gas concentrations in the atmosphere. Drought is represented by the increase in number of months per year of severe drought measured by the Palmer Drought Severity Index. By 2100, the County may experience up to 1.5 more months per year with severe drought.

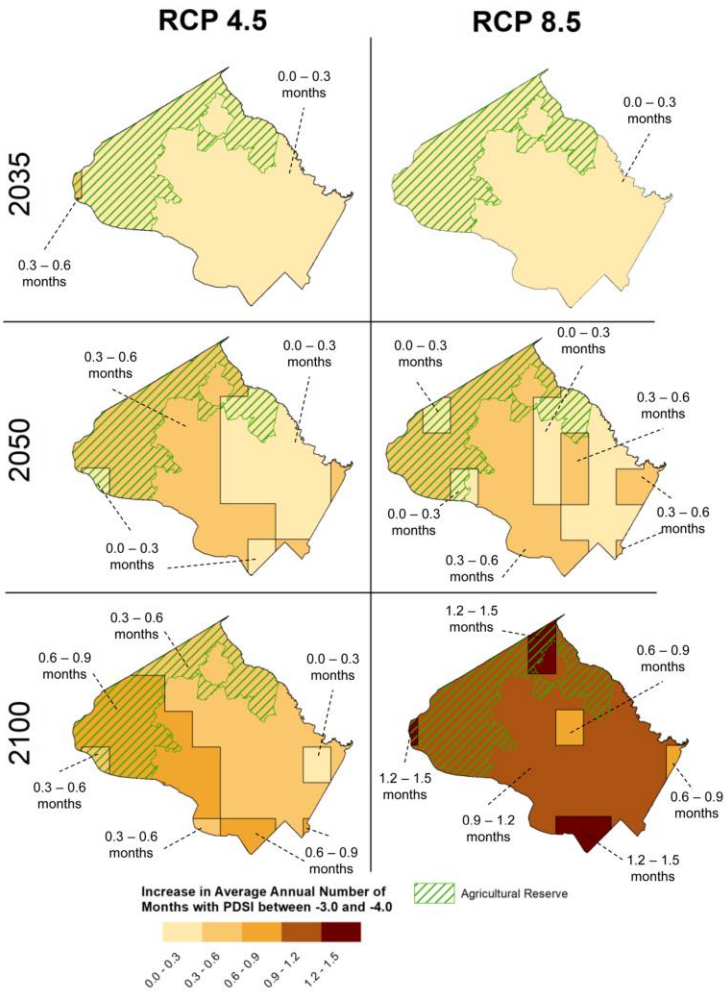

Figure 19: Projected increase in average number of months per year of severe drought[21]

[21] Palmer Drought Severity Index (between -3.0 and -4.0) for 2035, 2050, and 2100, and climate scenarios RCP 4.5 and RCP 8.5 in Montgomery County (Montgomery County Climate Action Plan.

Severe Storms[22]

The frequency and severity of extreme weather events is projected to increase (e.g., more concentrated rainfall events, high winds, hurricanes, nor'easters, hail, tornados, thunderstorms, ice storms, and other storm-related conditions) although modeling small-scale events is difficult. Observations indicate a possible increase in weather-related disasters. For example, ten of the nineteen weather-related disaster declarations in Montgomery County in the last 60 years occurred within the latter third of that period (Table 2).

Table 2. Presidential Disaster and Emergency Declarations in Montgomery County, 1962-2021

Emergency Declaration	Emergency Declaration Date	Event
FEMA-DR-4261	January 22-23, 2016	Severe Winter Storm and Snow Storm
FEMA-EM-3349	October 28, 2012	Hurricane Sandy
FEMA-DR-4075	August 2, 2012	Severe Storms, Winds
FEMA-EM-3335	August 27, 2011	Hurricane Irene
FEMA-DR-1910	May 6, 2010	Winter Storm
FEMA-DR-1875	February 19, 2010	Winter Storm
FEMA-DR-1652	July 2, 2006	Tornadoes, Flooding
FEMA-EM-3251	September 13, 2005	Hurricane Katrina
FEMA-DR-1492	September 13, 2003	Hurricane Isabel
FEMA-EM-3179	March 14, 2003	Snow Storm
FEMA-DR-1324	April 10, 2000	Winter Storm
FEMA-DR-1081	January 11, 1996	Blizzard
FEMA-EM-3100	March 16, 1993	Winter Storm
FEMA-DR-839	August 28, 1989	Severe Storms, Winds
FEMA-DR-524	January 26, 1977	Ice conditions
FEMA-DR-489	October 4, 1975	Flooding
FEMA-DR-341	June 23, 1972	Tropical Storm Agnes
FEMA-DR-309	August 17, 1971	Flooding
FEMA-DR-127	March 9, 1962	Severe Storms, Flooding

The County's Climate Action Plan identifies high winds as a major climate hazard. High winds commonly occur with thunderstorms or other frontal systems; they are also associated with coastal storms, such as tropical storms or nor'easters, if they retain strength far enough inland to reach Rockville. Average snowfall is decreasing over time[23], still, wind and other effects associated with intense snowstorms are possible due to the atmosphere's increased moisture.

[22] Fourth National Climate Assessment, 2018 https://nca2018.globalchange.gov/

[23] Capital Weather Gang https://www.washingtonpost.com/weather/2021/03/04/washington-dc-normal-average-snowfall/

Sea Level Rise[24]

Sea level rise is considered an indirect climate hazard for Rockville, but a concern due to Rockville's interdependence on the larger Maryland and DC metro area through economic, social, and infrastructure connections. Coastal flooding tends to be localized near tidal areas. Sea level rise combined with local land subsidence is projected to be 1.2 to 4 feet or more by 2100, depending on emissions and ice sheet dynamics. Sea level rise projections tend to increase with new, more sophisticated climate models. Recent National Oceanic and Atmospheric Administration models place global sea level rise close to 1.5 feet to 6.5 feet by 2100 (low and high emissions scenarios).[25] Storm surge flooding would add to that total level. For example, the tidal Potomac rose 10 feet with Hurricane Isabel. Whether a storm occurs at high tide, wind speed, and direction are critical factors in potential impacts. Climate scientists have observed increases in coastal storm systems' intensity; however, landfall frequency and other coastal storm dynamics are harder to gauge.[26]

[24] Sea Level Rise Projections for Maryland, 2019 https://www.umces.edu/sites/default/files/Sea-Level%20Rise%20Projections%20for%20Maryland%202018_1.pdf
[25] https://toolkit.climate.gov/topics/coastal/sea-level-rise
[26] Fourth National Climate Assessment, 2018 https://nca2018.globalchange.gov/

Vulnerability Assessment

Direct changes in climate lead to significant indirect effects including extreme events and impacts to air and water quality, ecosystems, and infrastructure, and many of these changes also create or exacerbate human health risks (Figure 20).[27] These effects are further analyzed in the next three sections.

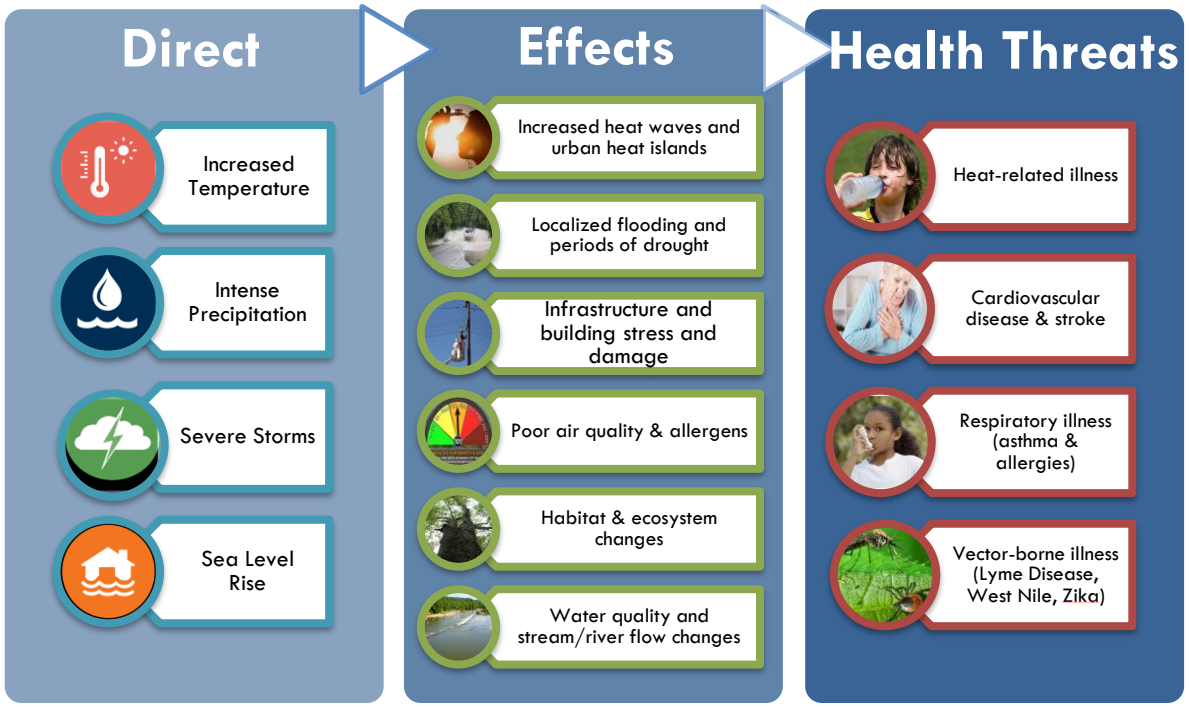

Figure 20: Climate Changes, Effects, and Health Threats

[27] Maryland Department of Health and Mental Hygiene. Maryland Climate and Health Profile Report. 2016. https://mde.maryland.gov/programs/Marylander/Documents/MCCC/Publications/Reports/MarylandClimateandHealthProfileReport.pdf

The County created a framework to use as a starting point for identifying higher priority climate vulnerabilities. In the chart below in Figure 21, the County's Climate Action Plan rated the vulnerability of asset categories (transportation, critical and community resources, utilities, stormwater management, agricultural reserve, parks and wetlands, and people and homes) to climate extremes (precipitation, temperature, drought, and high winds), incorporating the amount of exposure to the hazards, sensitivity to impairment from the climate risk, and capacity to adapt or withstand the weather extremes.[28]

Assets	Exposure				Sensitivity				Adaptive Capacity			
	Precipitation	Temperature	Drought	High Winds	Precipitation	Temperature	Drought	High Winds	Precipitation	Temperature	Drought	High Winds
Transportation	H	H	L	S	S	S	L	S	S	S	L	S
Critical and Community Resources	S	S	S	S	S	L	S	L	S	S	L	L
Utilities	S	H	H	H	S	H	S	H	L	L	S	S
Stormwater Management	H	L	L	L	H	L	L	L	S	L	L	L
Agricultural Reserve	S	H	H	S	S	H	H	S	S	S	S	S
Parks and Wetlands	S	H	H	S	L	S	S	L	S	S	S	S
People and Homes	H	H	H	S	H	H	H	S	S	S	S	S

H High vulnerability

S Some vulnerability

L Low vulnerability

Figure 21: Montgomery County Vulnerability Ranking by Asset Category and Hazard Category

Rockville has specific characteristics and conditions that can use this rubric as a framework. Identifying Rockville's climate risks requires examination of our local assets from a community standpoint. Utilities, parks and wetlands, and people and homes stand out as areas of concern for further evaluation. The next few sections break down more specifics in how climate change impacts infrastructure, ecosystems, and health risks in Rockville.

Impacts to Infrastructure, Buildings and City Services

Climate change poses risks to transportation, stormwater, wastewater, drinking water, and energy infrastructure and increased demand for emergency management services, including:

- Increased urban heat island effect increases demands on building cooling systems, especially summertime peak energy demand and energy costs.
- Risk of brown outs or power outages from strained energy infrastructure or severe weather.
- Increased intensity of precipitation events increases the likelihood of runoff volumes exceeding stormwater capacities, causing localized flooding and drainage problems.

[28] Montgomery County Climate Action Plan, Appendix C, p. 69.

- Extreme heat and storms impact the lifespan, performance, and maintenance needs of buildings (roofs, envelope, mechanical systems, etc.), infrastructure, parking lots, sidewalks, streets, and bridges.
- Extreme weather impacts to transportation by causing more frequent travel disruptions and delays (downed trees, power outages, rail, flash floods).
- Increased heat waves and precipitation variability (downpours or drought) impacts community facilities and parks resources and services (facilities, parks, fields, cooling centers, outdoor activities).
- Extreme weather events, sedimentation, drought, and algal blooms pose risks to the Potomac River that impact drinking water supply and treatment.

There are several types of flooding with different causes and solutions: coastal flooding caused by sea level rise and/or storm surge, riverine flooding, local stream flooding, and inland drainage flooding. The latter two are more prominent concerns for Rockville. Given the city's upland location, most of the city's infrastructure is out of reach of major riverine flooding and is not at direct risk from coastal flooding. Potomac basin floods or coastal floods may affect the city as its connected by infrastructure, social systems, and economic systems to the riverine and coastal areas of the Potomac. Rockville recently experienced how climate change-powered coastal storms, like Hurricane Ida, can move far inland and lead to localized stream and urban drainage flooding. As a warmer atmosphere holds more water vapor, Rockville's buildings, stormwater and transportation infrastructure is vulnerable to an increase in heavy precipitation events, and the City must plan accordingly. Some homes, businesses and other buildings are likely to be affected. The data upon which many infrastructure design standards and building codes are based is historic data, not future. For example:

- Building codes are based on past weather conditions although recent code updates improve on prior ones;[29]
- Stormwater regulations, and culvert designs in roadways, and erosion and sediment control regulations also rely historic data; and
- FEMA floodplains and dam safety assumptions do not incorporate future flood risk or the impacts of future development, positive or negative, on floodplains.

Further, FEMA floodplains do not include smaller streams or inland drainage flooding risks, current or future. Floodplain changes could affect infrastructure serving the City's water treatment plant, an issue discussed in the recent Resilience and Risk Assessment required by America's Water Infrastructure Act (AWIA). Figure 22 illustrates the City's FEMA floodplains and dam hazard classifications with flood areas based on historic data. The current maps are based in part on analysis completed in 1976 which was partially updated in 2006. Floodplain and dam safety management are necessary to minimize threats to public safety, property, and infrastructure, and should evaluate and start to address the additional risks posed by intense precipitation patterns. Similarly, climate change could create additional risks to critical facilities, utilities, and other critical infrastructure. In addition to updating planning data, other ways to incorporate future risk is to add a margin of safety in planning assumptions or incorporating additional requirements in future areas at risk.

[29] See https://www.iccsafe.org/wp-content/uploads/21-19612_CORP_CANZUS_Survey_Whitepaper_RPT_FINAL_HIRES.pdf

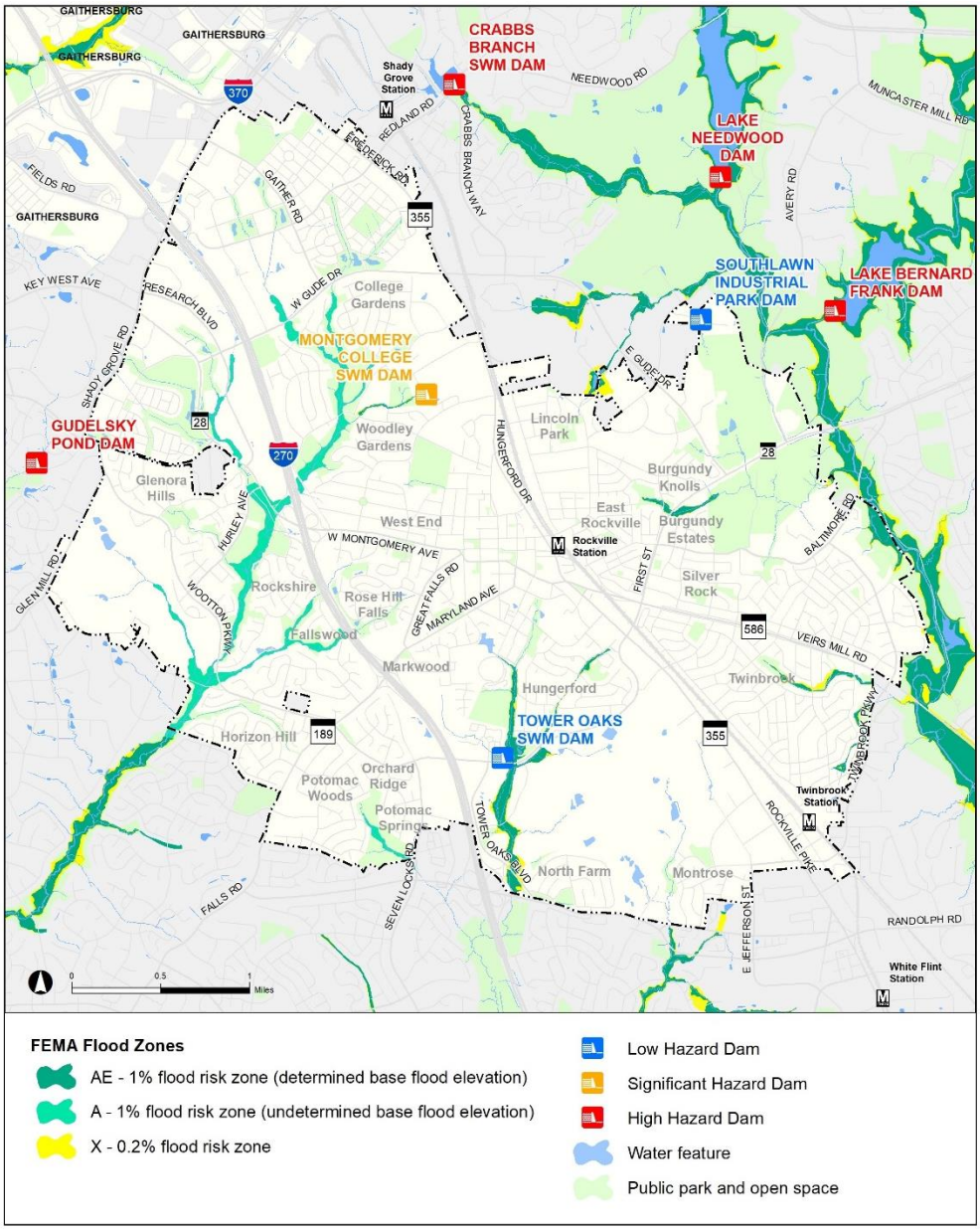

Figure 22: Rockville's Floodplains and Dams

The Montgomery County Climate Action Plan Vulnerability Assessment identified the transportation and water infrastructure vulnerable to flood risks. Table 3 summarizes Rockville's roads, bus routes, bikeways and water pump station that may be vulnerability to flooding.

Table 3: Rockville Infrastructure Identified in Montgomery County Climate Action Plan Vulnerability Assessment

Frequently Flooded Transportation Routes Serving Rockville
Bus Routes serving Rockville: 10, 48, T2
Bikeways serving Rockville: Veirs Mill Rd., Rock Creek Trail
Roads serving Rockville: Several roads originating in Gaithersburg and Bethesda serve Rockville and are prone to flood disruptions
Utility infrastructure located within 500 feet of a floodplain
Utilities: 1 of 3 Wastewater Pump Stations located in Rockville

Rockville's Water Treatment Plant is served by a frequently flooded road and the raw water intake is located near a floodplain. A similar analysis in Rockville could reveal other vulnerabilities. Rockville will need to continue to work with community partners to analyze other critical infrastructure (fire, police, library, recreation, multi-agency, nursing home, emergency shelter, school, hospital), stormwater and drainage infrastructure (dry/wet ponds, swales and bioswales, infiltration trenches, underground detention basins, dry wells, culverts) and utilities (transmission lines, substations, pump stations, drinking water reservoirs) within 500 feet of a FEMA designated floodplain. Additional analysis that includes site conditions, topography, future drainage patterns, and adaptive capacity could reveal other facilities protection needs.

Beyond the City Boundary

Rockville is dependent regional infrastructure, such as transportation, water and wastewater systems, communications, and fuel, electrical, and natural gas networks, that is also vulnerable to climate impacts. In addition to local analysis, tracking and participating in regional emergency and hazard mitigation planning efforts will help ensure the City's preparedness.

Impacts to Ecosystems and the Environment

Climate change is already causing vegetation and wildlife ecosystem shifts. In 2012 the United States Department of Agriculture remapped US agricultural hardiness zones, shifting Rockville and vicinity southward from zone 6 to zone 7 based on more recent winter temperature patterns.[30]

Due to increased heat, pests, storms and wind, native plant and tree species may be more vulnerable to non-native invasive species and disease. Climate change brings increased stress on urban tree canopy and landscapes already strained by the impacts of development, requiring more frequent maintenance and replacement. Stream health is affected by changes and variability in seasonal stream flow (flash flooding and drought) and changes in water quality (temperature, sediments, nutrients, dissolved oxygen). Local natural infrastructure is affected by human-caused climate change, and at the same time, it plays an important role in buffering weather and other development impacts in urban, suburban, and rural areas. Trees provide cooling shade and reduce wind force and vegetation absorbs and helps filter the rain and the air and absorbs carbon. Just like built infrastructure and social systems, if ecosystems are strong and healthy, they can better withstand natural hazards and bounce back quicker. Healthy forests foster robust soil layers, diverse habitats and species, and are more resilient. Healthy and properly cared for trees beautify streets, increase economic investments, and are less likely to cause hazards. Higher demand for multiple ecosystem services and recreation is placed on green spaces in urban and suburban landscapes, yet these spaces can be cultivated to have more adaptable species, more diversity, and to provide refuge for pollinators, birds and other native wildlife.

Building upon the priority habitats identified in the Environmental Trends Report (see Figure 23), ecosystems could be further protected from climate extremes by examining the health of areas of Potential Priority Wildlife Habitat, and assessing invasive presence, deer impacts, and other environmental degradation to identify priority management areas and strategies. Adaptive, hardy species could be considered in urban landscapes and street tree species choices. Additional protections could be considered in hydrologic studies to protect watersheds and stream health. An ongoing maintenance strategy for city-owned natural areas can foster more robust, scenic, and valuable ecosystems and improve their functions as havens for diversity, water quality and air quality, and recreational and educational value.

[30] https://www.usda.gov/media/press-releases/2012/01/25/usda-unveils-new-plant-hardiness-zone-map

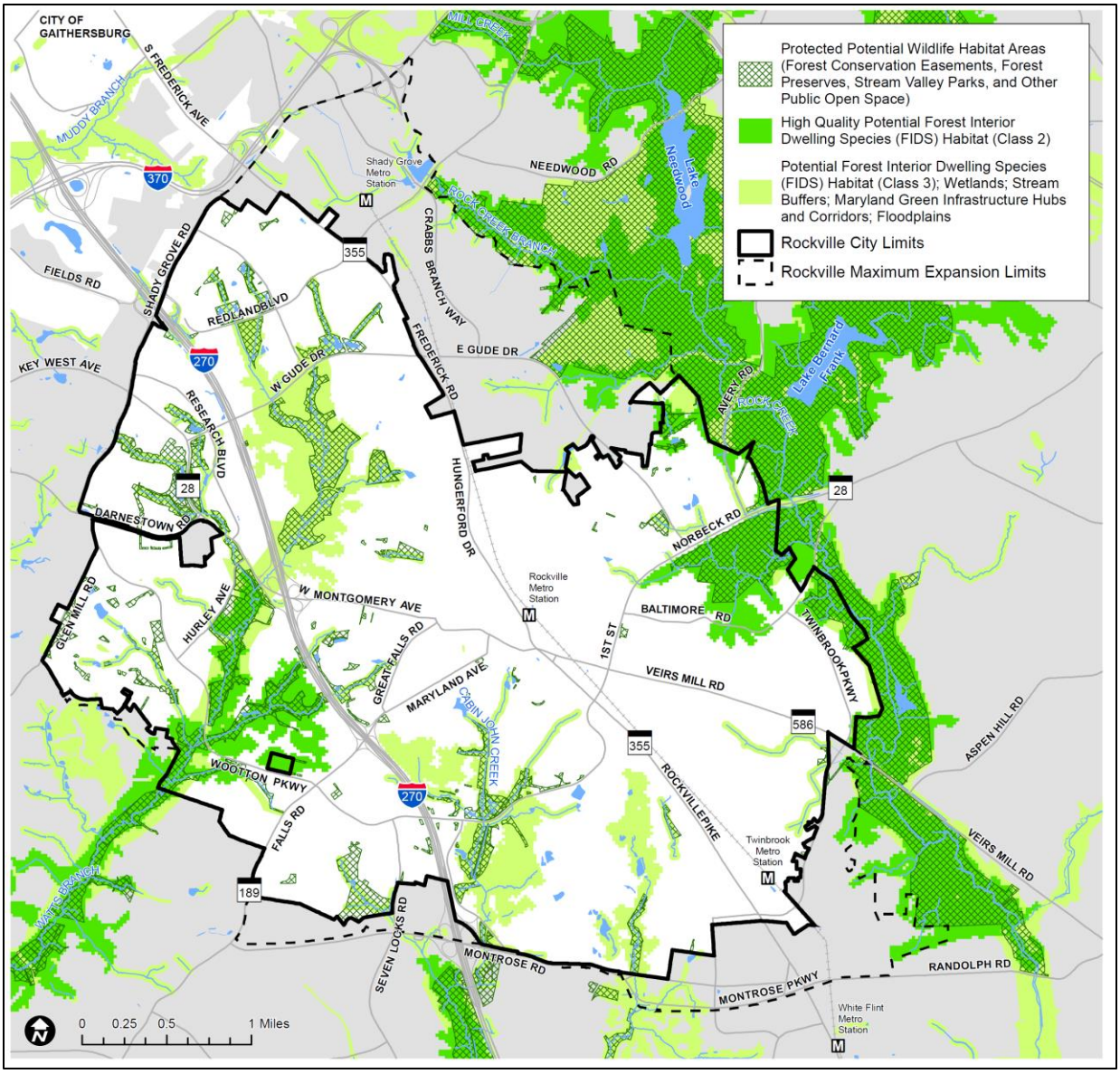

Figure 23: Priority Wildlife Habitats and Protected Lands (Rockville Environmental Trends Report)

Health Threats

Health impacts expected to increase include:[31,32]

- Heat related illness (heat stroke, rashes)
- Respiratory illness (asthma, allergies, respiratory disease)
- Cardiovascular disease, heart attack and stroke
- Vector-borne and infectious diseases (West Nile, Lyme Disease and other tick, mosquito, and foodborne illness)

Outdoor air quality has improved tremendously over the last several decades[33] with the enactment of the Clean Air act and the many state, federal, and local programs that followed. Still, Rockville experienced 53 days with unhealthy air for sensitive groups and 9 unhealthy air days so far in 2021[34] which increase emergency room visits especially on hot days[35]. Heat waves place pressure on human health, food security, water, energy, and emergency services. Heat waves disproportionately impact climate-vulnerable groups, such as the homeless and low-income households that lack shelter and air conditioning, the elderly, infants, children, outdoor workers, and persons living with pre-existing health conditions. Temperature extremes can worsen chronic conditions, including cardiovascular, respiratory, and cerebrovascular disease and diabetes-related conditions. The City can support various programs that help protect the community from the impacts of extreme heat, like helping residents get access to affordable and efficient air conditioning systems, planting trees to shade neighborhoods, shading bus stops and important pedestrian areas, providing public pools and spray parks, and operating cooling centers.

With the intensity of heat waves expected, impacts to City services, workforce, and outdoor activities need to be assessed. Many people who work outdoors, including in construction, landscaping, police, maintenance workers, refuse and recycling crews, and outdoor recreations staff will be affected more severely by summer heat especially when combined with humidity. Those in charge of planning and leading outdoor recreational activities, youth and adult sports, summer camps and other outdoor events will need to take into more careful consideration how to keep participants healthy and safe. Mitigation could include shifting schedules to morning or evening, less frequent or shorter services and programs in the summer, locating practices under shade and ensuring adequate breaks or cooling is available nearby. Some activities may need to be moved indoors more often. Outdoor workers must be protected from weather hazards and employers and human resources need proper training, planning, and preparedness to ensure worker safety in extreme heat. As heat waves intensify and persist, training is needed to identify prevention strategies and warning signs for heat illness and other associated heat-related health issues.

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[31] Maryland Department of Health and Mental Hygiene. Maryland Climate and Health Profile Report (2016).
[32] Metropolitan Washington Council of Governments (COG). Summary of Potential Climate Change Impacts, Vulnerabilities, and Adaptation Strategies in the Metropolitan Washington Region (2013).
[33] Metropolitan Washington Air Quality Trends Report https://www.mwcog.org/documents/2017/09/23/air-quality-trends-air-quality-air-quality-data-featured-publications/
[34] Air Quality Progress Dashboard, MWCOG https://www.mwcog.org/environment/data-and-tools/air-quality-progress-dashboard/
[35] Clean Air Partners https://www.cleanairpartners.net/why-air-quality-matters

Social Vulnerability and Racial Equity

Demographic Profile

Rockville is a diverse city with residents with many cultures and backgrounds. Counted among Rockville residents are recent transplants and longtime residents, with roots from all over the world, some dating back to original Native Americans that inhabited the mid-Atlantic, descendants of enslaved people with African origins, and European colonists. About 34% of residents were born abroad, hailing from Asia (53%), Latin America (28%), Europe (13%), and Africa (4.7%).[34] Figure 24 shows another indicator of the City's diversity, race by census category.[36] Nearly 45% of Rockville residents speak a language other than English at home. 15% of residents identify as Hispanic ethnicity. Rockville has a broad range of ages with about 20% youths under 20 and 19% seniors over 65. Rockville residents have a range of abilities. As of 2018, over one-fifth of households earned 50% area median income or less. In 2019, the poverty rate for the City was 6.3%. Poverty and unemployment rates may have increased since the COVID-19 pandemic and economic downturn.

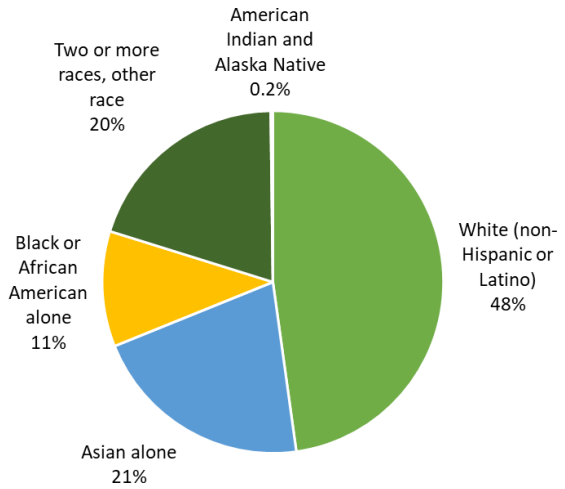

Figure 24: Race by Census Category in Rockville

Housing Affordability and Energy Burden

Low income and communities of color tend to pay a higher percentage of their income for energy utility bills– sometimes three times as much. Low-income households face barriers to implementing solar or energy upgrades including lack of access to financing. In addition, low-income households are more often renting and have less control over the energy efficiency or equipment quality in their units. In Rockville, about 45% of residents are renters, and the proportion of homeowners has decreased over time[37]. The Comprehensive Plan contains many important recommendations on housing diversity, affordability and supply that would help bolster home ownership, giving more control over energy choices to residents and resulting in more residents being on an equitable, environmental, and economically sound footing.

Climate Change Impacts on Health, Especially Low-Income and Communities of Color

Climate change affects everyone but tends to have outsized impacts on some of the same communities that have suffered disproportionate health and economic impacts from the COVID-19 pandemic – low-income groups and communities of color. Increasing heat and humidity worsens air quality, extends allergy seasons, which increases human health risks, especially for sensitive populations such as children, the elderly and low-income. The city must work with its partners to prepare to assist vulnerable populations, especially in emergencies.

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[36] US Census 2019 American Community Survey 5-year estimates
[37] Housing Market Analysis and Needs Assessment https://www.rockvillemd.gov/DocumentCenter/View/18286/Housing-Market-Analysis-and-Needs-

Racial inequities of past and present have created a situation that leaves many Rockville residents vulnerable to climate change. Specifically, people who have had constrained access to federal programs that lifted many others out of poverty, suffered from mortgage redlining and disinvestment in their communities, disproportionate incarceration, lack of access to the same educational opportunities, healthcare, reliable transportation, healthy food access, and worse. Whether intentional or unintentional, these policies and practices created lasting disparities and put communities of color on unequal playing field for centuries. Since the Civil Rights movement of the 1960s many protections were put in place, but there's much more work to do to mitigate this unfortunate legacy of racism.

The income gap has increased, and whenever an economic crisis strikes, Black and Hispanic communities tend to be affected disproportionately. The recent economic downturn was no different, exacerbating gaps that already persisted. Similarly, natural disasters and climate change tend to be more challenging or devastating to those who are living paycheck to paycheck or already have experienced more than their fair share of adversity.

Flooding and storms cause more economic harm, but heat waves cause more injuries to human health. Rockville residents are used to hot summers, but with worsened heat waves, those who work outdoors, depend on transportation outdoors such as walking, rolling, or biking, are unhoused, do not have adequate air conditioning (or cannot afford to run it) are particularly vulnerable.

In addition to race and ethnicity, disability status, immigrant status, income, age, LGBTQIA identity, being a non-native English speaker, cultural barriers, educational attainment, employment status, and many other factors can affect residents' capacity to adapt to climate change or any other challenges for that matter. The Centers for Disease Control created an index of various factors that contribute to social vulnerability. The factors in the index are described in the below. Rockville's mapped results are shown in Figure 25.

The CDC Social Vulnerability Index measures the following factors:

1. Socioeconomic Status
   - Below poverty
   - Unemployed
   - Income
   - No high school diploma
2. Household Composition & Disability
   - Aged 65 or older
   - Aged 17 or younger
   - Civilian with a disability
   - Single-parent households
3. Minority Status & Language
   - Minority
   - Speak English "less than well"
4. Housing & Transportation
   - Multi-unit structures
   - Mobile homes
   - Crowding
   - No vehicle
   - Group quarters

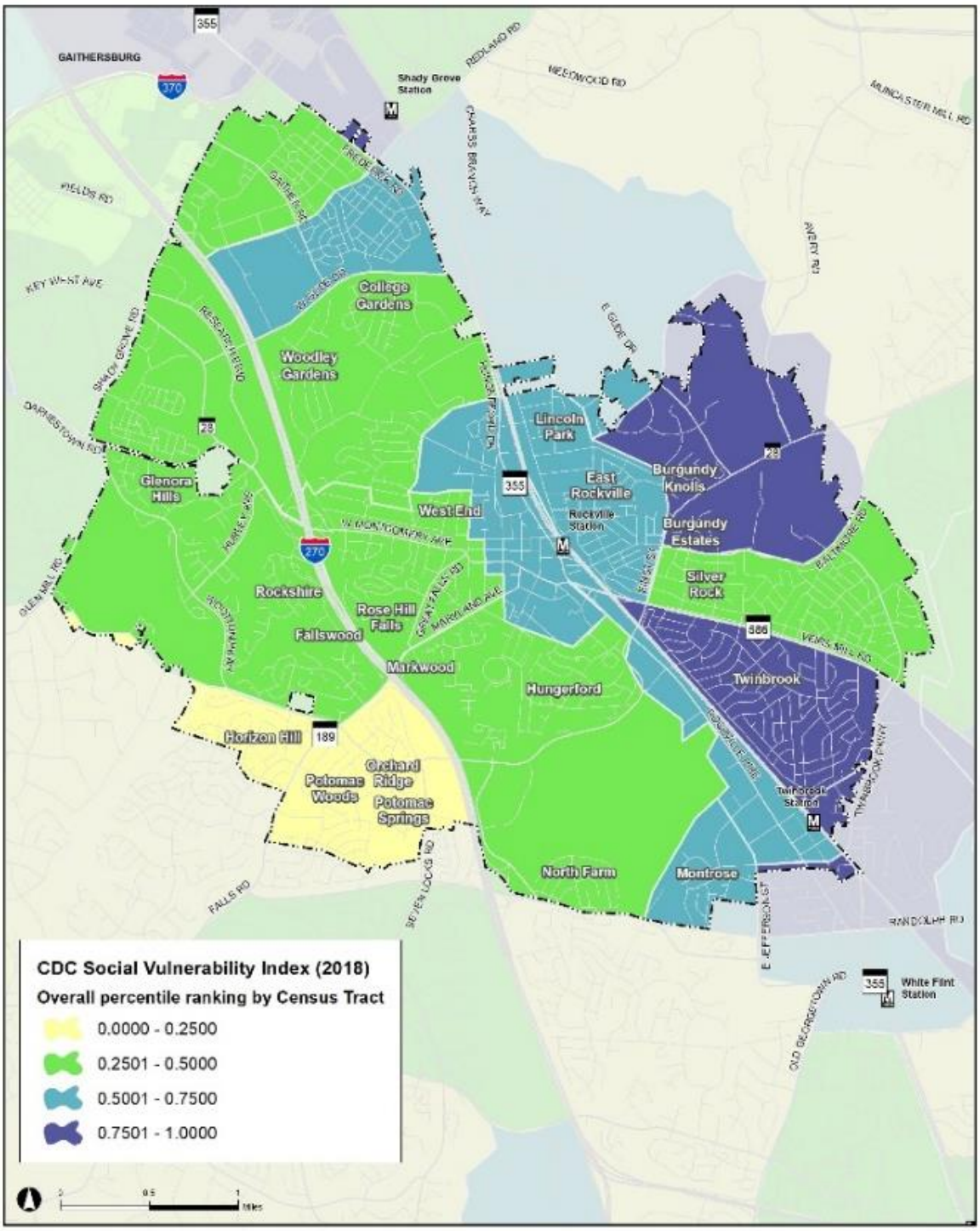


Figure 25: Rockville Social Vulnerability Index by Census Tract

Social vulnerability has a broad geographic distribution in Rockville. A few neighborhoods in the east and southeast are particularly vulnerable.

Mapping and distribution analysis are a tool to foster equity. Tracking the distribution of investments and services and monitoring climate impacts in particularly vulnerable neighborhoods is one way to foster resilience for those most vulnerable and ensure equitable distribution of city services.

Figure 26 shows the areas in yellow with 50% or more social vulnerability juxtaposed with tree canopy cover in the City of Rockville.

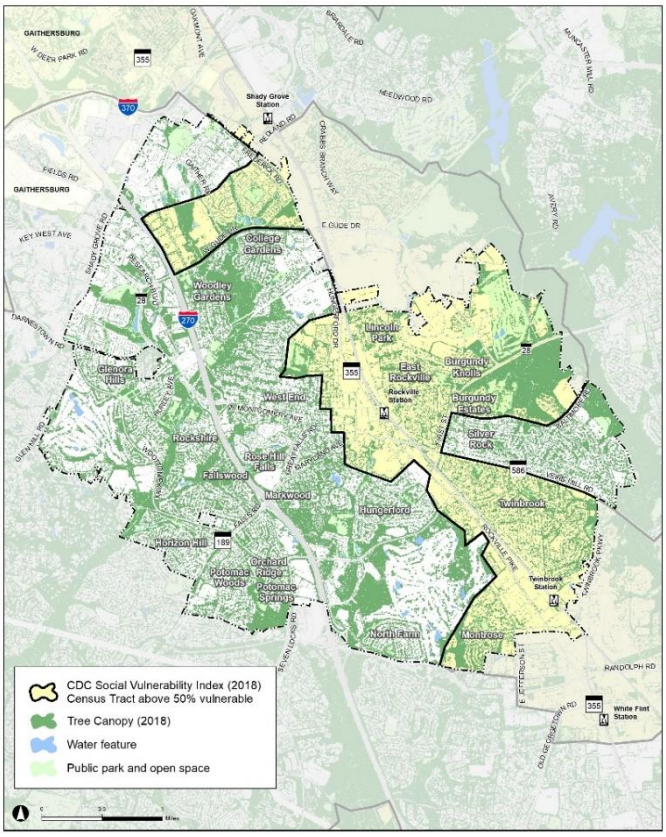


Figure 26 Tree Canopy Coverage and Socially Vulnerable Communities in Rockville

As the Climate Action Plan is implemented, care can be taken to ensure these neighborhoods and populations are prioritized for services and for climate impacts mitigation measures tailored to their needs. A more fine-grained examination is needed to ensure equity across all neighborhoods and especially those with economic disadvantages affecting health, such as prevalence of employment outdoors and lack of access to quality health care.

This type of lens can be applied to most of the Climate Action Plan actions. Investments in floodplain management, stormwater systems, solar, energy efficiency, transportation, community facilities, tree canopy, community gardens, parks, and so forth can consider similar screening and monitoring. Engaging on a deeper level and learning more about challenges faced will help provide the City guidance in ensuring that implementation is effective and mitigates health impacts on people, especially underserved populations.

Strengthening Rockville's Resilience

Some preparation for recent and near-term changes in weather patterns will be necessary regardless, but after about mid-century, the high emissions scenarios and low emissions scenarios diverge. The most disastrous impacts can be avoided by drawing down emissions and working towards carbon neutrality across the globe. Infrastructure resiliency and social resiliency are important considerations in combating climate change. Instituting and updating existing planning and building standards to protect our water supply, power grid and buildings from flooding enhance the long-term sustainability of our community. It may be valuable to consider such improvements for existing residential and commercial buildings.

Rockville can reduce future costs of climate change by preparing for more intense heat waves, intense precipitation patterns, and severe storms. Planning for climate resiliency focuses on protecting infrastructure, buildings, ecosystems, public health, and quality of life by identifying potential climate impacts, reducing community vulnerability, and increasing the capacity to recover from a disturbance and/or adapt to new conditions. Section V of the CAP outlines actions to enhance resiliency.

The data that engineers use in planning assumptions is based on historical trends, which are no longer indicative of the future. Stormwater regulations, floodplain ordinances, transportation design standards, and building codes are based on historic data and may be soon outdated. The City relies on robust and reliable infrastructure to serve its residents, businesses, visitors, students, and workers. Additional examination is needed to ensure resilient infrastructure systems are built to last.

Rockville's forests, meadows, streams, private yards and landscapes and public parkland may need new management approaches to achieve the same level of health and vitality and continue to provide the City with recreational opportunities and ecosystem services.

Equally important is the social resiliency of a community (including mental health) to help endure negative environmental impacts in a repeated or sustained manner. Addressing the human aspect of resiliency may include offering community support services before, during or following extreme events (like severe storm damage or prolonged electricity outage). Such extreme situations may develop more regularly in the future and are worthy of consideration from a long-term planning perspective. Rockville is a diverse city and its residents and businesses have a variety of unique and valued qualities. Like everywhere in the U.S., the City grapples with harms embedded in systemic racism. Rockville cannot solve climate change or historic racism alone, but this plan intends to outline actions that reduce the disproportional impacts of climate change on vulnerable communities and use an equity lens to ensure that the benefits reach everyone, especially those who need it most and do not contribute to historical disadvantages. This work intends to contribute to recent Mayor and Council initiatives to support social justice and the elimination of systemic racism and bias.

Coordination with Montgomery County, especially on emergency preparedness and hazard mitigation, as well as state and regional partners, utilities, non-profits, community groups, private companies, employers, landlords, and many others will be essential to prepare the community to withstand challenges and continue to thrive in a climate changed environment.

V. Rockville Climate Actions

Rockville developed a suite of climate actions to address the main GHG sources identified in the community inventory, strengthen community resiliency, promote equity, and guide CAP public involvement and oversight. The climate actions are organized in the following seven strategy categories (Figure 27).

Energy Efficiency

Increase energy conservation and efficiency and reduce fossil fuel use in all existing and new buildings and infrastructure.

Renewable Energy

Increase the generation, use and access to affordable, reliable, and clean energy systems.

Transportation

Expand safe, efficient, affordable, and equitable multi-model transportation options that utilize clean and efficient energy sources.

Land Management

Maximize the economic and social benefits of land while maintaining or enhancing natural systems and ecological health to ensure resiliency.

Materials and Waste

Manage solid waste by reducing, reusing, recycling, composting, and sustainable purchasing.

Resiliency

Improve the capacity of our community, homes, businesses, and natural environment to prevent, withstand, respond to, and recover from climate change impacts such as rising temperatures, more frequent and intense heat waves, heavy rainfall, and severe storms.

Public Education and Oversight

Conduct inclusive and equitable public engagement and establish systems for monitoring and accountability to encourage participation and support plan success.

Figure 27: Climate Action Categories

Action Prioritization

Regional climate action plans identified many possible climate and resiliency actions. For example, COG reviewed best practices across the country and compiled a list of 125 voluntary local government climate actions for consideration in their regional Climate and Energy Action Plan. Montgomery County led a robust community engagement effort that generated more than 850 climate actions for consideration in their plan. Actions from these regional plans were evaluated for relevancy, feasibility, and effectiveness in Rockville to reduce greenhouse gas emissions and improve resiliency for both the community (all residents, businesses, and organizations) and municipal operations. The community climate survey asked the public to rate support for 16 strategies and requested additional input on additional actions they would like to see in Rockville's plan. All 16 strategies received moderate to strong support from 76 percent of survey respondents. These strategies were combined with additional relevant actions from Montgomery County's Climate Action Plan and community suggestions that received widespread support. The City coordinated with a consultant to develop qualitative and quantitative cost-benefit analyses to prioritize local actions.

Prioritization Criteria

Rockville's Climate Action Plan incorporates a slate of strategies that draw from best practices, is right-sized for Rockville, and are aligned with the modeled 50 percent GHG reduction pathway by 2030. A systematic process prioritized community needs and identified actionable solutions for investment. Some actions are more obvious in their status as 'low-hanging fruit' – actions that will quickly pay for themselves in savings and community co-benefits, are straight-forward to implement, have broad support, and may have existing funding sources, such as tree planting, energy-efficient lighting, and installing solar on rooftops. For more complex or new policies, some communities systematically prioritize actions based on qualitative and quantitative criteria. Prioritization criteria are summarized in Table 4.

Table 4: Criteria to Prioritize Climate Actions

Option/Criteria	Description
1) Effectiveness	- Potential to reduce greenhouse gas emissions and conserve energy, increase energy efficiency, increase renewable energy, and increase sequestration. - Potential to improve resiliency.
2) Cost	- Availability of existing funding sources, financing, incentives, or partnerships. - Initial cost and savings over time to City or to other stakeholders. - Payback period for return on investment. - Potential to reduce future costs.
3) Feasibility	- Degree of City control to implement action. - Degree of staff time and resources required. - Degree of stakeholder support. - Amount of time needed to implement and achieve results.
4) Health & Equity	- Potential to reduce pollution, exposure to harmful climate extremes, and disease vectors. - Potential to benefit vulnerable community members (children, seniors, non-native English speakers, people with disabilities, low-income, people of color) through community investment, job creation, cost savings, resiliency, health, and safety - Potential to advance equity and reduce disparities.
5) Co-benefits	- Potential to support other City goals and objectives (e.g., housing, mobility, economic development, public safety, environmental restoration, efficient and effective services, safe and livable neighborhoods, stewardship of infrastructure, and informed and engaged residents, etc.). - Potential to reduce maintenance needs and improve worker health and safety.

Qualitative Benefits Assessment

For each action, the City identified important GHG reduction benefits from the technical assessment; including GHG reductions, resiliency, feasibility, health and safety, equity and other local co-benefits that align with Mayor and Council goals (mobility, economic, housing, environment, stewardship of infrastructure, etc.). The qualitative assessment attempts to identify and rank the strengths and weaknesses of the proposed CAP actions, using a Likert scale approach. It is important to recognize that different people can reach different conclusions when assessing the co-benefits (strengths), weaknesses, and feasibility of implementing CAP actions. Still, these assessments highlight important impacts for consideration as the actions move forward in the climate planning process. The following presents a summary of the cumulative qualitative benefits all actions in each category.

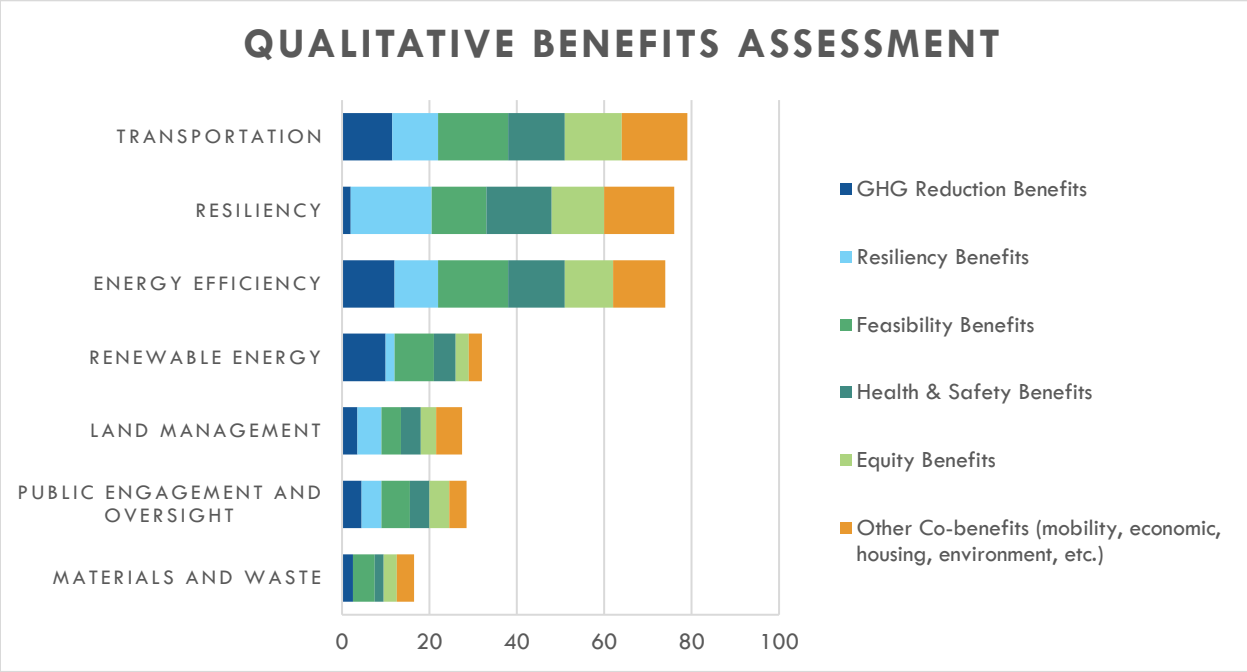
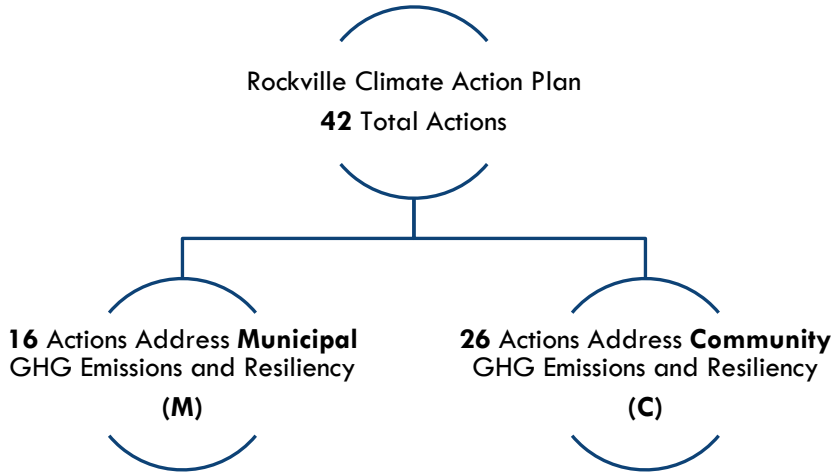


Figure 28: Qualitative Benefits Assessment by Category

Overview of Climate Actions

Rockville's climate actions are based on public input, cost/benefit analysis, and the prioritization tool. The plan includes 42 climate actions within seven categories that are focused on reducing emissions, strengthening resiliency, and developing a framework to oversee and monitor progress. Rockville's climate actions include 26 actions that address community GHG emissions and resiliency and 16 actions that address municipal operations and services to reduce local government GHG emissions and strengthen resiliency.



The City is already taking steps to implement many of these actions; however, additional resources and community involvement are needed to achieve CAP goals. While several actions are beyond Rockville's direct control and may require leadership from federal, State and County agencies, City advocacy and partnerships can support action implementation that leads to broader benefits. Table 5 provides an overview of Rockville's suite of climate mitigation and resiliency actions. Additional background information, benefits, and a detailed discussion of each action and future needs for implementation is included in the following action summarizes. Figure 29 provides an overall legend for how to read the climate action summaries.

Appendix A provides an overall summary of the CAP; outlining anticipated benefits, lead organization, partner organization(s), and preliminary cost estimates for City implementation. Benefits are qualitatively estimated for the overall community. It is important to note that GHG benefits are assessed relative to overall community GHG emissions. Since Rockville's municipal operations contribute a small percentage to overall GHG emissions, municipal actions (delineated with an M in the action number) result in relatively low overall GHG reductions but demonstrate leadership by example.

Given the far-reaching causes and implications of climate change, CAP implementation will impact all departments. The CAP will require City investment in staff capacity (new positions, adjusted positions, and/or training and expanded staff expertise), technologies, capital improvements, updated policies and ordinance, and the development or expansion of programs and services. When possible, some actions include estimates for operating and/or capital budgets. Some estimates include options for low and high levels of service (LOS). The costs for some measures are to be determined based on a variety of external factors, such as market conditions, incentives and other external factors. Additionally, the actions identify governance systems, outreach programs, and tracking and reporting procedures for accountability and progress reports.

Table 5: Rockville Climate Actions

Category	Action ID	Action
Energy Efficiency	C-01	Advocate for Montgomery County to adopt a Building Energy Performance Standard (BEPS) for existing commercial and multifamily buildings
	C-02	Expand the low and moderate income (LMI) home repair and weatherization program to increase energy efficiency, resiliency, and renewable energy opportunities
	C-03	Adopt net zero building codes for new construction
	C-04	Opt into Montgomery County's point of sale energy disclosure (Chapter 40, Real Property, Section 40-13B)
	C-05	Expand the home energy efficiency outreach program to increase participation in utility energy audits and rebates
	C-06	Coordinate with Montgomery County on electrification incentives for existing building systems
	M-01	Complete energy assessments of City facilities and develop a strategic plan to reduce facility energy consumption
	M-02	Convert City-owned streetlights to energy efficient LED (light-emitting diode) (CIP TA22)
	M-03	Advocate for a Pepco-owned streetlight LED conversion agreement that serves the public interest
Renewable Energy	C-07	Advocate to increase the Maryland Renewable Portfolio Standard by 2030
	C-08	Coordinate with Montgomery County on development of the Community Choice Energy Program to aggregate green power purchasing
	C-09	Promote private solar and geothermal installations through the solar co-op program, streamlined permitting, and expanding access to low-to-moderate income residents
	M-04	Identify and install feasible solar photovoltaic systems on City property
	M-05	Purchase renewable energy certificates (RECs) for municipal electricity
Transportation	C-10	Work with WMATA, MDOT, and Montgomery County to maximize transit accessibility and ridership and enhance mobility options
	C-11	Develop a Rockville Community Electric Vehicle (EV) Readiness Plan
	C-12	Require new developments and redevelopments to be electric vehicle-ready
	C-13	Promote a regional electric vehicle purchasing cooperative (EVPC)
	C-14	Expand active transportation and shared micro-mobility network by implementing improvements in the Bicycle Master Plan and Vision Zero Plan
	C-15	Adopt and implement a Pedestrian Master Plan
	M-06	Convert the City fleet to cleaner and more efficient fuel sources
	M-07	Establish a new Capital Improvement Project to expand electric vehicle charging infrastructure on City property to serve employees, fleet and the community
	M-08	Update City teleworking and transportation benefit policies to encourage City employees to reduce vehicle miles traveled (VMT)

Category	Action ID	Action
Land Management	C-16	Implement the Comprehensive Plan to steer the most-dense development/ redevelopment to mixed-use, transit-served locations to reduce VMT and conserve/restore environmental areas
	C-17	Expand education and incentives to support tree planting and maintenance, environmentally friendly landscape conversions, and management of non-native invasive plants on private property
	M-09	Develop a Green Space Management Plan for public lands to assess and restore trees, forests, meadows, stream valleys and wetlands
Materials and Waste	C-18	Develop a food waste composting program for residents
	C-19	Expand residential recycling and waste reduction outreach program to increase compliance and waste diversion
	M-10	Develop a City sustainable procurement policy
Resiliency	C-20	Incorporate climate resilient building and infrastructure design features in new buildings and retrofits
	C-21	Partner with Federal Emergency Management Agency (FEMA) to update the Flood Insurance Rate Maps (100-year floodplain maps) used to implement the National Flood Insurance Program
	C-22	Work with Montgomery County and state agencies to provide cooling centers, resilience hubs, and other services to strengthen community resiliency
	C-23	Work with Montgomery County and community partners to measure and map urban heat islands to mitigate exposure to extreme heat
	C-24	Increase tree planting, green, cool and photovoltaic roofs, and cool pavements on public and private property
	M-11	Continue assessing the vulnerability of Rockville's critical infrastructure, facilities, and services, and prioritize areas for improved climate resiliency
	M-12	Advocate for state and federal authorities to update stormwater infrastructure design, operations and maintenance standards to accommodate new rainfall/ storm event projections and help reduce projected flooding issues
	M-13	Assess Rockville's risk of flooding and develop a Flood Mitigation Plan to reduce or mitigate flooding impacts
	M-14	Develop and implement Heat Illness Prevention Plans for various City services and operations
Public Engagement and Oversight	C-25	Work with community partners to conduct an inclusive public engagement campaign to reduce emissions and adapt to the impacts from climate change
	C-26	Develop metrics and performance indicators for climate actions to establish a data-driven assessment and reporting process
	M-15	Incorporate climate mitigation and resiliency considerations into the City's budget prioritization process
	M-16	Develop an interdepartmental climate action team to implement and track plan progress

Legend for Climate Action Summaries

Category Icon **Action #** **C = Community** **M = Municipal**	**Action**		
Objective	The description of the action objective		
Metrics	Metrics to assess action progress		
Target	Target of action (community/municipal/ residential/commercial, GHG/resiliency)	**Development Stage**	The current stage/status of the action: Ongoing, Proposed, Expansion of existing program, etc.
Lead	Leading organization or department	**City Upfront Cost**	Capital or one-time upfront costs to initiate action
Partners	Partnering organizations	**City Operating Cost**	• Annual operating costs and Full Time Equivalent (FTE) employees required to implement the action. • Includes estimates for low and high level of service (LOS) options • Identifies synergies and resource coordination opportunities with other climate actions.

GHG Benefit*	**Resiliency***	**Feasibility***	**Health***	**Equity***	**Co-Benefits****
+++	N	++	+	-	Economic

*Benefits Legend

Benefits associated with greenhouse gas mitigation, resiliency, feasibility to implement, health, and equity.

+++ = High Benefits
++ = Medium Benefits
+ = Low Benefits
N = Neutral
- = Negative Impact

**Co-Benefits Legend

Co-benefits associated with the action implementation with other City priorities and goals:

- Economic
- Mobility
- Environment
- Housing
- Safe and Livable Neighborhoods
- Stewardship of Infrastructure
- Efficient and Effective Services
- Informed and Engaged Residents
- Good Governance
- Fiscal Responsibility

Narrative describing the action background, intent and resources needed for implementation.

Equity Considerations

Description of equity considerations for each action to be considered during implementation.

Figure 29: Legend for the 42 Climate Action Summaries

Energy Efficiency

Increase energy conservation and efficiency and reduce fossil fuel use in all existing and new buildings and infrastructure. Commercial and residential buildings account for 58% of Rockville's greenhouse gas emissions.

Action C-01 Advocate for Montgomery County to adopt a Building Energy Performance Standard (BEPS) for existing commercial and multifamily buildings

Objective	Improve building energy performance to reduce building energy use intensity and greenhouse gas emissions		
Metrics	% of eligible buildings in compliance, building energy use intensity (kBtu/ft²)		
Target	Community emissions, multifamily and commercial	**Development Stage**	In progress, ordinance introduced to County Council in 2021
Lead	Montgomery County	**City Upfront Cost**	No direct implementation cost; City compliance costs (M-01)
Partners	Public Works (Environment), Pepco, Washington Gas, Planning and Development Services	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+++	+	++	+	-	Economic

Montgomery County's Building Energy Benchmarking Law applies in Rockville and requires owners of nonresidential buildings over 50,000 square feet to benchmark their building energy use and report annually to the County for public disclosure. Currently, approximately 110 properties covering 15 million square feet are covered by the benchmarking law in Rockville (including two City-owned buildings). In May of 2021, the County proposed to change the law's requirements to apply to buildings greater than 25,000 square-feet and phase in additional building types, such as multifamily buildings. If adopted, it would automatically apply in Rockville and the proposed covered buildings in Rockville would increase to 225 properties, covering roughly 28 million square feet.

Additionally, the County proposed to institute a building energy performance standard (BEPS) that requires building owners to make energy efficiency improvements while also giving them flexibility to determine how to achieve these upgrades. Energy and water performance standard compliance could be measured in energy or water use intensity (the amount of consumption per square foot) or greenhouse gas reductions (metric tons of carbon dioxide equivalent). These standards would continually increase in stringency to ensure that existing buildings are set on a path toward decarbonization. The City should coordinate with the County to ensure that once established, new performance standards are consistent with new construction building code requirements, so that newly constructed buildings are set up for success in meeting future performance standards. Finally, several City facilities (e.g., City Hall, 6 Taft Court, Swim and Fitness Center, Senior Center) may be covered under the proposed law and would need to implement building energy efficiency improvements (see M-01 for compliance costs).

Equity Considerations

The County is considering ways to implement the BEPS program to ensure it does not negatively impact income-limited or vulnerable groups, such as small and minority-owned business tenants and affordable multifamily housing. The County will explore ways to provide technical assistance, financial incentives, and/or flexible and affordable compliance pathways.

Action C-02 — Expand the low and moderate income (LMI) home repair and weatherization program to increase energy efficiency, resiliency, and renewable energy opportunities

Objective	Provide funding and support for equitable home energy performance improvement opportunities to reduce building energy use intensity and greenhouse gas emissions, support renewable energy systems, and improve home resiliency		
Metrics	Number of participating homes, energy savings, GHG reduction		
Target	Community emissions, residential	**Development Stage**	Proposed program expansion
Lead	Housing and Community Development	**City Upfront Cost**	-
Partners	Public Works (Environment), Maryland Energy Administration, Pepco, Washington Gas, Housing non-profits	**City Operating Cost**	Low LOS: $100,000 per year +1 FTE High LOS: $250,000 per year +2.5 FTE (includes solar). Shared resources: C-05, C-09, C-20

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	++	++	++	+++	Housing, Economic

Climate change is increasing the incidence of extreme weather events that threaten life and property and deepen socioeconomic divides through its disproportionate negative effects on low-income communities, communities of color, and other vulnerable populations. Climate change is already causing more frequent and extreme heat waves, but many low-income households lack sufficient (or affordable) air conditioning, ventilation, and insulation which increases the risk of heat-related illnesses. The increase in frequency and severity of storms also makes the vulnerable populations more susceptible and less able to recover from flooding, water damage, moisture and mold, poor indoor air quality, loss of power, and storm debris. Ensuring residents live in safe, weatherproof, energy-efficient homes with access to efficient cooling/heating systems will help mitigate climate change disruptions, reduce household energy costs, and produce better health outcomes.

The City can expand existing housing programs to better promote affordable, safe, energy efficient, and resilient housing opportunities. Rockville's Department of Housing and Community Development currently administers the Single-Family Rehabilitation Program, using Community Development Block Grant funding. Under this program, income-eligible Rockville homeowners may apply for forgivable loans to make repairs such as roof replacement, plumbing and electrical upgrades, furnace replacement, and kitchen and bathroom rehabilitation. To meet residents' needs, funds are typically used on the most urgent repairs to meet health and safety standards. The current program has a budget of $263,000 and typically serves approximately seven homes per year using all CDBG funding allocated.

Equity Considerations

Housing programs need to address disparities vulnerable populations face with housing energy burden (% of income spent on energy costs), safety, weatherization, and barriers to renewable energy installations and housing resiliency solutions.

Renters face additional barriers because they do not control properties and landlord retrofit investments are not incentivized because they typically do not cover utilities.

Housing upgrades should also preserve affordability.

The City has already begun to leverage this program to promote energy efficiency and help reduce the burden of energy bills on residents. If more repairs are needed than the current maximum per household cap, the City has partnered with a non-profit receiving funding from the Maryland Energy Administration's (MEA) Low-to-Moderate Income Grant Program to fund repair needs that involve energy and water efficiency upgrades. This program could be expanded to include additional efficient equipment, building envelope sealing, insulation, efficient cooling systems, solar or other renewable energy systems, and help homes become more resilient to heat and severe storms (e.g., cooling systems, drainage). Investment of additional City staff and funding resources into this program could enable the City to tap into more outside funding sources to increase program capacity to support approximately 45 applicants annually, where feasible. Upon researching other communities, the consultant estimated resources needed for program expansion may require:

- Additional staff to administer (2.5 FTE for a program manager and support staff).
- Increase funding for energy weatherization services at an average of $5,000 per home once the maximum from CDBG and State grants are reached. An additional $100,000 could support an additional 20 homes per year.
- Support for the installation of solar systems to promote renewable energy and reduce monthly utility bills, where site conditions allow. This expansion may cost about $15,000 per home for a 5kW system or could work with partners to identify other financing sources. While financing opportunities may be available through Montgomery County's Green Bank; grants or forgivable loans may be more effective at reducing the upfront cost barriers for solar; providing up to $150,000 could support solar installations for approximately 10 homes per year.

The rehabilitation program only addresses single-family homes; meanwhile, public comments in the CAP survey reported additional barriers for residents living in multifamily properties and/or renting. The program should examine ways to include low-income renters, multifamily buildings, or landlords renting affordable units. Program expansion would need to fully investigate models and outside sources of rebates, grants, financing, and State and Federal funds to defray upfront costs and identify opportunities for weatherization upgrades, resilience upgrades, and solar installations that can reduce monthly electric bills without raising rents. Such a program could involve technical assistance, outreach, or grants and incentives. Potential partners include the Housing Opportunities Commission of Montgomery County, Rockville Housing Enterprises (RHE), utilities, the Montgomery County Green Bank, Maryland Solar United Neighbors, and State and Federal agencies.

Action C-03 Adopt net zero building codes for new construction

Objective:	Improve residential and commercial building performance to reduce energy and water use intensity, support renewable energy systems, and improve resiliency		
Metrics:	Number of high-performance buildings constructed		
Target:	Community emissions, residential and commercial	**Development Stage:**	Proposed to phase in by 2030 building code cycle
Lead:	Planning and Development Services	**City Upfront Cost:**	-
Partners:	Public Works (Environment), Montgomery County, Development Community	**City Operating Cost:**	1 FTE/Consulting support; expand staff capacity and training. Shared resources with C-09, C-20

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
++	++	++	+	N	Economic

A net-zero building consumes the amount of energy equal to the amount of energy produced by renewable energy sources calculated over a year. There are a variety of net zero building rating and classification systems. The 2021 International Energy Conservation Code (IECC) includes appendices for both residential and commercial buildings that requires greater efficiency over the base code and onsite or offsite renewable energy production to achieve an Energy Rating Index (ERI) score of zero. Renewable energy compliance may combine onsite power production, energy generated through community renewable energy facilities, and renewable energy purchase contracts or leases.

Montgomery County is proposing to phase in net zero commercial and residential building code requirements by the 2030 building code cycle. The City can align with the IECC's and County's proposals and prepare the development community to transition to new zero construction through gradually strengthened building codes during the 2021, 2024, 2027 and 2030 amendment cycles. More sophisticated codes will require additional plan review and inspection staff or additional training to provide the specialized technical expertise to adopt and administer the codes. Alternatively, consulting technical assistance could support code adoption and compliance. Ensuring building code compliance will also help new buildings comply with future building energy performance standards (C-01).

There are currently incentives for property owners that go beyond base energy and green building codes. For example, Montgomery County provides an energy and environmental design property tax credit for buildings that exceed energy performance standards or achieve green building certifications; this tax credit applies to properties in Rockville.

Equity Considerations

While net zero buildings reduce long term utility costs, upfront costs may pose challenges. Certain types of buildings and owners, such as affordable housing or small businesses, may need technical assistance, financial incentives, or financing tools for building code compliance and construction. Outside resources, such as Montgomery County's Green Bank, may serve financial assistance.

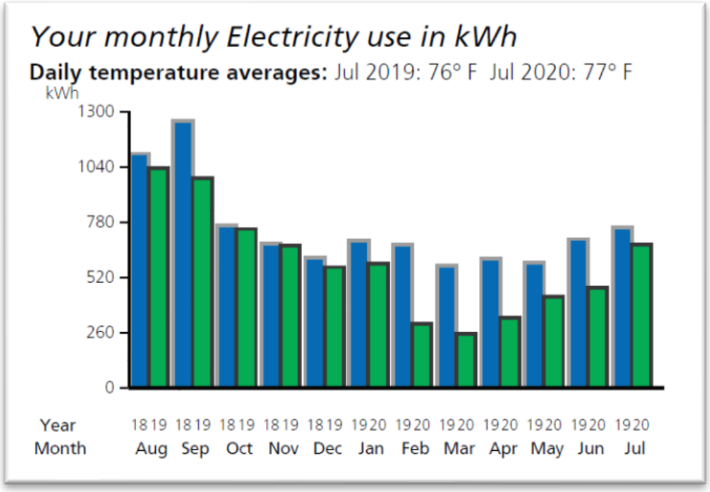
Action C-04 — Opt into Montgomery County's point of sale energy disclosure (Chapter 40, Real Property, Section 40-13B)

Objective	Educate buyers on home energy consumption and costs during the point of sale to reduce building energy use intensity and greenhouse gas emissions.		
Metrics	Milestone/status update		
Target	Community emissions, residential	**Development Stage**	Proposed for FY 2023
Lead	Public Works (Environment)	**City Upfront Cost**	-
Partners	Montgomery County	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	N	+++	N	+	Housing

Montgomery County requires home sellers to provide an energy cost and consumption history, along with information on residential energy efficiency opportunities. The law went into effect January 1, 2009 and applies to owner-occupied single-family homes and condos which are individually metered by electricity or natural gas utilities. Before signing a contract, the seller of the home must provide copies of applicable electricity, gas, and home heating oil bills, or a cost and usage history for the 12 months immediately prior to the sale, unless the home was unoccupied for the entire 12-month period. The seller must also provide a list of resources, energy conservation tools such as Pepco energy incentives and ENERGY STAR® yardstick. This requirement is intended to ensure that the home buyer is informed of the home's energy performance before the sale and provides options to finance future energy efficiency improvements.

This requirement is found within Chapter 40, Real Property, Section 40-13B of the County Code and is. This section currently does not apply in the City of Rockville; however, the City could voluntarily opt into this program by amending Chapter 1-8, Application of County Law. This law is enforced by Montgomery County's Office of Consumer Protection.



Equity Considerations

Utility bill disclosure is intended to ensure that all home buyers are informed of a home's energy performance and utility costs before the sale. This helps inform household budgets and provides options for energy efficiency improvements.

Action C-05	Expand the home energy efficiency outreach program to increase participation in utility energy audits and rebates		
Objective	Educate and incentivize resident participation in utility energy audits, rebate programs, and Montgomery County Green Bank financing resources.		
Metrics	Number of participating homes, energy savings, GHG reduction		
Target	Community emissions, residential	**Development Stage**	Proposed expansion
Lead	Public Works (Environment)	**City Upfront Cost**	-
Partners	Montgomery County, Environment Commission, Nonprofits, Pepco, Washington Gas, Housing and Community Development	**City Operating Cost**	Low LOS: $5,000 per year +.5 FTE (multilingual outreach materials and staff support) High LOS: $15,000 per year +1 FTE (includes City incentives) Shared resources with C-02, C-09

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	++	++	++	Economic, Housing

Expanding home energy efficiency outreach programs to encourage more residents to take advantage of available utility incentives to reduce GHG emissions, improve home comfort, and help residents save money on energy bills. For example, Pepco offers free quick home energy assessments, discounted comprehensive home energy assessments, and rebates on home energy efficiency upgrades. Washington Gas offers rebates to purchase efficient natural gas-powered equipment. The Montgomery County Green Bank also offers financing options that use energy savings to pay back low-interest loans over time. In order to take advantage of these programs residents or contractors must submit various applications, which may be confusing or time-consuming for residents.

The City could better leverage Montgomery Energy Connection, a network of County Government and community partners created to provide customized education on the benefits of energy efficiency, availability of programs and incentives, and opportunities for assistance. It helps residents better understand energy bills and energy use, lower energy bills, and learn about renewables. To amplify its effectiveness, the City could increase outreach in Rockville which would involve funds for staff/outreach contractors and outreach materials. Materials and messaging could also support opportunities under Action C-02 for low-income residential properties. The City could also provide funding to further incentivize uptake of utility incentives to offset the upfront costs for residents.

Equity Considerations

To better serve Rockville's diverse community, multilingual and culturally appropriate outreach programs need to be developed in coordination with trusted community leaders.

Additionally, many community members may not have internet access or use traditional outreach sources. Resources that support community-specific communication modes and face-to-face outreach may be more impactful.

Action C-06 Coordinate with Montgomery County on electrification incentives for existing building systems

Objective	Promote outside technical and financial assistance to help residents and businesses replace fossil fuel building equipment with electric options		
Metrics	Number of participating building, GHG reduction		
Target	Community emissions, residential and commercial	**Development Stage**	Proposed in Montgomery County Climate Action Plan
Lead	Maryland, Montgomery County, Pepco	**City Upfront Cost**	-
Partners	Public Works (Environment), Planning and Development Services	**City Operating Cost**	Shared resources:C-02, C-05

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+++	+	+	+	+	Economic, Housing

Most buildings run on multiple fuels. They use electricity to power lights, refrigerators, air conditioners, and electronic devices. They also consume fossil fuels such as natural gas, propane, or heating oil to power furnaces, boilers, cooking appliances, and water heaters. Building electrification shifts building systems to use electricity rather than fossil fuels for heating and cooking. In a fully electrified home or office, furnaces and boilers that run on natural gas, propane or heating oil can be replaced with ground- or air-source heat pumps. Gas-powered water heaters can be replaced with heat pump water heaters. Gas-powered ovens and burners can be replaced with electric ranges and induction cooktops. Maryland is considering broadening the goals of the EmPOWER program and removing existing barriers to fuel switching to provide incentives for homeowners and building managers. The benefits include reduced on-site fossil fuel combustion, decreased local pollutants, and public health and safety benefits from eliminating combustion of gas and air pollutants inside the home.

The upfront costs for existing building electrification can be challenging. Financial incentives and technical assistance programs may offset the barriers. Montgomery County's Climate Action Plan proposes to help residents and businesses pay for upfront costs and defray the marginal costs associated with fossil fuel equipment replacement, operation, and maintenance through technical assistance and incentives. Electrification incentives may target large equipment, such as space and water heaters, as well as an appliance trade-in program for electric options for other gas appliances, such as stoves and clothes dryers. In addition, a technical assistance program could provide individual guidance to facilitate electrification retrofits for existing commercial and residential buildings and provide design assistance for any major renovations. The City should follow the development of County and State programs and ensure that City mechanical, electrical and plumbing permitting can be streamlined to support the transition to electrification. The program could provide economic benefits through increased demand for local jobs in the building, electrical, and mechanical sectors.

Equity Considerations

The upfront costs of electrification may be a barrier. Programs should ensure that income-limited, vulnerable groups, and small businesses receive priority and eliminate barriers to accessing incentive programs.

Action M-01	Complete energy assessments of City facilities and develop a strategic plan to reduce facility energy consumption		
Objective	Improve municipal building energy performance to reduce energy use intensity and greenhouse gas emissions, support renewable energy systems, and improve resiliency		
Metrics	Facility energy use intensity, GHG emissions		
Target	Municipal GHG emissions	**Development Stage**	Proposed expansion of existing projects
Lead	Recreation and Parks	**City Upfront Cost**	Phased: $11,000/facility for a consultant audit + costs of energy conservation measures. Group: up to 6 for $66,000
Partners	Public Works (Environment), Utilities, Maryland Energy Administration	**City Operating Cost**	0.5 FTE; Shared resources with M-04, M-07, C-22, M-11; Potential long-term savings

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	++	+	+	Efficient and Effective Services, Utility Savings

The City operates a variety of facilities, parks, water and sewer utilities, street and traffic lights, and fleet that consume significant energy resources, costing approximately $3 million annually. Given that electricity accounts for more than 70 percent of energy costs, the Mayor and Council adopted a resolution declaring the City's intent to take a leadership role in reducing electricity consumption and generating renewable energy and partner with the Maryland Energy Administration (MEA) to enroll as a Maryland Smart Energy Community (MSEC). As part of the MSEC program, the City adopted an energy policy for City buildings and operations that establishes a 15 percent electricity reduction goal. The City developed an electricity baseline and continues to plan and implement cost-effective energy projects to reduce energy costs at various sites with a combination of funds from the City, MSEC grants, and utility rebates.

To continue to support the goals of the MSEC program, the CAP, and begin compliance with the County's propose building energy performance standard (C-01), the City can continue to complete building energy assessments and tune-ups of the larger and highest energy consuming facilities, such as the Water Treatment Plant, City Hall, 6 Taft Court, Senior Center, Swim and Fitness Center, Gude Maintenance Yard, and the Police Station. The energy assessments will identify sources of energy waste and the most cost-effective energy improvements that could either be incorporated into modifications to facility operations, future planned equipment replacements, building renovations, or new energy retrofit CIP projects. These assessments also provide the basis for future energy grants and utility incentives. In FY 2021, the City conducted a lighting audit and budgeted $11,000 to conduct an energy assessment of City Hall, one of the City's lower performing buildings. The process identified LED lighting upgrades eligible for a MEA grant and equipment scheduling, occupancy controls, and weatherization improvements eligible for utility rebates and long-term energy savings. This model could be expanded to include assessments and tune-ups of other facilities. This would involve a consultant cost of approximately $11,000/facility; up to $66,000 for a group of six, plus costs for any energy conservation measures. Additional staff support are needed to oversee a consultant, retrofit projects, the various incentives and contribute to other related CAP actions. Depending on available staff resources, this could be phased or a one-time cost.

Action M-02	Convert City-owned streetlights to energy efficient LED (light-emitting diode) (CIP TA22)		
Objective	Convert approximately 3,200 City-owned streetlights to more efficient light emitting diode (LED) fixtures to improve lighting and safety and reduce energy consumption and GHG emissions		
Metrics	Streetlight energy use, GHG emissions		
Target	Municipal GHG emissions	**Development Stage**	Proposed FY 2023
Lead	Public Works (Traffic and Transportation)	**City Upfront Cost**	FY 2023: $1 Million FY 2024/2025 unfunded: $2.2 Million
Partners	Pepco, Maryland Energy Administration	**City Operating Cost**	Savings to be determined, dependent on Pepco rebates and tariffs

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	+	+	+	Safe and Livable Neighborhoods, Stewardship of Infrastructure, Utility savings

The LED Streetlight Conversion (CIP TA22) project provides for the replacement of all remaining City-owned and maintained high pressure sodium (HPS) streetlights (approximately 3,200) with more energy efficient, light- emitting diode (LED) luminaires. This project is partially funded in the CIP. There is currently $1 million budgeted in FY 2023 and a total of $2.2 million unfunded in FY 2024 and FY 2025. Current funding covers replacement of approximately 2,000 non-decorative HPS fixtures. The unfunded portion of this project covers the remaining 1,200 decorative fixtures.

In addition to energy savings and greenhouse gas reductions, the project supports safe and livable neighborhoods through improved lighting quality and stewardship of infrastructure. The project is eligible for rebates through the EmPOWER Maryland incentive program to offset some of the upfront costs. The project amount of maintenance and electricity costs savings is dependent on Pepco's tariff rate for LED fixtures.

Community feedback on this climate action recommended the planning phase for this project consider potential light pollution impacts and be considerate of dark skies, including cutoffs and avoid uplighting. As LEDs are brighter than the City's existing mercury vapor or high-pressure sodium streetlights, project planning should avoid over-lamping or overly blue temperatures which could result in added installation and billing expenses, increased light-pollution, and resident complaints. Planning could involve piloting different light wattages and colors to help tailor the new lighting to meet community needs.

Equity Considerations

Outdoor lighting is important for community safety especially for those who work early or late hours, and depend on transit, walking, rolling, or biking. LED retrofits should prioritize areas that benefit socially vulnerable residents first.

Action M-03	Advocate for a Pepco-owned streetlight LED conversion agreement that serves the public interest				
Objective	Convert approximately 2,925 lighting Pepco-owned streetlights to more efficient light emitting diode (LED) fixtures to improve lighting and safety and reduce energy consumption and GHG emissions				
Metrics	Streetlight energy use, GHG emissions				
Target	Municipal emissions		**Development Stage**	PSC review of Pepco proposal/rate case	
Lead	Pepco, Maryland Public Service Commission (PSC)		**City Upfront Cost**	-	
Partners	Public Works (Traffic and Transportation)		**City Operating Cost**	To Be Determined, dependent on Pepco rebates and tariffs	
GHG Benefit	**Resiliency**	**Feasibility**	**Health**	**Equity**	**Co-Benefits**
+	+	+	+	+	Safe and Livable Neighborhoods, Stewardship of Infrastructure

The City is currently billed by PEPCO for approximately 2,925 streetlights owned and maintained by PEPCO. PEPCO streetlights in Rockville are primarily overhead cobra head-style fixtures with mercury vapor or high-pressure sodium light sources. The City spends more than $700,000 annually on PEPCO utility bills serving our combined streetlight network. PEPCO proposed a Multi-Year Plan (MYP) (PSC case No. 9655) in 2020 that included a Smart Streetlight Initiative to replace fixtures with LED technology.

On the surface, upgrading streetlights would appear to reduce energy usage, modernize the system to reduce operating and maintenance costs, and improve visibility for all transportation corridor users. However, this is an important initiative with long lasting impacts on infrastructure, budgets, and rate payers. The Mayor and Council submitted comments on Potomac Electric Power Company's Application for an Electric Multi-Year Plan – Case 9655 in May of 2021. The City should continue to advocate for the Maryland Public Service Commission to require PEPCO to design a retrofit program that serves the public interest.

Renewable Energy

Increase the generation, use and access to affordable, reliable and clean energy systems. Low-carbon energy sources such as wind, solar, and geothermal are key to a climate-friendly future.

Action C-07 Advocate to increase Maryland Renewable Portfolio Standard by 2030

Objective	Advocate the Maryland Legislature to increase the Renewable Portfolio Standard (RPS) by 2030		
Metrics	% renewable energy		
Target	Community emissions, residential and commercial	**Development Stage**	Monitor legislation for proposed bills
Lead	Public Works (Environment)	**City Upfront Cost**	-
Partners	Environment Commission	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+++	N	+	+	To Be Determined	Environment

The electricity consumed in Rockville is primarily generated by a mix of fossil fuel (coal and natural gas) and nuclear resources. A renewable portfolio standard (RPS) is a regulatory mandate to increase production of electricity from renewable sources such as wind, solar, biomass and other alternatives to fossil and nuclear electric generation. The most straightforward approach to cleaning the electric grid is to require utilities providing electricity in the Maryland to generate electricity from renewable sources.

The current Maryland RPS requirement sets to increase the percentage of renewable energy to 50 percent by 2030. Fuel sources approved by Maryland's RPS are divided into two categories, Tier 1 and Tier 2. Tier 1 includes solar, wind, qualifying biomass, methane from a landfill or wastewater treatment plant, geothermal, ocean, fuel cell that produces electricity from a Tier 1 source, hydroelectric power plants of less than 30 MW capacity, poultry litter-to-energy, waste-to-energy, and refuse–derived fuel. Tier 2 includes hydroelectric power other than pump storage generation.

Supporting an increase in a cleaner electric grid is a crucial step in meeting the emissions reduction goals of the State, County and City. Rockville has a historically advocated for changes in Maryland's RPS and has recommended Legislative Action Requests (LARs) for the Maryland Municipal League (MML) to prioritize engagement in climate policy initiatives, such as renewable energy. The city can continue to monitor legislation and lobby for bills that increase the RPS from Tier 1 resources that are carbon-free, such as solar and wind.

Equity Considerations

The State will need to balance the costs and percent of renewables in the electricity mix. If there is a premium associated with offering a higher level of renewable electricity, the State will need to consider ways to offset the premium for low-income residents.

Action C-08 Coordinate with Montgomery County on development of the Community Choice Energy Program to aggregate green power purchasing

Objective	Increase the percent of renewable energy in the energy supply serving Rockville residents and businesses.		
Metrics	Aggregate green power purchased (% green power, kWh)		
Target	Community emissions, residential and commercial	**Development Stage**	House Bill 768 adopted in 2021; monitor program development in 2023.
Lead	Maryland Public Service Commission, Montgomery County	**City Upfront Cost**	-
Partners	Public Works (Environment)	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+++	N	++	N	To Be Determined	Environment

The electricity consumed in Rockville is primarily generated by a mix of fossil fuel (coal and natural gas) and nuclear resources. As Maryland's Renewable Portfolio Standard (RPS) only requires 50% renewable energy by 2030, the City will need to look at other options to reduce its electricity-related greenhouse gas (GHG) emissions. An "opt-out" Community Choice Energy (CCE) program would allow Montgomery County to purchase renewable energy on behalf of electricity customers in the County (including Rockville).

The CCE program would allow the County to aggregate the electric loads of residents and small businesses to negotiate more favorable terms with an electricity supplier or enable the direct purchase of power from a renewable generation source. In a CCE program, the electricity of participants would continue to be distributed by Pepco, which serves Rockville. However, the CCE program would enable the County to choose an electricity supply that is greener than the default service. An opt-out CCE program would replace the basic service offered by Pepco, and residents and businesses would need to opt out if they did not want to participate. Through a CCE program, important energy decisions can be made at the local level rather than by an investor-owned utility or a for-profit competitive electricity supplier. In addition, a CCE program could potentially deliver price stability and cost savings to residents and small businesses.

The Maryland General Assembly adopted House Bill (HB) 768 during the 2021 session, which gives Montgomery County the right to create a CCE program. Regulations governing the implementation of the program will be developed by the Public Service Commission (PSC), and a County CCE program could begin no earlier than December 31, 2023. The City will need to monitor program development during this time.

Equity Considerations

The County will need to balance the costs and percent of renewables in the electricity mix. If there is a premium associated with offering a higher level of renewable electricity, the County will need to consider ways to offset the premium for low-income residents.

Action C-09	Promote private solar and geothermal installations through the solar co-op program, streamlined permitting, and expanding access to low-to-moderate income residents		
Objective	Increase local renewable energy installations		
Metrics	Number of installations		
Target	Community emissions, residential and commercial	**Development Stage**	Proposed expansion
Lead	Public Works, Planning and Development Services, Housing and Community Development	**City Upfront Cost**	-
Partners	Montgomery County, Non-profits, Montgomery County Green Bank	**City Operating Cost**	To Be Determined Cost-share with C-02, C-03

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
++	+	++	N	+	Economic, Environment

One way to reduce reliance on fossil-fuel based electricity is to increase the number of on-site solar photovoltaic (PV) and geothermal systems on private property. Especially with the increase in electricity demand from vehicle and building electrification, on-site renewable energy is needed to augment grid-based renewable generation to meet demand. To do this, a combination of voluntary measures and code requirements is needed. The City has issued approximately 750 electric permits for solar systems. Recognizing that not all homes and businesses are prime candidates for solar due to orientation, shading, trees, and structural concerns, the greenhouse gas reduction pathway has a conservative goal of 1,800 solar installations.

- **Voluntary program outreach.** The City should continue to support regional solar co-op programs that promote education, existing incentives, tax credits and financing resources. Since 2015, Rockville has participated in six solar co-ops to help residents install solar on their homes. In 2020, the co-op model expanded to help residents install solar and Level 2 electric vehicle charging stations. The solar co-op model helps residents better understand the process of going solar and leverages group buying power to get discounted prices. While each participant signs an independent contract with the installer for their own system, pooling together to purchase larger quantities reduces the total cost of installation for both the group and individuals.
- **Building code and permits.** The City's building code could require all new developments to install solar or meet solar-ready requirements, subject to appropriate and well-defined exemptions (ex. trees and shading from nearby buildings, rooftop space availability). A net-zero energy code requirement (C-03) would further support both energy efficiency and renewable energy installations. Additionally, the site plan and permitting process for solar canopies over parking lots could be streamlined to facilitate new installations.

Equity Considerations

Renters, multi-family, and income restricted property owners typically do not have easy access to on-site renewable energy. Programs should be designed to help those with less means to be better positioned to work through the process of procuring renewable energy systems and accessing financial incentives.

- **Incentives and Financing**: The City can work with community partners to identify financing opportunities. For example, Montgomery County Green Bank offers additional financing assistance for residential and commercial property owners to install renewable energy systems (solar photovoltaic, geothermal, and energy storage). Montgomery County's Climate Action Plan also identifies the needs for solar incentives, such as tax credits and grants, to reduce the upfront financial barriers to solar installations.
- **Low and moderate income and small business opportunities:** Some property owners, residential and commercial, need more information and assistance to install solar. Strategies to connect residents, landlords, and commercial property owners with low-income programs as part of Action C-02. The program could be designed to work with the County and local communities to help guide stakeholders towards the appropriate financing strategies and connect them with others who have installed solar or geothermal to help mentor them through the process.

Action M-04	Identify and install feasible solar photovoltaic systems on city property		
Objective	Increase local renewable energy generation, reduce reliance on the electric grid, and reduce electricity costs.		
Metrics	Number of installations; installed renewable energy capacity		
Target	Municipal emissions	**Development Stage**	Proposed
Lead	Recreation and Parks	**City Upfront Cost**	Pending MEA study. A solar power purchase agreement (SPPA) provides access to solar with no to low upfront costs
Partners	Public Works (Environment), solar contractor/developer, Maryland Energy Administration	**City Operating Cost**	Contract management support. The SPPA requires the purchase of electricity for the term of the contract

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	+	N	N	Environment, Economic

The City's annual electricity bills cost more than $2 million annually. Installing solar photovoltaic (PV) panels on City property only generate clean renewable energy, reduce reliance on the electric grid, and reduce energy costs.

In 2012, the City coordinated with the U.S. Environmental Protection Agency (EPA) and a solar consultant to screen 18 City facilities and assess the technical, operational, and economic feasibility of solar. The study identified barriers at 14 facilities, including roof age, size, orientation, and structural conditions. The study identified four sites as potential candidates for solar installations under a solar power purchase agreement (SPPA) that could generate long term savings on electricity bills: Gude Maintenance Facility, Swim and Fitness Center, Thomas Farm Community Center, and Mattie Stepanek Park and recommended installing solar canopies over existing parking spaces to generate electricity without sacrificing valuable real estate, parking, and open space. While the 2012 study identified potential feasible locations for solar and provided general system estimates, the study did not include actual system designs, detailed specifications, or system cost estimates. Upon further site evaluation and public outreach, constraints were identified at Thomas Farm Community Center (natural gas easement), Mattie Stepanek Park (potential future school), and the Swim and Fitness Center (tree canopy and roof structure).

In 2015, solar planning efforts for the Gude Maintenance Facility encountered a barrier with adjustments to parking lot greenspace and landscaping zoning requirement that prevented the project from moving forward. Since that time, new technologies and codes have evolved to reduce barriers to implementation. While other commercial properties in the region have received site plan and permits for solar canopy installations, Rockville may need additional changes to the Zoning ordinance and landscape requirements to provide flexibility for solar canopy installations. These changes may allow the City to revisit the solar canopy proposal. Additionally, the City received a grant for solar technical assistance from the Maryland Energy Administration in 2021 to evaluate solar and resiliency options for 6 Taft Court and adjacent properties. The study is underway and will determine the feasibility of installing solar to serve this new

facility. The City should consider renewable energy options in other future projects and renovations, including roof, solar canopies, and ground mount installations.

Several jurisdictions, such as Montgomery County, M-NCCPPC, and Montgomery County Public Schools have utilized a solar power purchase agreement (SPPA) to install solar on government facilities with low or no upfront installation costs. A SPPA is an arrangement in which a third-party developer installs, owns, and operates a renewable energy system, and a host customer (the City) agrees to site the system on its property and purchases the system's electric output from the owner for a predetermined period. This arrangement would allow the City to install solar with no or low upfront cost and to receive stable and lower-cost electricity, while the developer receives income from the sale of electricity as well as the tax credits and renewable energy credits from the projects. Some government SPPA contracts include a cooperative rider clause, which may provide favorable pricing opportunities.

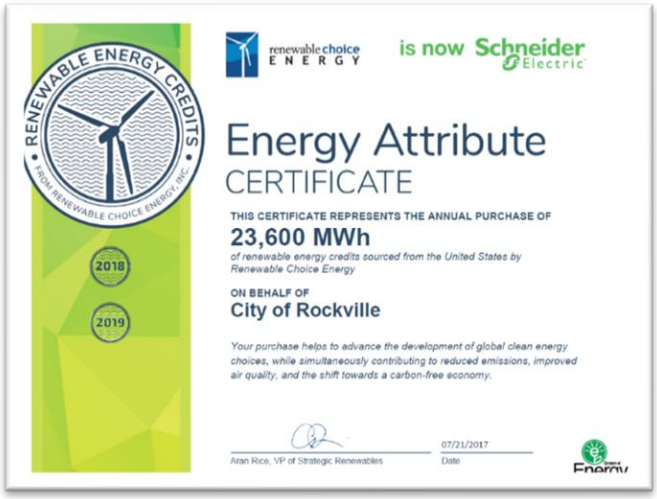
Action M-05	Purchase renewable energy certificates (RECs) for municipal electricity		
Objective	Support demand for renewable energy systems and offset 100% of municipal emissions from clean, renewable energy sources		
Metrics	Percent of green power purchase for municipal electricity		
Target	Municipal emissions	**Development Stage**	Ongoing
Lead	Montgomery County	**City Upfront Cost**	-
Partners	Public Works, Recreation and Parks	**City Operating Cost**	Approximately $20,000 to $85,000/year (fluctuates with market conditions)

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	N	++	N	N	Environment

Renewable energy certificates (RECs) monetize the environmental benefits of clean energy that a generator produces from a clean, renewable source (such as wind or solar) and transmits to the power grid. Purchasing RECs creates the demand for more renewable energy, adding clean power to the electricity grid and decreasing the amount of electricity and emissions generated from fossil fuels.

Since 2004, Montgomery County has led a coalition of Montgomery County agencies, to purchase electricity supply generated from clean national wind energy. Current participants include Montgomery County Government, Montgomery County Public Schools, Montgomery College, the Maryland National Capital Park and Planning Commission, Chevy Chase Village Section 5, City of Takoma Park, Town of Kensington, the Town of Somerset, the City of Rockville, the City of Gaithersburg, and the Washington Suburban Sanitary Commission. The County, and most of its purchasing partners, have consistently increased their purchases of clean energy. All agencies are purchasing greater than 20% of electricity consumption with the majority graduating to a 100% commitment.

In FY2021, the City purchased wind RECs to offset the GHG emissions from 100% of the electricity used by its municipal facilities, utilities, and operations. The City's annual electricity bills cost more than $2 million annually. Traditionally the cost to purchase RECs to offset 100% of municipal electricity was less than $20,000 and was offset through competitive electricity supply contracts that provided savings over the standard-offer service rates from the local utility. However, recent market volatility has increased this price to $85,000. Given the unexpected high price of wind RECs, the County is leading a cooperative purchasing effort to explore pricing for alternative products that meet Tier 1 Renewable Energy Credits and will be providing updated cost estimates for member jurisdictions.


renewable choice ENERGY is now Schneider Electric

RENEWABLE ENERGY CREDITS

Energy Attribute CERTIFICATE

THIS CERTIFICATE REPRESENTS THE ANNUAL PURCHASE OF

23,600 MWh

of renewable energy credits sourced from the United States by Renewable Choice Energy

ON BEHALF OF

City of Rockville

Your purchase helps to advance the development of global clean energy choices, while simultaneously contributing to reduced emissions, improved air quality, and the shift towards a carbon-free economy.

Aran Rice, VP of Strategic Renewables

07/21/2017

Date

Transportation

Expand safe, efficient, affordable, and equitable multi-model transportation options that utilize clean and efficient energy sources and reduce reliance on vehicles. Transportation accounts for 36% of the City's greenhouse gas emissions.

Action C-10 — Work with WMATA, MDOT, and Montgomery County to maximize transit accessibility and ridership and enhance mobility options

Objective	Maximize the use and value of transit assets and services to reduce transportation GHG emissions		
Metrics	Transit ridership		
Target	Community transportation emissions	**Development Stage**	Ongoing
Lead	Montgomery County, WMATA, MDOT	**City Upfront Cost**	Costs included in various projects and programs
Partners	Public Works (Traffic and Transportation), Planning and Development Services	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
++	+	+	+	+	Mobility, Economic, Environment

For many, the transit system is a crucial means for accessing employment, shopping, and services. To reduce transportation emissions and congestion, mode shifting to transit and active (walking, bicycling, rolling, etc.) will be necessary to reduce private vehicle use. Rail and bus transit service is a crucial part of Rockville's transportation system, providing mobility across the city and access to the region. Rockville is served by a variety of transit services that can be improved to increase mobility and encourage ridership.

A variety of transit options run in and through Rockville, including Amtrak, MARC trains, Metrorail, Metrobus, RideOn, and paratransit. Transit services are primarily operated by WMATA and Montgomery County, these agencies are exploring transitioning to technologies, such as electric buses, to reduce emissions. The City of Rockville offers a senior citizen bus service that can be used to transport Rockville residents 60 years of age and older to the Senior Center and to shopping destinations within the city. The City will explore electrification options for this bus service, as discussed in action M-06.

Rockville can also encourage more transit use through regional partnerships to advocate for funding and improvements to local stops and stations, transit information, accessibility, and integrative wayfinding to reduce transportation GHG emissions. The Bicycle and Pedestrian Master Plans (C-14 and C-15) support this action. Rockville 2040 Comprehensive Plan includes several policies to maximize the use and value of transit assets and services (Goal #3), including:

Equity Considerations

Prioritize access and bus stop improvements in low income and communities of color. Ensure equitable or improved service levels for high social vulnerability neighborhoods. Work with partners to provide transportation information in a variety of languages and forums to meet people where they are.

- Policy 6: Actively support the transit services provided by WMATA, Montgomery County government, the State of Maryland, and Amtrak.
- Policy 7: Advocate for MDOT MTA to expand MARC commuter rail service with midday and reverse commute service, and off peak and Saturday service at the Rockville transit station.
- Policy 8: Improve bus service, stops, and shelters in Rockville.
- Policy 9: Redesign and reconstruct the Rockville transit station as a 21st century multi-modal transit hub.
- Policy 10: Improve the Twinbrook transit station as an enhanced asset for the community.

Rockville should identify approaches to advancing these policies and implementing the actions listed under them in the 2040 Comprehensive Plan. Actions revolve around advocacy for funding and service improvements and collaboration with the transit service agencies on a suite of improvements. Actions include Rockville local projects such as pathway improvements, planning for Bus Rapid Transit, and redesigning metro stations and enhancing surrounding land use planning to improve access, comfort, safety, and information regarding transportation choices and programs to promote and incentivize transit use to maximize cost efficiency and environmental quality. These approaches, along with Action C -16 (implement 2040 Comprehensive Plan to steer the most-dense development/redevelopment to mixed-use, transit-served locations) are needed for the 2040 Comprehensive Plan implementation.

Action C-11 Develop a Rockville Community Electric Vehicle (EV) Readiness Plan

Objective	Expand electric vehicle charging infrastructure equitably across the city		
Metrics	Number of permits for electric vehicle charging station installations (public and private)		
Target	Community transportation emissions	**Development Stage**	Proposed
Lead	Public Works (Environment and Traffic and Transportation)	**City Upfront Cost**	One time consulting services: $100,000
Partners	Planning and Development Services, Recreation and Parks	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	++	+	+	Mobility, Economic, Environment

As of June 2021, there were approximately 1,068 electric vehicles and 440 plug-in hybrid vehicles registered in Rockville zip codes and 103 public charging station ports (Level 2 and Level 3) listed by ChargeHub. While the pace of electric vehicle (EV) adoption is accelerating, Rockville will require an extensive network of electric vehicle charging infrastructure to support transportation GHG emissions reductions goals. Additionally, EVs could have widespread impacts on the community and change everything from simple parking space requirements for new developments; retrofits of existing buildings, parking lots and on-street parking; and creating economic growth opportunities.

Although private companies and many homeowners will continue installing stations on their own, cities will face pressure to install publicly available chargers that ensure all neighborhoods, housing types, and renters have access to charge vehicles. Therefore, many communities are in the process of developing electric vehicle readiness plans to identify strategies and foster policies and programs to support widespread and equitable access to electric vehicles and charging infrastructure.

EV readiness plans develop a roadmap that anticipate the electric vehicle charging infrastructure needs of residents, workforce members, and visitors as electric vehicles become more mainstream. An EV readiness plan would evaluate the logistical issues involved in expanding EV infrastructure and involve a one-time consultant cost for plan development, estimated to be approximately $100,000. The City could also explore options for grants and technical assistance to support plan development.

Equity Considerations

Ensure equitable access to charging infrastructure for a range of buildings and ownership types, neighborhoods, and socio-economic classes.

Ensure people who do not own their own homes can still find a place to charge their vehicles.

Deploy EVs and infrastructure in traditionally underserved communities to improve areas with limited access and poor air quality.

Plan elements may include, but are not limited to:

- Evaluate projections for current and future demand for electric vehicle charging infrastructure.
- Recommend locations for publicly-accessible charging infrastructure with integration into a broader regional electric vehicle charging infrastructure network.
- Evaluate strategies to help residents access charging, especially if they live in multifamily dwelling units, townhouse communities without garages, and single-family homes with limited driveway or alley access.
- Recommend charging infrastructure options, including hardware, business ownership, and operation models, interoperability, and operations and maintenance solutions.
- Review the City's zoning and building codes, permitting, and inspection requirements and processes to recommend updated language to promote and anticipate electric vehicle charging needs, including ADA accessibility.
- Recommend policies, approaches, and synergies for locating electric vehicle charging infrastructure at businesses, multi-unit dwellings, single-family homes, rights-of-way, and other locations.
- Identify opportunities to streamline permitting, including updating applicable codes (i.e., zoning, forest and tree protection ordinance, stormwater, building codes) with the guidance and flexibility needed to resolve conflicts between community goals (i.e., residential electric vehicle charging vs. stormwater controls) on a case-by-case basis.
- Identify funding and financing strategies available through federal, state and utility programs.

The EV Readiness Plan could also identify charging station locations for City property (M-07) and support the electrification of the City fleet (M-06). The EV Readiness Plan should mutually support and integrate with other City plans and policies such as the Comprehensive Plan, small area plans, Bicycle and Pedestrian Master Plans (C-14 and C-15). The plan may also consider special charging or space needs of other e-micro-mobility services, such as electric bicycles and scooters.

Action C-12 Require new developments and redevelopments to be electric vehicle-ready

Objective	Implement measures to expand electric vehicle charging infrastructure equitably across the city as part of the development process		
Metrics	Number of permits for electric vehicle charging station installations (public and private)		
Target	Community transportation emissions	**Development Stage**	Proposed during building code update for 2021 ICC
Lead	Planning and Development Services	**City Upfront Cost**	-
Partners	Public Works (Engineering, Environment, Traffic & Transportation)	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	N	++	N	+	Mobility

Installing electric vehicle supply equipment (EVSE) is much easier during development than it is after construction is completed. It is more expensive and challenging for property owners to go back and install wiring, ensure electric loads are suitable, and provide for universal access after a building and parking lot is constructed. For this reason, the International Code Council (ICC) approved changes to building standards in 2020 that functionally will make new homes "EV-ready." For a single-family home, that means installing the proper panels, outlets and conduits — essentially everything short of the actual charger. For multi-family buildings, the code calls for two "EV-ready" parking spots, while making more spots "EV-capable," meaning they can be more easily retrofitted with a 240V outlet. The new EV-ready provisions will appear in the 2021 International Codes. Upon State adoption, jurisdictions typically have up to a year to adopt the latest standards.

In addition to code requirements, the City can assess the Zoning ordinance for changes needed to support electric vehicle charging stations in residential and commercial areas including parking lots and gas stations. This effort should standardize permitting and inspections to streamline procedures and minimize costs for EVSE installation in new construction and retrofits, including, but not limited to:

- Classify EVSE installation as a "minor" amendment to the site plan;
- Provide a permitting template and online permitting application; and
- Ensure a clear and efficient inspection process.

Action C-13 Promote a regional electric vehicle purchasing cooperative (EVPC)

Objective	Increase electric vehicle adoption to reduce GHG emissions		
Metrics	Number of electric vehicles registered in Rockville zip codes		
Target	Community transportation emissions	**Development Stage**	COG issued RFP in 2021
Lead	COG, Montgomery County	**City Upfront Cost**	-
Partners	Public Works (Environment)	**City Operating Cost**	Utilize existing sustainability outreach resources

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
++	N	++	+	+	Mobility, Economic

To support the transition from internal combustion on-road vehicles to battery electric vehicles (EVs), regions need to expand the network of charging infrastructure and foster market adoption of EVs. A regional electric vehicle (EV) purchasing cooperative (EVPC) would seek to educate the community about EVs and leverage the collective buying power to negotiate and obtain discounts on EV purchases or leases. In 2021, the Metropolitan Washington Council of Governments (COG) issued a request for proposals to support a pilot EVPC program in Montgomery County to help consumers become more comfortable and willing to purchase EVs in the region, through cooperative purchasing designed to reduce the cost of vehicles. Specific goals of the proposed County program include:

- Reduce transportation sector emissions, thus making progress in achieving regional GHG emission reduction goals for a healthier, equitable, and resilient community.
- Make electric vehicles more accessible to interested parties, in particular with education, financing opportunities, and more equitable access for low-income residents who have historically been left out of similar technology initiatives.
- Work with local car dealerships to develop favorable pricing schedules in return for certain quantities of purchases/leases.
- Market, advertise and conduct community engagement.

A successful EVPC would increase the scale and rate of EV adoption in the area and generate more EV sales for local car dealerships. MWCOG anticipates this first pilot program will run through March 2022, with options for an extension. The City could partner with COG and the County to promote the program to residents through education opportunities and outreach, similar to the model used by the successful solar co-op program.

Equity Considerations

The program should identify ways to make EVs more accessible to all, particularly to lower-income residents and others who have historically been left out of similar technology initiatives.

Action C-14 — Expand active transportation and shared micro-mobility network by implementing improvements in the Bicycle Master Plan and Vision Zero Plan

Objective	Increase bicycle, rolling, walking, scooter, bikeshare and e-bikeshare, etc. trips in place of vehicle trips by improving facilities, user comfort, accessibility, and safety.		
Metrics	Milestone/Status update, miles of bike pathways		
Target	Community transportation emissions	**Development Stage**	Plan implementation
Lead	Public Works (Traffic and Transportation)	**City Upfront Cost**	Cost included in various transportation projects
Partners		**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
++	+	++	++	++	Mobility, Safety, Economic

Rockville can reduce GHG emissions and improve mobility by promoting opportunities to replace vehicle trips with bicycle, rolling, walking, scooter, bikeshare and e-bikeshare, etc. trips through improvements to infrastructure and user comfort, accessibility, and safety. The City has several policies and plans that support this goal, including the Comprehensive Plan, Complete Streets Policy, Bicycle Master Plan and Vision Zero Plan. The proposed Electric Vehicle Readiness Plan (C-11) could also support e-bike or e-scooter charging and space needs.

Implementing the Transportation Element in the Comprehensive Plan, particularly Goals 1, 2, and 5 will have the ancillary benefit of reducing greenhouse gases as well as providing more options for exercise and fresh air as residents and visitors travel to work, home, retail, or entertainment. Implementing Complete Streets upgrades, the Bicycle Master Plan, pedestrian and sidewalk amenities, and Vision Zero Plan all help create a safer, more convenient, and inviting active transportation system. Completing connections between potentially high-use routes following the County's bicycle stress mapping concepts could help prioritize improvements. Implementing upgrades in areas with higher social vulnerability will also help increase equity to meet resident needs. Other community benefits of increased bicycling and walking include health and fitness and economic development. Having these facilities is one way to attract residents, businesses and employees who are looking for a high quality of life. The concepts of universal design reflected in Complete Streets can also improve mobility for people with disabilities, the elderly, youth, and other people who do not drive or prefer alternatives.

Equity Considerations

Care should be taken to ensure that all neighborhoods have access to high quality walking, rolling, and bicycling routes and shared micro-mobility network. Work with the micro-mobility companies to provide subsidized or free access for low-moderate income residents. Conduct outreach to communities of color to broaden user diversity.

Action C-15 Adopt and implement a Pedestrian Master Plan

Objective	Improve overall infrastructure to encourage and increase walking/rolling to reduce vehicle miles traveled and GHG emissions		
Metrics	Milestone/Status update		
Target	Community transportation emissions	**Development Stage**	Proposed FY22/23
Lead	Public Works (Traffic and Transportation)	**City Upfront Cost**	
Partners	Community stakeholders	**City Operating Cost**	To Be Determined

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	++	++	++	Mobility, Safety

Rockville's Comprehensive Plan recommends developing and implementing a Pedestrian Master Plan to improve the city's overall infrastructure to encourage and increase walking and rolling as an equitable form of transportation. Through the continued support of the pedestrian experience, the plan will identify steps toward fulfilling its goals of increasing safety, reducing impact on the environment, promoting healthier lifestyles, and providing opportunities for all residents. In addition to providing public health, safety and mobility benefits, this action supports the reduction of local GHG emissions from transportation by displacing vehicle miles traveled. The Plan will enable residents and visitors to walk or roll safely, comfortably, and directly for recreational, economic, and social purposes by:

- Identifying ways to improve the city's overall infrastructure, ensure accessibility, and encourage and increase walking/rolling;
- Constructing pedestrian infrastructure to expand the network and provide connectivity;
- Recommending methods to improve and maintain pedestrian infrastructure for safe and barrier-free movement; and
- Emphasizing the safety, ease, accessibility, and benefits of walking/rolling in Rockville.

Elements of the plan may include improved transit wayfinding, ADA-compliant furniture and facilities, complete sidewalks, pedestrian-scale lighting, landscaping and street trees, and parking for bikes and other wheeled, non-vehicular modes. The plan should consider the potential impacts of climate change on the pedestrian/rolling experience and how to best protect health and safety (e.g., high heat events, extreme weather).

Equity Considerations

- Ensure equitable across all communities and socio-economic classes.
- Provide safe walking and rolling access to all neighborhoods bus stops; early and ample investment to neighborhoods with the greatest need; and proactive outreach to communities at every stage of the process to ensure recognition and appreciation of various perspectives.

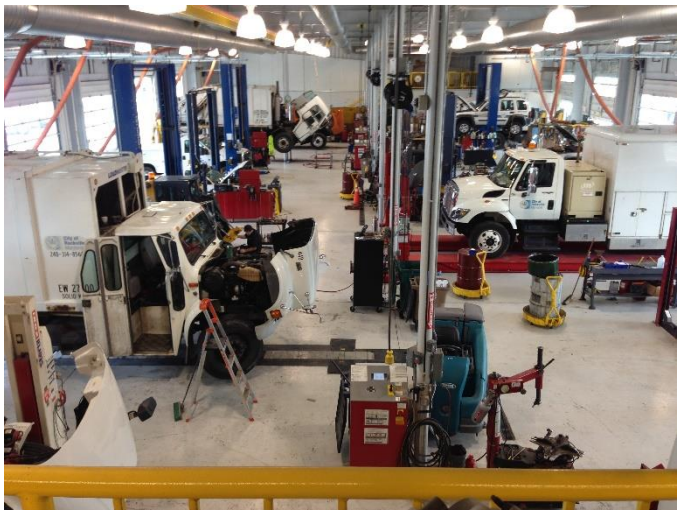
Action M-06 Convert the City fleet to cleaner and more efficient fuel sources

Objective	Transition fleet to low/zero emissions vehicles, beginning with electrification opportunities.		
Metrics	Percent of fleet that are ultra-low emission vehicle (ULEV), gallons of gasoline and diesel fuel consumed; average fuel efficiency of fleet, fleet GHG emissions		
Target	Municipal transportation emissions	**Development Stage**	Proposed FY2023 – FY2035
Lead	Public Works (Fleet and Environment)	**City Upfront Cost**	See M-07
Partners	All departments	**City Operating Cost**	Ranges from $15,000/year to $175,000+/year for heavy duty; staff training costs; potential long-term savings in operations and maintenance

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	++	+	+	Environment

Rockville seeks to operate a safe and efficient fleet that meets service delivery needs, reduces the cost of operation, contributes to healthy air quality, and reduces greenhouse gas emissions. Over the next decade, transitioning City vehicles to electric where feasible, and other low/zero emission technologies is important to meeting these goals. Fleet Management operates at a single maintenance facility with a fueling station at the Gude Maintenance Facility and manages approximately 294 vehicles; including 93 police and parking or code enforcement vehicles, 114 public works vehicles including refuse trucks, leaf collection vehicles, water and sewer maintenance vehicles, street service vehicles, and stormwater facility service vehicles, 60 vehicles used for parks, recreation, and facilities, and 27 other vehicles used for inspections, community services, and other city travel needs. While the City currently operates one hybrid vehicle and one battery electric vehicle, City leadership is needed to expand the proportion of alternative fuel vehicles in the fleet in a cost-effective manner while continuing to meet the public's high service standards.

Given Rockville's compact size of 13.57 square miles, the fleet primarily operates under low annual mileage and city driving conditions, which makes the economics of transitioning to alternative fuels economically challenging. Transitioning to all-electric vehicle fleets for light and heavy-duty vehicles requires thoughtful long-term planning and the ability to tap into incentives to facilitate the transition. In 2020, Rockville was among four jurisdictions awarded fleet technical assistance through the Maryland Energy Administration's (MEA) Clean Fuels Technical Assistance (CFTA) Program. A consultant completed a high-level fleet assessment to



identify a list of potential vehicles where the mileage, use, and cost savings may be suitable for electrification. The consultant also factored in special operating considerations. For example, police vehicles incur the highest annual mileage in the fleet but need to be able to respond to any type of emergency with uncompromised functionality. Police vehicles often need to run for extended times with additional in-vehicle equipment to perform their duties. Some other types of vehicles have dual purposes and need to have the ability to be deployed quickly and to be in operation for extended periods of time to meet emergency needs. For example, several pick-up trucks are also used for snow plowing which require 4-wheel drive (4WD) and around-the-clock operations following large snowstorms.

First, the consultant reviewed all 294 on-road vehicles eligible for replacement between FY 2021 through FY 2035 and developed the following electrification recommendations based on **mileage, use, and potential cost savings during the vehicle's tenure with the city**. Due to unique operating needs, emergency vehicles for police patrol and pursuit were not recommended eligible for electrification in the study. Police and Fleet are monitoring the availability and performance of pursuit rated BEVs or PHEVs for a potential pilot in the future. The consultant recommended between 20 to 61 internal combustion engine (ICE) vehicles for electrification (10-30 percent of the remaining 203 vehicles evaluated); based on current and announced electric vehicle (EV) make and model availability, which includes 20 to 38 plug-in hybrid electric vehicles (PHEVs) and up to 23 battery electric vehicles (BEVs). Some low mileage sedans were not recommended for electrification because of high costs of acquisition and EVSE infrastructure. Instead, these sedans could be candidates for leased hybrids that reduce gasoline consumption and GHG emissions.

The higher range of these recommendations is reliant on Rockville's ability to apply for, and receive, EV and charging station incentives. The conversions would take place over Rockville's existing 5-year lease cycle or during the longer replacement cycle for heavy duty equipment, with the actual number of vehicles eligible for electrification likely increasing over time as more EV make and models become available. Table 6 summarizes the CFTA's electrification recommendations for the higher range, assuming maximum incentives, and the estimated savings total financial saving and lifetime GHG emissions reductions. The consultant estimated the total financial savings based on capital cost of vehicle acquisition, NPV fuel costs, NPV maintenance costs, EVSE installation, EVSE hardware, and potential incentives.

Table 6: CFTA 15- Year Electrification Recommendations (with incentives)

Vehicle Type	Total Quantity in Fleet	Total Eligible Vehicles[38]	Quantity Recommended to Convert to Electric[39]	Total Financial Savings	Lifetime GHG Emission Reductions (MT)
Sedan	55	15	1	$199	14
SUV	28	26	11	$6,433	134
Light-Duty Pickup	57	17	15	$9,901	126
Van	14	9*	9	$21,459	225
Shuttle Bus	5	2*	2	$45,433	163
Refuse Truck	16	16*	13	$444,965	2144
Heavy Truck	28	10*	10	$142,530	263
TOTAL	**203**	**95**	**61**	**$670,920**	**3,068**

[38] * Indicates vehicle models meeting full fleet duty needs is uncertain at this time.

[39] Recommendations from the Rockville Electrification Analysis report developed by the Maryland Energy Administration's (MEA) Clean Fuels Technical Assistance (CFTA) program, in a partnership with ICF. March 31, 2021.

Second, staff evaluated the 61 vehicles recommended for electrification and the potential market availability of a suitable model that meets the operating needs in the replacement year. After reviewing available models and comparing them with operating needs, the list of was divided into three phases for implementation (Table 7):

- **Phase 1: Implement electric vehicle replacement.** An electric model that meets operating needs is available/likely available in replacement year.
- **Phase 2: Monitor market for suitable options in replacement year**. The availability of an electric model that meets operating needs is uncertain in the replacement year; therefore, staff will monitor the market for suitable options.
- **Phase 3: Reassess in next replacement cycle.** An electric model meeting operating needs is not available in the replacement year; the vehicle will be reassessed in the next replacement cycle.

Implementation would be based on the availability of electric vehicles through lease or purchase. In FY 2020, the City began to work with Enterprise Fleet Management to phase much of the currently owned fleet to all-leased vehicles, swapping about 35 vehicles per year. All sedans, sport utility vehicles, police vehicles, vans, and pick-up trucks are included in the lease program. This lease program permitted the City to reduce the traditional 15-year vehicle replacement schedule to a 5-year replacement schedule. The City purchases other vehicles, such as shuttle buses, refuse trucks and heavy-duty trucks typically on a 10 to 15-year replacement cycle. Potential replacement schedules by fiscal year are included in Table 8.

It was determined that the light-duty fleet recommended for electrification could be transitioned to battery electric vehicles (BEVs, such as Chevy Bolts or Nissan Leaf), with some plug-in hybrid electric vehicles (PHEVs, such as Ford - Escape SE FWD PHEV) that travel primarily using electricity, but also have gasoline engines for flexibility and resiliency needed for emergency preparedness. Some vehicles, such as 4-WD pickups used in emergency snow operations, were deferred to a second phase, until electric 2WD pickups could be tested in the first phase to meet the same duty cycle of existing vehicles. In addition, the availability and performance of electric refuse and other heavy-duty vehicles was deferred to later phases until more models become available on the market, are tested under operating conditions, and the necessary charging infrastructure could be planned through a capital improvement program (CIP).

Third, staff identified the facilities serving as overnight parking for each vehicle and summarized the charging stations needs for each phase to aid in planning electric vehicle supply equipment (EVSE) capital improvements. Retrofitting some facilities to install charging stations to accommodate the growth in electric vehicles may be challenging due to site and electricity service constraints. It should be noted that this initial assessment does not speculate on the potential relocation of divisions to 6 Taft Court. Construction Management vehicles currently park at the Recreation Services Building, but could potentially relocate 6 Taft Court in the future. The potential relocation of services from City Hall to 6 Taft Court is also not factored into the EVSE assessment.

Table 8 summarizes the fleet electric vehicle implementation plan to replace 57 vehicles between FY 2023 and FY2035 and the associated charging station needs. Phase 1 identifies 28 light duty vehicles and two buses that are candidates for electric replacements. Phase 1 also has broad EVSE needs that span six facilities. Phases 2 and 3 involve medium-duty and heavy-duty vehicles that primarily require EVSE investments at the Gude Maintenance Yard. The study estimated the cost to install EVSE infrastructure may range from $644,625 to $1,083,475 over the next five to ten years, depending on available incentives and is factored into action M-07. The incremental cost for electric vehicle acquisition would need to be determined each fiscal year based on the most recent quotes for lease or purchase. For example, in 2021, Enterprise estimated the PHEV SUV would cost an additional $3,682 and the PHEV sedan would cost an additional $2,518 throughout the term of the 5-year lease. Additionally, this action would require fleet and facilities maintenance training for all employees responsible for operating or maintaining an EV or EVSE. The plan is an initial estimate that will continue to evolve as technology and market conditions progress.

Table 7: Fleet Electric Vehicle Implementation Plan

Implementation Phase	Number of Electric Vehicles Replacements	Number of Charging Stations
Phase 1: Implement electric vehicle replacement	Sedan = 1 Pickup (2WD) = 7 Shuttle Bus = 2 SUV = 11 Van = 7 **Total = 28**	City Hall = 10 Gude = 8 to10* Rec Services Building = 5 Croydon Creek Nature Ctr = 1 Senior Center = 1 to 3* Twinbrook Community Ctr = 1 **depending on senior bus parking* **Total = 28**
Phase 2: Monitor market for suitable options in replacement year	Pickup (4WD) = 7 Refuse truck = 2 **Total = 9**	Gude = 9 **Total = 9**
Phase 3: Reassess in next replacement cycle	Heavy Truck = 9 Refuse = 11 **Total = 20**	Gude = 20 **Total = 20**
Total	**57**[40]	**57**

Additional details on Phase I Implementation are illustrated in Table 8, including proposed fiscal year of planned replacement, vehicle type and the current parking locations. The first phase focuses on electrifying SUVs, non-emergency pickups, and piloting EV buses. This initial list will continue to evolve as more models become available and market conditions change. Please note that for starred "*" facilities, future parking may be shifted to another facility, depending on service location/needs and site conditions. For example, functions parking at the Recreation Services Building could eventually shift to Taft Court or some Senior Center buses currently parked at Gude could be shift to the Senior Center. Additionally, if an electric pursuit vehicle becomes available on the market to pilot, the Police Station may also need to be retrofitted with charging infrastructure.

[40] Four vehicles (2 vans, 1 pickup, and 1 heavy-duty) were replaced during the course of the grant application and fleet study. These four vehicles were not included in the implementation plan and could be considered during the next replacement cycle.

Table 8: Proposed Phase I Electric Vehicle Replacement Schedule and Current Parking Location

Fiscal Year/ Vehicle Type (#EV of #)	Recreation Services Building*	Croydon Creek Nature Center	City Hall	Gude Maintenance Facility*	Senior Center*	Twinbrook Community Center	Total
2022			1	1			2
SUV			1				1
Pickup				1			1
2023	1	1	2	2		1	7
SUV			2				2
Van		1				1	2
Pickup	1			2			3
2024	1		5	2			8
SUV			2	1			3
Van			2				2
Pickup	1		1	1			3
2025	3		2	3	1		9
Sedan			1				1
SUV	3			2			5
Van			1	1	1		3
2029				2			2
Shuttle Bus				2			2
Grand Total	**5**	**1**	**10**	**10**	**1**	**1**	**28**

Incentives and funding mechanisms will need to be regularly explored as programs evolve over time. Establishing plans for both vehicle acquisition and EVSE installation will be critical to allow the City to take advantage of funding opportunities as they become available. One potential funding mechanism is the Maryland Smart Energy Community (MSEC) program. While the City is enrolled in the program for building energy efficiency and renewable energy, it has not enrolled in the fleet energy goal yet. To participate in the MSEC fleet program, the City would need to establish a goal to reduce on-road petroleum (gasoline and diesel fuel) consumption by 20 percent. Petroleum consumption is measured as gallons of gasoline equivalent (GGE) where one gallon of diesel fuel equals 1.13 gallons of gasoline. According to the electrification study, depending on the market and incentive availability, replacing 20 to 61 vehicles with electric models could displace 241,000 to 345,000 gallons of gasoline over 15 years of operation (which is approximately 7 to 10% of annual gasoline consumption). The City could adopt a resolution consistent with the MSEC policy to become eligible for fleet grant funding. Other incentives to explore include EV and EVSE rebates and State and Federal grants.

Furthermore, technologies, markets and programs for low/zero emissions vehicles and infrastructure will continue to innovate and evolve over the next decade. The City's annual fleet replacement assessment will continue to evaluate opportunities and be positioned to take advantage of federal initiatives, funding programs, or new market options for low/zero emissions vehicles that meet service duty needs. Should City leadership decide to accelerate the integration of low/zero emissions beyond the initial list of vehicles recommended for payback by the CFTA study, Figure 30 summarizes the vehicle category and fiscal year of replacement through FY 2035. If additional vehicles are identified for electrification in the future, the accompanying action item M-07 that establishes a Capital Improvement Project (CIP) to expand electric vehicle charging infrastructure on City property will need also need to be adjusted to accommodate increased electrification opportunities.

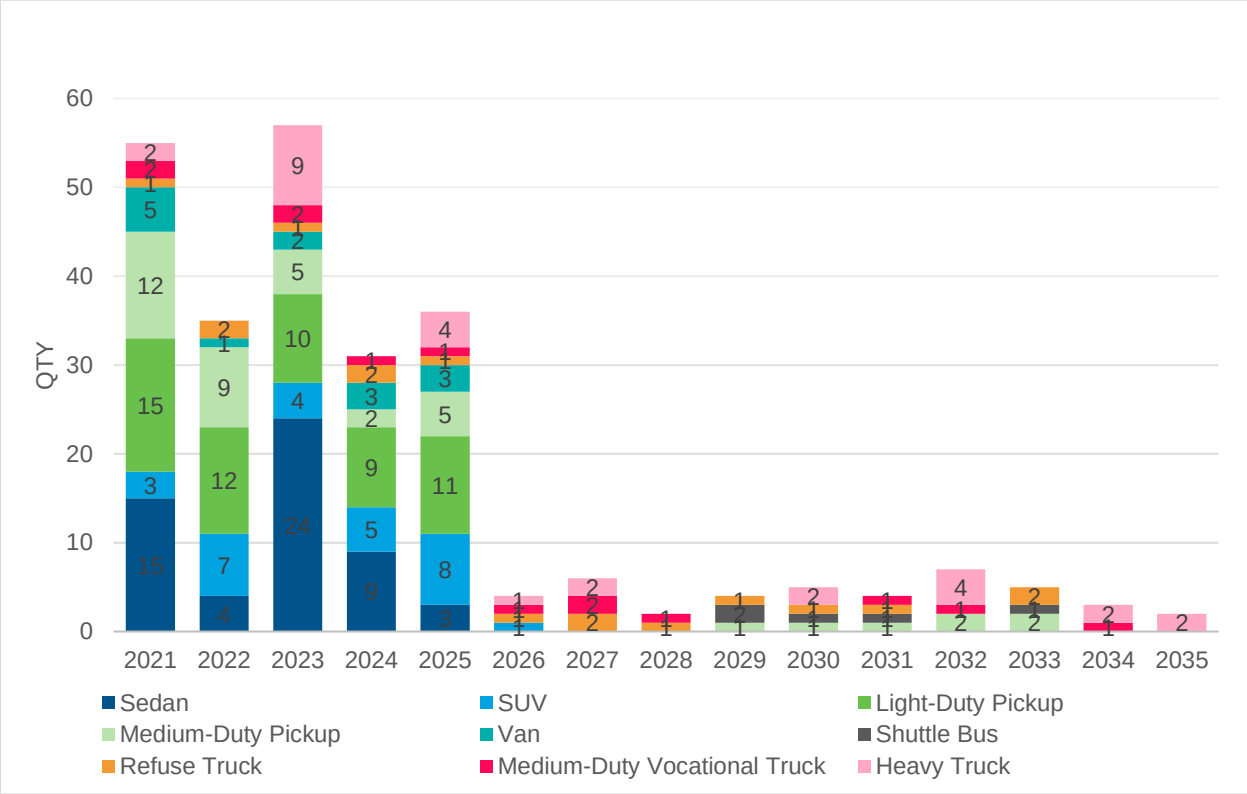


Figure 30: Rockville Fleet Replacement Schedule FY 2021- FY 2035

Action M-07	Establish a new Capital Improvement Project (CIP) to expand electric vehicle charging infrastructure on City property to serve employees, fleet and the community		
Objective	Strategically plan, fund and install electric vehicle supply equipment (EVSE) to support the transition to electric vehicles		
Metrics	Number of EVSE installed		
Target	Community and municipal transportation emissions	**Development Stage**	Proposed FY 2023
Lead	Recreation and Parks	**City Upfront Cost**	$644,625 to $1,083,475; range depends on incentives and site design considerations. 0.5 FTE Planning cost-share with C-11
Partners	Public Works (Fleet and Environment)	**City Operating Cost**	To Be Determined; may include charging station software subscriptions and increased electricity costs; may be offset by fuel savings

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	++	+	+	Mobility, Economic, Economic

Rockville has a limited electric vehicle supply equipment (EVSE) to serve the fleet and the public. Thomas Farm Community Center has a Pepco DC fast charger and a Level II charging station that is available to the public. City Hall has a Level II charging station available to serve the City fleet. To electrify the City fleet (M-06), a significant expansion of electric vehicle charging infrastructure (EVSE) is needed to charge vehicles.

After examining potential Phase 1 fleet electrification options in Table 7, additional Level II and DC fast charging infrastructure will be needed to charge vehicles at City Hall, the Gude Maintenance Facility, 6 Taft Court and potentially the Senior Center and other facilities. Potential charging station locations and timelines are outlined in Table 8. Given the time required to plan, procure, design, permit and construct charging stations, the City should establish a new Capital Improvement Project (CIP) for phased multi-year EVSE deployment that aligns with the vehicle replacement cycle. The fleet electrification study discussed in M-06, estimates that transitioning light-duty fleet and potential some heavy-duty vehicles to electric vehicles (EVs) over the next ten years will have significant costs, due primarily to expenses associated with needed charging infrastructure. The study estimated the cost to install EVSE infrastructure may range from $644,625 to $1,083,475 over the next ten years, depending on site conditions and available incentives. Further, to promote resiliency in the case of a power grid disruption, many studies recommend exploring solar photovoltaic (PV), battery energy storage systems and/or backup generators. It is important to examine potential sources of grant funding and to opportunities to make the most of this investment. With limited parking space availability at City facilities to meet fleet, employee and public charging demands, the City could evaluate dual-use stations where the public or employees could utilize the charging infrastructure during the day and fleet could charge at night. Management software and oversight would be needed to oversee the systems and ensure Fleet charging is available. The proposed EV Readiness Plan (C-11) could recommend options and financing models.

Action M-08 Update City teleworking and transportation benefit policies to encourage City employees to reduce vehicle miles traveled (VMT)

Objective	Reduced City employee vehicle miles traveled (VMT) through increased telework, transit use, and carpooling.		
Metrics	Number of employees utilizing telework agreements, transit benefits		
Target	Municipal transportation emissions	**Development Stage**	Proposed
Lead	Human Resources	**City Upfront Cost**	-
Partners	All Departments	**City Operating Cost**	Depends on level of transit incentives Cost share: M-07

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	++	++	+	+	Mobility

Rockville's FY 2022 adopted budget has a total of 620 regular and temporary full time equivalent (FTE) positions. The emissions from employee commutes are included in the overall community transportation emissions. Providing telework and transportation benefits to encourage employees to reduce vehicle miles traveled in single-occupancy, internal combustion engine vehicles would reduce emissions from employee commutes. Such policies could include enabling regular teleworking where feasible, flexible schedules, more robust transit benefits, parking cash-outs for employees taking alternate means of transportation other than transit. These could complement the City's recently updated Telework Policy, bicycle storage, shower facilities, and before-tax transit benefit.

Additional steps to support reducing emissions from employee commutes could include incentives for employees to reside in Rockville, incentives for carpooling, or leveling costs to park with costs to commute via alternative means, providing access to vehicles on-site, or considering Rockville among other local employment destinations in transit service improvement initiatives. Additionally, while providing employees with greater access to electric vehicles charging stations (M-07) could reduce GHG emissions from employee commutes, although not reduce VMT.

As experienced in the pandemic, telework policies provide resiliency co-benefits by supporting the continuation of community services.

Land Management

Maximize the economic and social benefits from the land while maintaining or enhancing natural systems and ecological health to ensure resiliency.

Action C-16	Implement the Comprehensive Plan to steer the most-dense development/redevelopment to mixed-use, transit-served locations to reduce vehicle miles traveled (VMT) and conserve/restore environmental areas		
Objective	Reduce vehicle miles traveled and GHG emissions by increasing allowable density and types and number of desirable destinations within a short distance of transit hubs and activity centers and conserve/restore environmental areas		
Metrics	Milestone/Status update		
Target	Community transportation emissions	**Development Stage**	Ongoing
Lead	Planning and Development Services	**City Upfront Cost**	
Partners	Planning Commission, Public Works, Housing and Community Development, Rockville Economic Development Inc. (REDI), Rockville Chamber of Commerce	**City Operating Cost**	Capital and implementation costs determined in a separate process. Cost share with many other CAP measures.

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
++	++	+	++	+	Mobility, Economic, Environment

Rockville's Comprehensive Plan identifies 17 existing and 8 potential future activity nodes to help guide land use and development policies (Figure 31). Key area of the city planned for land use changes include Rockville Town Center, Rockville Pike corridor, Twinbrook Metro Station area, East Rockville neighborhood, North Stonestreet Avenue, Shady Grove Road/Piccard Drive corridor, and Veirs Mill Road corridor. Directing new residential development and employment to these locations will help reduce vehicle emissions.

The Plan identifies community facilities and gathering places as key components of activity nodes. Another way to make activity nodes attractive to residents and developers is to implement land use destination balancing. According to the City's Transportation Demand Management Plan, a balanced destination mix at a neighborhood-scale activity center contains at least eight neighborhood-scale retail uses or schools. Neighborhood scale uses include "Main Street" type uses, such as restaurants, cafes, clothing stores, post office, bank, dry cleaners, fast food, bookstores, schools, libraries, etc. Sub-neighborhood destinations to promote more walking and rolling trips could contain a handful of destinations to serve local residents within a quarter-mile walking distance such as a corner store, carryout, or pocket park. Giving residents and visitors places they want to go within a short and safe walking distance provides more choices and increased quality of life, not being obligated to get in a car to go places. It also reduces vehicle miles traveled and improves air quality.

Other supportive actions include thoughtful urban design standards that incorporate vegetation and green space, art, and cultural amenities, and community-led programming. Supporting a balanced land use and transportation mix increases the supply of diverse housing types near transit and other activity centers to improve

Equity Considerations

Neighborhoods with higher than average social vulnerability index could be prioritized for investments in City facilities serving the public.

Coordination with REDI and the Rockville Chamber of Commerce can help support local businesses, especially minority, female or disabled-owned businesses.

affordability. Reducing minimum parking requirements provides more flexibility to enrich city life with non-pavement land uses. Finally, as the Comprehensive Plan observes, local destinations need customers to stay afloat. Working with residents and local leaders to identify ways to support valued local businesses and neighborhood gathering places will be important in the era of internet retail and big box stores. Current ordinances and zoning should be updated to provide flexibility to address tradeoffs between City objectives for tree cover, stormwater management, solar or renewable energy, improved air quality through the reduction of vehicle miles traveled, and 'green' building features.

The wedge diagram analysis combined this action with Actions C-10 and C-14 resulting in 90% of residential growth near activity centers or walking nodes and assumes buildout of Bike and Pedestrian plans and transit access improvements to support a comprehensive network to reduce VMT.

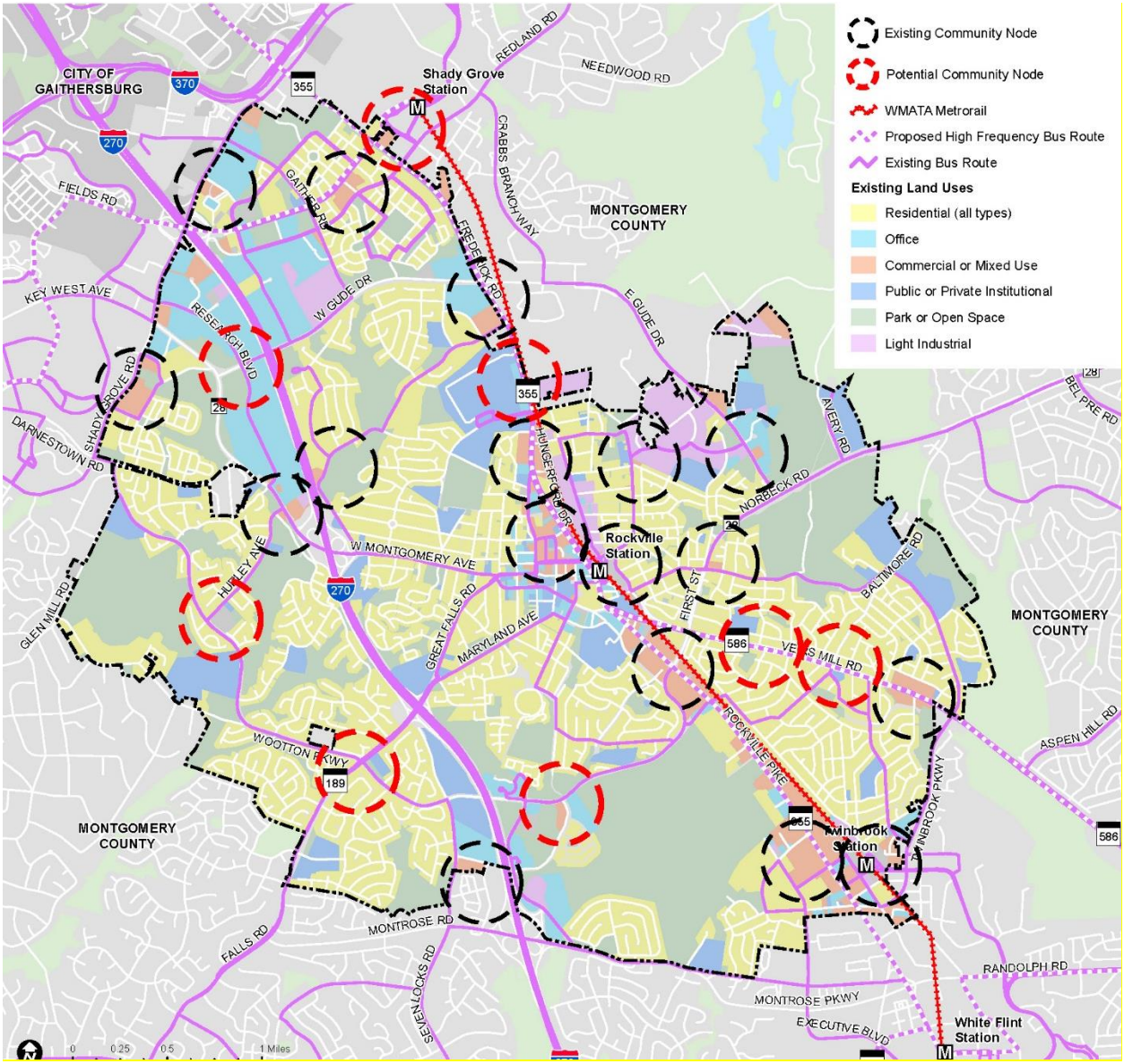


Figure 31: Rockville Comprehensive Plan Community Node Concept

Action C-17	Expand education and incentives to support tree planting and maintenance, environmentally friendly landscape conversions, and management of non-native invasive plants on private property		
Objective	Increase biodiversity and carbon sequestration, ecosystem health and resiliency, and improve native wildlife corridors		
Metrics	Number of participating properties, number of measures installed, incentive amounts		
Target	Community carbon sequestration and resiliency	**Development Stage**	Ongoing
Lead	Public Works (Environment)	**City Upfront Cost**	-
Partners	Recreation and Parks, Planning and Development Services, Community Volunteers	**City Operating Cost**	Low LOS: $15,000 High LOS: $30,000 1 FTE

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	++	++	+	+	Environment, Safe and Livable Neighborhoods

In Rockville, approximately 40 percent of pervious land covered with turf or landscaping is located on private property. Additionally, of the 4,301 acres of tree canopy in Rockville, approximately 79 percent is privately-owned and not protected by forest preserves or easements. Efforts by private property owners are crucial to maintaining and expanding tree canopy, creating connected native wildlife habitat, and removing non-native invasive plants to build sustainable and biodiverse ecosystems within the City. These efforts also have a range of climate adaptation benefits including increased resilience to storms, floods, and ecosystem stressors, cooling provided by tree canopy shade, and carbon sequestration by plants, trees, and healthy soil.

The City has established some private property incentive and education programs including the popular Rockville RainScapes Program, annual native tree and seed giveaways, Green Your Backyard information sessions, Environment & Sustainability email newsletter, and the Rockville Weed Warrior Volunteer program. The City recently opted into the County's Pesticide Law that restricts the use of certain pesticides. However, these programs are currently limited in scope, funding and staff resources.

The City can develop a more inclusive private property education and incentive program that is reshaped to better incorporate equity and climate considerations. The program should take into consideration the goals and findings of a public Green Space Management Plan (Action M-09) related to ecosystem needs and challenges and encourage and assist more property owners to shift to sustainably managed landscapes that restore nature and build climate resilient landscapes. Program components may include the following and the level of service (LOS) could be adjusted depending on the available resources and staff support. It is

Equity Considerations

Programs should solicit feedback and input directly from neighborhood residents about their concerns and needs to help identify ways to direct resources and support to vulnerable communities to support tree planting and maintenance and neighborhood resilience to heat and flooding.

An inclusive program should reduce barriers to participation by featuring outreach materials in different languages, identify measures to defray upfront costs, and address maintenance concerns.

anticipated that additional staff and at least $15,000 to $ 30,000 per year would be needed to pilot a comprehensive program of this nature. State grants and outside partnerships could be explored to support program expansion.

- **Reshape the RainScapes Rebate Program** to meet the increasing demand for RainScapes rebates and identify areas for expansion that could better address equity considerations and further incentivize environmentally friendly practices such as tree plantings, native habitats, and non-native plant removal while expanding access and removing barriers for those most affected by climate change. The RainScapes program is currently funded at $10,000 per year under the Stormwater Fund. Program expansion would increase funding to $25,000 (net $15,000 increase) and require adjustments to the existing RainScapes Coordinator position to increase the time spent on program administration.
- **Continue community native plant and seed giveaways** to increase access to native trees, plants, and seeds. Staff should explore options for modifying the events and building partnerships with neighborhoods, community centers, and faith-based groups to provide native plant resources and support directly to residents who will be most affect by climate change.
- **Create a Tree Stewards Program** to provide outreach and education, volunteer and training opportunities, and tree planning and maintenance incentives to promote, enhance and increase tree canopy on private property. Tree Stewards programs existing in several communities (Arlington, Richmond, Ann Arundel, etc.) where urban forestry coordinators oversee the following:
  - **Outreach and education** that focuses on how community members can be active stewards of trees and forests; including tree selection, planting and care and threats to trees. Identify and build partnerships with local organizations and community members that can serve as "tree champions" in Rockville's neighborhoods.
  - **Volunteerism and training** opportunities focused on tree planting and care in Rockville. Volunteer opportunities could include tree planting, watering, pruning, mulching, non-native invasive (NNI) management, and tree inventory and mapping. This could leverage partnerships with outside organizations and existing volunteer programs. For example, Rockville Weed Warrior volunteers could lead or support a NNI vine and tree survey and conduct outreach to improve tree health on private property.
  - **Tree planting and maintenance incentives** that provide grants or services for residents, non-profits, schools, institutions, and other community groups and associations to reduces barriers by eliminating the upfront costs, the physical challenge of tree planting, and concerns for long term maintenance. For example, the County's Tree Montgomery program is model that uses development fees to plant trees on private property and maintain them for three years. The program could also consider resources for preservation, sustainable management, invasive species management, prevention and repair of storm damage, and tree replacement.

Action M-09 — Develop a Green Space Management Plan for public lands to assess and restore trees, forests, meadows, stream valleys and wetlands

Objective	To increase biodiversity and tree canopy cover and improve soil health to increase systems' resiliency and carbon sequestration capability		
Metrics	Milestone/Status update		
Target	Resiliency, Carbon Sequestration	**Development Stage**	Proposed
Lead	Recreation and Parks	**City Upfront Cost**	$115,000 consultant
Partners	Public Works (Environment)	**City Operating Cost**	Implementation cost to be estimated in plan

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	++	++	+	+	Environment, Stewardship of Infrastructure

The City owns and maintains more than 1,100 acres of parkland. Parkland uses vary from actively maintained ball fields, playgrounds, community gardens, and landscaped parks to passively managed forested stream corridors, meadows, and wetlands. Climate change impacts habitats and ecosystem biodiversity, requiring adaptation to changing weather patterns, invasive species, pests, and diseases. Enhanced open space management can improve ecological health and value, play a role in mitigating the impacts of climate change, support ecosystem resiliency, and enhance human health and recreational opportunities. Managed correctly, these areas can provide an opportunity for increased carbon sequestration and mitigation of environmental hazards like air and water pollution, heat islands, and the impacts of extreme weather events (heatwaves, extreme rainfall or flooding).

The Comprehensive Plan recommends the City develop a Green Space Management Plan (Action 11.2) to evaluate, and enhance, where possible, habitats on public lands, including urban forest canopy. The goals are to increase ecosystem health, biodiversity, resiliency and carbon sequestration capacity. The plan will define a strategy to integrate ecosystems services to maximize environmental returns by curbing loss of existing habitats, enhancing the quality and diversity of habitats, and identifying areas for expanding habitat and tree canopy where possible. The plan can also act as the general mitigation plan required under Maryland's Forest Conservation Act to enable a municipality to collect a fee-in-lieu during development. The CAP technical consultant estimated plan development would cost $115,000. The plan would identify staff and resources needed for implementation. The plan could be developed in coordination with habitat/tree expansion programs on private property to promote integrated and enhanced tree canopy and habitat (C-17).

Equity Considerations

The plan should identify ways to:

- Ensure socially vulnerable neighborhoods have increased tree canopy coverage and access to high-quality diverse open spaces.
- Explore partnerships and opportunities to incorporate food forests and edible landscapes into public spaces to foster biodiverse, food-bearing trees, shrubs and perennial plants. Communities that have incorporated these permaculture practices in open space management have reported equity, educational, nutritional, health, and environmental benefits.

Waste & Materials

Manage solid waste by reducing, reusing, recycling, composting, and sustainable purchasing.

Action C-18	Develop a food waste composting program for residents		
Objective	To divert organic food scraps from incineration/landfill to be processed into compost and used as soil amendment		
Metrics	Tons of waste composted, % of waste diverted from incinerator/landfill		
Target	Community waste emissions	**Development Stage**	Proposed FY 2023
Lead	Public Works (Environment)	**City Upfront Cost**	$6,000/site (bins + site work, signs)
Partners	Recreation and Parks, Private contractors,	**City Operating Cost**	$10,000/site + outreach support. Cost share: C-19, C-25

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	N	+	+	+	Environment

The City of Rockville provides weekly refuse, recycling, yard waste and special collections for more than 14,000 residential homes (single family and townhomes). Commercial and multifamily properties contract private services. While City yard waste is composted by Montgomery County, organic food waste is included as refuse. In FY 2021, the City collected more than 11,000 tons of refuse, which was brought to the County's Transfer Station and sent to the waste-to-energy Resource Recovery Facility (RRF) at Dickerson. Montgomery County estimates about 15 to 19% of municipal residential refuse taken to the Transfer Station from municipalities is food waste.[41] For Rockville, this translates to approximately 2,000 tons of potentially compostable food waste that could be diverted from disposal as refuse annually.

Although waste comprises approximately 0.43% of GHG emissions and the creation of a composting program would generate minimal GHG reductions, numerous residents requested the City provide food waste composting options. The City has not provided this service due to economic and operating constraints associated with the lack of local food waste processing options in Montgomery County. The County's website currently suggests residents interested in composting food scraps hire a collector to collect and deliver the food scraps to a composting facility in the region. The Mayor and Council have requested the County provide food waste composting infrastructure that is as economically feasible and easily accessible as the County's current yard trim composting program.

Until that time, the City could explore smaller voluntary options to encourage food waste diversion, such as a voluntary community drop off or coordination with private collectors for transportation and processing at a regional facility. While there

Equity Considerations

Ensure equitable access to composting drop-offs for a range of residential building types, neighborhoods, and socio-economic classes. Residents from multifamily properties expressed interest in food waste composting options; however, these properties currently do not pay into the Refuse fund. A combination of Refuse and General funds could support a more equitable food-waste composting drop-off program through-out the city.

[41] Montgomery County. 2017 Waste Characterization Study Summary of Results. https://www.montgomerycountymd.gov/SWS/Resources/Files/studies/waste-composition-study-2017.pdf

is demand for composting in the area, the regional organics recovery infrastructure has not grown in proportion to the demand. The main facilities that accept both food and yard wastes in the area include the Prince George's County facility in Upper Marlboro and the Balls Ford Composting Facility operated by Freestate Farms in Manassas, Virginia. An aerobic digester facility is under construction in Jessup for organics recycling and is expected to open in 2022.

The CAP technical consultant researched programs options and estimated the costs of contracted curbside collection was more than $1 million per year, while a voluntary drop-off center was approximately $10,000 per year (per site), plus staff resources for administration and outreach. Rockville could pilot the more affordable drop-off center model, which is used by cities such as Gaithersburg, College Park, Baltimore, Alexandria and Fairfax. They provide 24-hour community compost drop-off centers at several municipal facilities. Residents collect their food waste in compost containers/caddies and drop the material off, free of charge, in composting carts at municipal facilities/parks. Most of the jurisdictions work with a private composting contractor/food scrap hauler to collect the waste weekly and transport it to a regional processing facility.

In additional to annual hauling contracting costs, the consultant estimated the program would require staff and resources to establish the drop-off centers to deter vandalism and pests (carts, signage, safety measures, etc.); distribute home composting starter kits (caddies, biodegradable bags and education); and staff to establish and administer contracts for weekly collections, set-up and monitor the drop-off centers, provide ongoing public education and outreach on acceptable items. The consultant conservatively estimates 150 homes may participate in a voluntary drop-off, reducing 20 metric tons of waste over 9-year period.

To provide equitable access, site selection should consider convenient access to various neighborhoods. Facilities such as the Gude Maintenance Facility, Thomas Farm Community Center, the Senior Center, Twinbrook Community Center, Croydon Creek Nature Center or even the weekly Farmers' Market may be considered for a pilot, depending on community interest. Space constraints and site accessibility would also need to be factored in the design of a pilot project.

Action C-19	Expand residential recycling and waste reduction outreach program to increase compliance and waste diversion		
Objective	To reduce materials from incineration/landfill, reduce GHG emissions, conserve energy, recover resources, and protect the environment		
Metrics	Tons of waste recycled, % of waste recycled, recycling tons per household		
Target	Residential waste and GHG emissions	**Development Stage**	Proposed program expansion
Lead	Public Works (Environment)	**City Upfront Cost**	-
Partners	Public Information Office, volunteers, Montgomery County	**City Operating Cost**	$5,000 + outreach support Cost share: C-18, C-25

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	N	++	+	N	Environment

In FY 2021, Rockville's residential recycling program collected approximately 5,000 tons of single stream recycling, metal recycling and electronics recycling and more than 4,000 tons of yards waste and leaves for composting. The City's recycling rate dipped to 45% by weight and is below Montgomery County's 70% goal. While this rate is higher than many other communities, it is City's lowest level in the last decade. This drop is a result of increased limitations in acceptable recyclable materials due to volatile commodities markets and processing constraints, reductions of newspaper and printed materials due to the prevalence of electronic media, and reductions in the weight of many plastics. Additionally, recycling rules are complicated and vary from place to place. Depending on the recycling processor, the types of materials and methods to recycling could differ between a business, single family home, and an apartment all located in Rockville.

While waste is a minor source of our community GHG emissions, many stakeholders in the CAP planning process strongly valued the environmental and public health benefits associated with improving recycling and waste reduction efforts and reducing single use plastics. While plastic bag fees and restrictions on polystyrene and plastic straws apply in Rockville, there are more opportunities for improvement. State and federal actions are also needed, especially those that reduce plastic waste, which derive from GHG emitting fossil fuels. On-going outreach and education, events to foster materials reuse, technical assistance, and training efforts are essential components of an integrated solid waste system. The City could further expand the information and outreach provided to residents and businesses about reducing waste, reusing items, recycling, and using their purchasing power to support demand for recycled materials and products that conserve valuable natural resources. Given that Montgomery County oversees the Transfer Station and the commercial and multifamily recycling program in Rockville, better coordination with the County would also improve waste diversion efforts. Recycling volunteers can also augment City resources through grassroots efforts to increase participation.

Equity Considerations

Recycling materials need to be easy to find, leverage clear graphics, and available in multiple languages to communicate to Rockville's diverse community. Recycling outreach materials must also be diversified to help reach a broader audience, such as quick search feature on a phone or a multilingual decal with tips on the recycling carts or bins.

Rockville collections provide a back-door service to residents that are either temporarily or permanently unable to move their carts to the curb can receive weekly services.

Action M-10	Develop a City sustainable procurement policy		
Objective	To minimize environmental impact of purchased products, foster innovation in supply markets, and foster and integrate supplier diversity		
Metrics	Milestone/Status update		
Target	Municipal GHG emissions and waste	**Development Stage**	Proposed
Lead	Procurement	**City Upfront Cost**	-
Partners	Various Departments	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	N	++	+	+	Environment, Economic

Section 17-89 of the City Code, Environmentally preferable procurement, states that "[t]he purchasing agent will develop an environmentally preferable procurement policy which shall provide preference, to the greatest extent practicable, to products and services that will enhance and protect the environment, protect the welfare of workers, residents, and the larger global community, and represent the best overall value to the City."

While the City has evaluated and improved many purchasing processes, the development of an environmentally preferable procurement policy is still pending. Procurement can develop a comprehensive sustainable procurement policy to lay the foundation for an effective sustainable procurement program. The policy may include identifying staff roles and responsibilities; developing sustainable procurement plans, goals, procedures and implementation tools; educating employees to use credible eco-labels and "best value" assessment methods when making purchasing decisions; and tracking and reporting requirements. Many governments are discovering that sustainable procurement can including the following to help make measurable progress toward achieving their sustainability goals:

- GHG can be significantly reduced by purchasing electric and hybrid-electric vehicles, LED light bulbs and fixtures, energy-efficient computers and appliances, solar panels, electricity from wind, solar and coal-free sources, plant-based food options, and recycled paper.
- Consider the life-cycle costs and GHG emissions of products purchased.
- Waste and toxins can be reduced by purchasing reusable, refillable, and readily recyclable products or utilizing processes, technologies, services and products that reduce exposure of Substances of (Very) High Concern (SVHCs/SHCs) to people and the environment.

Equity Considerations

Local governments can meet their social responsibility, diversity, and local economic development goals by giving preference to goods and services that are certified as fairly traded; offered by certified disadvantaged businesses, B Corps, or worker-owned cooperatives; or locally sourced.

Resiliency

Improve the capacity of our community, homes, businesses, and natural environment to prevent, withstand, respond to, and recover from climate change impacts such as rising temperatures, more frequent and intense heat waves, heavy rainfall and severe storms.

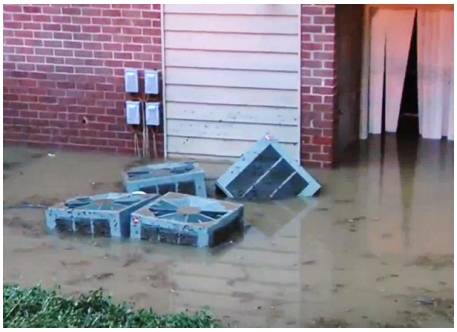
Action C-20 — Incorporate climate resilient building and infrastructure design features in new buildings and retrofits

Objective	Incorporate new building codes and education and incentive programs to protect building occupants, infrastructure, and the environment from the impacts of climate change.		
Metrics	Milestone/Status update		
Target	Community Resiliency	**Development Stage**	Proposed
Lead	Planning and Development Services	**City Upfront Cost**	-
Partners	Public Works (Engineering, Environment)	**City Operating Cost**	Coordinate with C-03, C-22, C-24, M-09, and M-13

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	++	++	++	+	Economic, Housing, Safe and Livable Neighborhoods, Stewardship of Infrastructure

Building codes and development standards are traditionally based on historical data. Since the past is no longer a reliable predictor, future development, redevelopment, and building retrofits should consider climate resiliency measures. Although green building codes, stormwater management requirements, and energy conservation codes address many aspects of building and structure resilience, some gaps may be significant enough to warrant additional considerations to help new buildings and existing buildings become more resilient to more frequent high heat conditions, severe weather events, and new precipitations patterns. Rockville should assess how to best incorporate climate resilience in updates to building codes and consider education, grants or rebates to improve the resiliency of existing buildings.

- **Flooding:** A few areas in Rockville may be more susceptible to urban flooding and require flood proofing measures, such as directing water away from buildings to prevent rainwater intrusion, floodproofing doors and walls on the ground floor, and raising mechanical equipment above potential flood levels. Some communities, like Alexandria, have developed a Flood Mitigation Pilot Grant program to assist property owners by providing education and grants to help make building improvements for flood and moisture prevention.



- **Severe weather:** Other resiliency measures help structures withstand extreme weather conditions, such as high heat, severe storms, and drought. Measures may include wind resistance, water conservation and rainwater capture, heat-resistant landscaping, outdoor shading, reduction of building heat retention, efficient mechanical systems and appliances, energy storage, peak power reduction, on-site renewable energy, natural solar lighting, and passive survivability design that allows buildings to continue to have power to operate during brownouts or blackouts.

Equity Considerations

Ensure that any new building codes protect housing affordability and local businesses.

Vulnerable communities may need resources to retrofit their homes to improve resiliency.

Action C-21	Partner with Federal Emergency Management Agency to update the Flood Insurance Rate Maps (100-Year floodplain maps) used to implement the National Flood Insurance Program		
Objective	Update Flood Insurance Rate Maps in the Federal Register		
Metrics	Maps updated in Federal Registry; Property owners educated on impact of update and inquiries addressed		
Target	Community resiliency	**Development Stage**	Ongoing
Lead	Public Works (Engineering, Environment)	**City Upfront Cost**	Utilize Existing Resources
Partners	Public Information Office, FEMA, Montgomery County, Maryland Department of the Environment, Planning and Development Services	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
N	++	+++	+	+	Economic, Housing, Stewardship of Infrastructure, Safe & Livable Neighborhoods

Rockville entered the National Flood Insurance Program (NFIP), administered by the Federal Emergency Management Agency (FEMA), in 1978 when it adopted its first floodplain ordinance as Chapter 10 of the Rockville City Code. Chapter 10 provides for protection of, and limits development within, the 100-year floodplain. The term '100-year floodplain,' now known in Federal regulations as the 'Special Flood Hazard Area' or SFHA, is the area near a stream that has a one percent chance of being inundated by floodwaters in any given year. Communities that participate in the NFIP are eligible for Federal benefits, such as special emergency assistance funding. More importantly, the communities' property owners are eligible to purchase flood insurance for insurable structures at discounted rates. Owners of insurable structures in the floodplain must purchase flood insurance to secure a federally-backed mortgage.[42]

FEMA map changes occur periodically, as the agency deems necessary. The City's first maps were developed in 1976. In 2006 these were partially updated, and the 1978 development and flood boundary conditions were overlaid onto 2006 basemaps that showed then-current topography and roads but did not update stream flows or flood modeling, Therefore, the City is currently relying on maps created in part with data from 1976.

Floodplains and flood risk change over time due to weather patterns, land development, and erosion, and therefore the 100-year floodplain changes as well. Rockville is currently participating in a Flood Insurance Study being conducted by FEMA to update the City's floodplain maps. Floodplain maps identify the 100-year floodplain for streams with drainage areas of one mile or larger and inform communities about local flood risk. The maps help set minimum floodplain standards, which helps communities build safely and resiliently, and they also determine the cost of flood insurance, which helps property owners financially protect themselves against flooding.

[42] https://www.fema.gov/sites/default/files/2020-07/fema_nfip_map-change-need-to-know-compliance.pdf

The updated FEMA floodplain maps will capture the new 100-year floodplain under current development and precipitation conditions. The changes are likely to affect some residential and commercial property owners whose property was not historically in the floodplain. These impacted property owners may need to obtain coverage under a new flood insurance policy or alter existing policies.

The City of Rockville is a partner in this map update process, but FEMA develops the new maps and sets the process timeline. As partners, the City will:

- Share our existing areas of flooding concern and providing FEMA with relevant as-built information on significant road culverts, bridges and stream modifications made since 2006.
- Review preliminary updated maps and submit comments about possible mapping inaccuracies.
- Coordinate with FEMA, MDE and Montgomery County on a comprehensive public information process to explain the new maps and how changes may affect City property owners.
- Become familiar with the new NFIP mapping format and Risk Rating 2.0 insurance evaluation process to answer Rockville property owner questions and help guide them through the map appeals process,
- Update City Code Chapter 10, Floodplain Management, to incorporate the new floodway component that is required by the State and Federal governments for compliance with the NFIP.
- Revise the floodplain permit processes accordingly.

FEMA floodplain maps show risk associated with existing conditions for larger streams. They do not show risk associated with smaller streams like those that flow through the King Farm and Fallsgrove neighborhoods. Further, these maps represent the risk associated with current condition and do not forecast potential flood prone areas based on predicted increased in number and intensity of rain events. Action M-13 outlines plans to forecast and mitigate potential flood issues associated with climate change.

Action C-22	Work with Montgomery County and community partners to provide cooling centers, resilience hubs and other services to strengthen community resiliency		
Objective	Expand community services to increase community resiliency to high heat conditions, emergencies, and extended grid outages		
Metrics	Milestone/Status update		
Target	Community resiliency	**Development Stage**	Proposed expansion
Lead	Recreation and Parks, Housing and Community Development	**City Upfront Cost**	-
Partners	Public Works, Public Information Office, Montgomery County	**City Operating Cost**	To Be Determined

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
N	+++	++	++	++	Safe & Livable Neighborhoods, Efficient & Effective Services

Extreme heat events, poor outdoor air quality days, severe storms and power disruptions increase human health risks, especially for sensitive populations such as children, the elderly, low-income and persons with differing abilities. In addition to coordinating with the County on emergency plans, hazard mitigation and preparedness, more local actions may be needed to adapt to changes in climate and respond to severe weather events. Rockville currently provides critical community services that support resiliency through the operation of cooling centers, emergency notification and assistance programs, and community support services which can be adjusted to address the impacts of a changing climate.

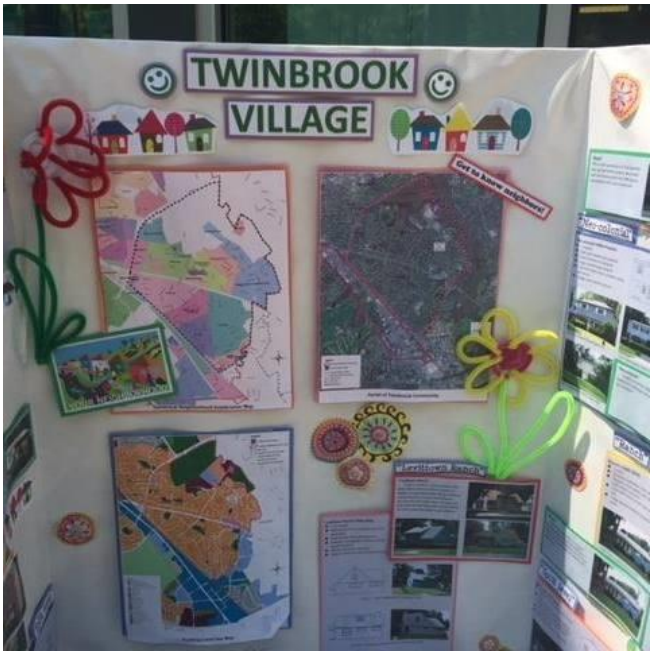
- **Cooling centers:** The City operates four cooling centers when the temperature hits 95-plus degrees, or when a code red air quality alert is issued for Montgomery County. The centers are located at the following facilities: Lincoln Park Community Center, Thomas Farm community Center, Twinbrook Community Recreation Center and the Rockville Senior Center.

- **Emergency notifications:** Rockville operates the "Alert Rockville" emergency communications system which sends time-sensitive emergency alerts, notifications and updates to devices. This system enables Rockville to provide critical information in a variety of situations, including public safety, severe weather and traffic updates.

Equity Considerations

The City could explore outreach methods to ensure that all members of the community know about the availability of community or emergency services. The City could solicit feedback from community leaders on ways to improve the delivery of services to better meet community needs.

- **Social connections and support systems:** Social networks are important, especially during times of emergencies. Rockville's "villages" program includes multigenerational and multicultural neighbor support networks. The program fosters social connections through activities and events, and coordinate volunteer help at home using a neighbor-helping-neighbor model. Villages are in formation in Rockville's West End, East Rockville, Twinbrook and King Farm. Villages coordinate friendly visits, check-in phone calls, social events, health and safety events, grocery and pharmacy pickups and delivery and transportation to medical appointments. These volunteer networks can be used to ensure that vulnerable neighbors are checked upon during snowstorms, severe weather or heat waves to strengthen community resiliency.



- **Resilience Hubs:** To further expand community resiliency, the City could explore state and federal resiliency technical assistance and grant funding programs to expand upon current services. The City could explore working with County and State agencies to support local emergency hubs for the distribution of emergency services during extended power outages. The Maryland Energy Administration defines a resiliency hub as a facility that is located within short walking distance from economically disadvantaged populations that can serve as a heating and cooling center, provide refrigeration for medications and milk for nursing mothers, and allow for charging of small devices, like cell phones and computers. Buildings such as schools, religious institutions, community centers, senior centers, and affordable housing buildings with community spaces are recommended examples of suitable facilities. The hubs are meant to be meeting places and information centers for the surrounding community during an outage and are intended to augment -- not to replace -- emergency shelters or hospitals. The City could explore state grants to establish resilience hubs.

Action C-23 Work with Montgomery County and community partners to measure and map urban heat islands to mitigate exposure to extreme heat

Objective	Identify areas of extreme heat especially in key transportation connections and vulnerable communities to focus mitigation strategies		
Metrics	Milestone/Status update		
Target	Community resiliency to heat	**Development Stage**	Proposed
Lead	Public Works (Environment)	**City Upfront Cost**	Montgomery County is seeking grant for project; may require City cost-share
Partners	Montgomery County, community volunteers	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
N	++	+	++	++	Economic, Mobility, Safe & Livable Neighborhoods, Efficient & Effective Services

Urban heat islands are areas of developed land where pavement, walls and rooftops are prevalent and absorb and release heat during sunny hot days and subsequent evenings. Urban heat islands create conditions that could be 10 to 15 degrees higher than surrounding agricultural or wooded areas. Heat islands are not caused by climate change, but they are worsened by the heat waves that climate change makes more frequent, intense, and unrelenting. Urban heat is responsible for more harm to human health than any other climate stressor experienced by Rockville. Exposure to heat whether on the job, while playing sports, or simply traveling on errands can contribute to higher emergency room visits, heat stroke, exacerbation of other health problems, sometimes even leading to death.

Rockville will work with Montgomery County and regional partners to pursue options for mapping urban heat islands in the city, such as grants for citizen science assessments that identify fine-grained temperature patterns in the urban landscape. The data can inform a future heat island mitigation strategy, such as identifying areas of high pedestrian and transit travel, low income and socially vulnerable neighborhoods, and economic centers that have lots of pavement and fewer trees and greenery. Prioritizing these areas for tree planting along transportation corridors, and incentivizing green roofs, cool roofs and cool pavements, promoting other forms of shade such as canopies, and locating water elements or misters in these areas can help reduce heat impacts. These mitigation measures will help enable active transportation, reduce health exposures for those that already experience health challenges and less access to health care, and ensure that areas with high economic activity are as comfortable as possible to promote vitality and community resilience.

Equity Considerations

Like COVID-19, economic downturns and other forms of adversity, low income and communities of color suffer most from weather extremes. This measure can be designed to be aimed at vulnerable neighborhoods with less green space and more reliance on active transportation.

Action C-24 — Increase tree planting, green, cool and photovoltaic roofs, and cool pavements on public and private property

Objective	To reduce urban heat island effects.		
Metrics	Number of installations		
Target	Resiliency to urban heat	**Development Stage**	Proposed expansion
Lead	Public Works (Engineering), Planning and Development Services	**City Upfront Cost**	-
Partners	Parks and Recreation	**City Operating Cost**	To Be Determined Cost share with C-03, C-09, C-17, M-09

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	++	++	++	+	Safe and Livable Neighborhoods, Economic

Enhancing environmental stewardship by increasing urban greening, stormwater management, cool roofs and pavements, and distributed renewable energy in new and existing buildings will help reduce heat islands throughout the community and help promote improve air quality and protect public health. A **green roof**, or rooftop garden, is a vegetative layer grown on a rooftop. Green roofs provide shade, absorb rainwater and pollutants, reduce temperatures of the roof surface and surrounding air, and can even provide habitat. **Cool roofs** and **cool pavements** are made of highly reflective materials that remain cooler than traditional materials during peak temperatures. **Pervious pavements** are another form of cool pavement that cool nearby air through evaporation. Pervious pavement and green roofs are also stormwater management environment site design (EDS) facilities that meet SWM requirements for development and redevelopment. **Solar photovoltaic (PV) and solar shingles** generate onsite renewable energy and increase a building's resilience to power outages if connected to on-site storage. This action could also promote economic prosperity by creating local jobs in installation and maintenance. Where conflicts between environmental benefits exist (i.e. trees, stormwater or solar), the City should develop a flexible, case-by-case approach to balance environmental returns.

- **Tree Planting:** Increasing tree planting and maintenance will enhance carbon sequestration and mitigate environmental hazards like heat islands, air and water pollution. Healthy trees and forests also provide opportunities to mitigate impacts of extreme weather events (heatwaves, extreme rainfall or flooding). Tree planting programs under Action C-17 and M-09 encourage tree planting and maintenance on both private and public lands. Updating the Forest and Tree Preservation

Equity Considerations

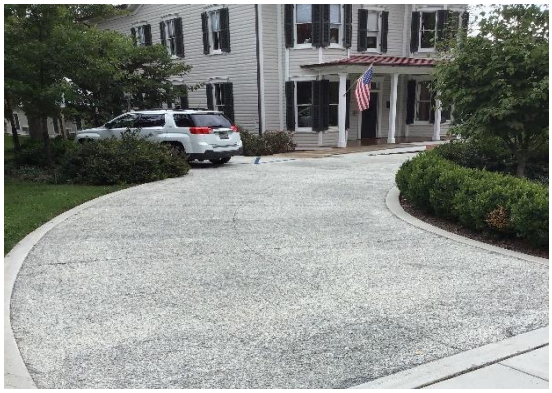
It is important to ensure that all neighborhoods have access to resources and programs to reduce heat-related impacts in the community, impacts of flooding, and protect public health.

This action may negatively impact racial equity and social justice if adhering to codes would require costly investments unless they are offset with financial opportunities and incentives. These might include tax credits and grants, Montgomery County Green Bank, and Single-Family Rehabilitation Program using Community Development Block Grant.

Ordinance to optimize overall community benefits will support this action's success.

- **Green/PV/Cool Roofs:** Rockville should evaluate building codes, zoning, and stormwater ordinances to strengthen requirements and/or provide incentives for existing and new roofs to be (1) green roofs, with native plants, (2) solar photovoltaic (PV) systems tied to the building, or (3) cool/albedo roofs. The building code should prioritize green and solar roofs over cool roofs and include appropriate site-specific exemptions (ex. nearby tree shading, mechanical equipment placement, historic design considerations, or rooftop uses such as decks or pools). Performance goals could be incorporated into code requirements for permit approval. Cool roof materials should have a minimum initial solar reflectance (i.e., 0.70 for low-sloped roofs, and 0.40 for steep-sloped roofs) and a minimum thermal emittance (i.e., 0.85).

  Cool Pavements: Cool pavements reduce heat island effects by staying cooler in the sun than traditional pavements. *Reflective* cool pavement has a lighter color and chemical properties that turn sunlight back toward the atmosphere rather than absorbing heat like dark asphalt. Microsurfacing is an option that involves adding a layer of reflective materials. *Evaporative* cool pavement relies on rainwater seeping into its porous surface and then cooling the pavement and ambient air through evaporation. Rockville could evaluate residential and commercial codes, zoning, and stormwater management requirements to increase the use of cooler pavements through requirements or incentives. For example, Rockville could consider developing pavement standards or incentives for specific land use types. For example, pervious pavement for parking lots, or microsurfacing to increase the albedo effects on sunny areas that receive minimal foot traffic. There are many alternate paving solutions that can be used based on the functions they serve with costs ranging from minimal to substantial. Rockville should follow the costs and availability of these technologies and other sustainable pavement innovations such as low CO2 concrete.



Action M-11	Continue assessing the vulnerability of Rockville's critical infrastructure, facilities, and services, and prioritize areas for improved climate resiliency					
Objective	To assess climate risks and increase the adaptive capacity of Rockville's infrastructure, facilities, and services where needed.					
Metrics	Milestone/Status update					
Target	City and Community Resiliency		**Development Stage**		Proposed expansion	
Lead	Public Works, Recreation and Parks, Police		**City Upfront Cost**		$180,000 for consulting services for new Emergency Operation Plan and Continuity of Operation Plan	
Partners	Montgomery County, Planning and Development Services		**City Operating Cost**		Coordination with M-14 M-13, M-10, and M-09	
GHG Benefit	**Resiliency**	**Feasibility**	**Health**	**Equity**	**Co-Benefits**	
N	+++	++	++	++	Safe and Livable Neighborhoods, Stewardship of Infrastructure, Efficient and Effective Services	

Past precipitation and weather patterns are no longer expected to continue to remain the same, but most plans, operating assumptions, and building and infrastructure standards rely on historic data. Therefore, many communities are examining ways that built infrastructure and services to the public may need to be adjusted or fortified given changing weather patterns. Prolonged and more frequent heat waves, intense rainfall that can overwhelm drainage systems and cause flooding, and intense weather events such as tropical storms and strong winds are occurring more frequently. The City Emergency Operation Plan and Continuation of Operations Plan must recognize changing conditions to ensure continued critical services to protect Rockville residents, businesses, students, and visitors, and reflects responsible stewardship of public resources.

- **Work with the County to ensure a robust Hazard Mitigation Plan:** Although Public Works, the Department of Recreation and Parks, and Police are the lead for several local operations. For example, the City responds to water and sewer emergencies within its service area and snow and ice operations. Montgomery County is responsible for the over community Hazard Mitigation Plan. The City adopted the County Hazard Mitigation Plan on August 22, 2019. The City works closely with the County in developing this plan. The County runs the overall emergency response functions for the County. This action entails working with the County to ensure the robustness of their functions under a range of climate future conditions. In addition, other departments will have their own insights about how climate change might factor into their services and operations.

Equity Considerations

Ensuring the City Emergency Operation Plan and Continuity of Operations Plan deliver high-quality services under emergency situations is particularly important for those already experiencing social disadvantages or health disparities. Special attention should be paid to protecting and enhancing City service functions for low income and socially vulnerable community members.

- **Incorporate climate change considerations into local plan updates:** With the development of this Climate Action Plan and other linked initiatives, including the Comprehensive Plan, the City has begun preliminary work to explore how climate change is impacting and may continue to impact services, facilities, and infrastructure. The changes in community hazards due to climate change necessitate comprehensive revisions to the existing City Emergency Operations Plan (EOP) and Continuity of Operations Plan (COOP). Preliminary estimates for consulting services to update Rockville's EOP and COOP are $180,000 for a process that would take approximately two years. Some specific activities are already underway to assess risks and resiliency of City infrastructure. For example, the US Environmental Protection Agency required a Risk and Resilience Assessment and Emergency Plan for the Rockville Water Treatment Plant.

- **Seek to update planning and engineering standards where applicable**: Incorporating climate risk considerations in city facility, infrastructure, and program-related plans, especially critical functions such as water, sewer, and stormwater services are key goals of this effort. Coordinate with outside agencies, such as MDE and the County to evaluate infrastructure planning assumptions and program planning assumptions to assess whether adjustments or additional levels of planning or preparedness are warranted.

- **Assess critical functions and infrastructure performance under climate change**: Examine location of mechanical equipment that support critical public service functions and whether they could be subject to flooding or storm impacts. Identify specific projects to enhance transportation, stormwater, or water infrastructure performance at vulnerable locations. Examine the transportation network and accessibility of critical infrastructure in light of potential flood impacts, power outages, or other chronic issues that could be caused by more intense precipitation patterns. Assess compounding or cascading impacts especially for critical locations (schools, nursing homes, day cares, hazardous waste storage sites, a potential future emergency operations center) involving heat, power outages, flooding and accessibility, drainage, or other ongoing or health-related climate impacts.

- **View all City decisions about operations, programs, and capital plans through a climate change lens**: This action will involve understanding current and future changes and how to adjust city infrastructure, facilities, operations and services to anticipate and reduce or eliminate long-term risks to infrastructure, ecosystems, people and property from hazards and their effects. For example, the City operates a water treatment plant, water/sewer/stormwater utilities, various facilities, local road network, and the Police Station. The City operates a senior center, a nature center, three community centers, a swim and fitness center, community gardens, and many accompanying programs. The City also provides trash and recycling services, snow clearing, and responds to other emergency issues. The Housing and Community Development Department supports residents by helping connect them to assistance services. Planning and Development Services reviews and processes numerous permits and development reviews, serving the City's property owners and businesses. The City's parks include many recreational and natural assets including athletic facilities, community gardens, and forestland. Assessing the vulnerability of City facilities and services and identifying ways to enhance climate resilience could be accomplished ad-hoc or more holistically through development of an internal policy or Climate Resilience Plan.

- **Update design guidelines for City facilities to incorporate climate changes**: In particular, the City should examine opportunities to design stormwater management and landscapes that can absorb and filter larger quantities of water, to improve water quality to the extent possible and reduce flooding. Some cities have used approaches such as designing park areas to hold water during a cloudburst to keep surrounding buildings safe. The City employs some operational methods such as draining stormwater facilities ahead of a storm to allow them to hold more water. These methods could be more systematically implemented or expanded.

- **Look for funding and technical assistance opportunities:** Maryland Energy Administration, FEMA, and others offer funding opportunities for resiliency projects. For example, the City was recently awarded technical assistance to assess the feasibility of a solar-powered microgrid to power City functions that would be located at 6 Taft Court property in the future. A microgrid would ensure continuity of critical operations during power outages. The City should also explore funding and technical assistance for flood assessment and mitigation plans and projects.

- **Leverage existing resources where possible**: The City can leverage resources of other agencies that have overlapping efforts including the federal government, the State of Maryland, and members of the Metropolitan Washington Council of Governments. Montgomery College, Montgomery County Public Schools and Maryland National Capital Park and Planning are also considering climate change in their policies. As the County continues to develop their climate resiliency strategy, there will be future opportunities to work on a joint effort involving engineers, program managers, and facility operators about what climate change means for their mission and start to identify strategies to improve the City's resilience to climate change and other disruptions.

Action M-12	Advocate for state and federal authorities to update stormwater infrastructure design, operations and maintenance standards to accommodate new rainfall/ storm event projections and help reduce projected flooding issues		
Objective	Incorporate updated design standards/operations and maintenance standards for stormwater infrastructure		
Metrics	Milestone/Status update		
Target	Community Resiliency	**Development Stage**	MDE is updating data and standards
Lead	Public Works (Engineering and Environment)	**City Upfront Cost**	Utilize existing resources
Partners	Maryland agencies, Planning and Development Services	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
N	++	++	+	+	Save and Livable Neighborhoods, Stewardship of Infrastructure

Polluted stormwater runoff from developed areas is one of Rockville's greatest water quality challenge. Whenever it rains, water flows off parking lots, roadways, rooftops, and other impervious surfaces, picking up pollutants and litter. This contaminated runoff drains directly into streams, rivers, and eventually the Chesapeake Bay potentially without any treatment. Stormwater runoff also contributes to urban flooding that has the potential to damage private property and public infrastructure. Paving over natural areas with impervious surfaces that don't absorb rain dramatically increases the amount of water running off the land during storms. As climate change brings more frequent and intense storms, stormwater runoff volumes without modern SWM treatment will continue to increase, exacerbating existing flooding and pollution problems—and creating new ones. Heavy downpours can overwhelm existing stormwater management facilities and storm drain networks and cause increase damage to Rockville streams. As a result, communities can experience more localized flooding and greater runoff of contaminants such as trash, nutrients, sediments, or bacteria into local waterways.

While Maryland has progressive stormwater management requirements that the City incorporated into City Code for new and redevelopment projects, the design standards are outdated. Facilities that are built today are not designed to treat and convey the larger intensity storms that are occurring now and forecasted to occur even more frequently in the future. The 2021 Maryland General Assembly approved legislation requiring the Maryland Department of the Environment (MDE) to update specified stormwater management regulations and criteria once every five years to incorporate specified updated precipitation data.[43] Among other things, in updating the regulations, MDE must conduct specified public outreach and consult with specified entities. The City should continue to advocate for the Maryland Department of the Environment (MDE) to update to design standards and operation and maintenance standards to ensure stormwater management infrastructure constructed today can help mitigate projected climate related water quality and flooding issues in the future.

[43] https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/SB0227

Action M-13	Assess Rockville's risk of flooding and develop a Flood Mitigation Plan to reduce or mitigate flooding impacts					
Objective	Identify areas that are vulnerable to flooding and associated flood mitigation options. Position Rockville to apply for grant funding for flood mitigation projects.					
Metrics	Plan milestone/Status update					
Target	Community Resiliency		**Development Stage**	Proposed plan		
Lead	Rockville Public Works		**City Upfront Cost**	$1,500,000 for consulting services		
Partners	Planning and Development Services, Recreation and Parks		**City Operating Cost**	To Be Determined		
GHG Benefit	**Resiliency**	**Feasibility**	**Health**	**Equity**	**Co-Benefits**	
N	+++	++	+	+	Safe and Livable Neighborhoods, Stewardship of Infrastructure	

Heavy downpours have increased in frequency and intensity in the last 50 years. They are expected to become more frequent and intense as global temperatures continue to rise. As a result, the average 100-year floodplain is projected to increase in area by 45 percent by the year 2100 and flash flooding could impact low-lying, inland areas (adapted from Manage Flood Risk | US EPA). Through progressive stormwater management (SWM) regulations and participation in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP), the City has largely kept development out of currently delineated floodplain areas. It has also installed, through private development and public retrofit projects, a large number of SWM facilities designed to treat and reduce the volume of water running off impervious surfaces. However, the City anticipates that climate change will increase flood impacts to developed property.

The City will work with a consultant to analyze the potential for future flood risk by using flood forecast models based on climate informed precipitation projections. This will result in multiple flood impact maps based on different predicted storm event scenarios and would include the flood risk to streams that fall below the FEMA regulated threshold; for example, headwater streams near Woodmont Country Club, King Farm and Fallsgrove neighborhoods. The analysis will also provide information on potential risks associated with pluvial, or in-land flooding not associated with rivers and streams. Staff will use this data to develop a Rockville Flood Mitigation Plan that will identify areas of concern and outline specific actions the City can take to mitigate the impact of flooding on residential and commercial property. Typical actions may include culvert upgrades, property purchase and demolition, quantity control-type SWM facility retrofits, and reductions to impervious surface wherever possible. The plan will identify fair and equitable decision-making criteria to prioritize flood mitigation project locations and mitigation strategies. Many of the current flood mitigation grant opportunities currently available from the federal and state governments as well as private foundations require a robust flood mitigation plan for eligibility. Therefore, this effort will position the City to apply for flood mitigation project funding in the future.

Equity Considerations

Ensure plan prioritizes flood mitigation project to protect human safety and property damage, especially vulnerable communities.

Action M-14 Develop and implement Heat Illness Prevention Plans for various City services and operations

Objective	Protect the health and safety of workers and community members using City services from the health impacts of high heat.		
Metrics	Milestone/Status update		
Target	Reduce human exposure to high heat	**Development Stage**	Ongoing
Lead	Human Resources	**City Upfront Cost**	-
Partners	All Departments	**City Operating Cost**	-

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
N	++	++	++	+	Efficient & Effective Services

Rockville already experiences high heat periods during the summer and climate models project heat waves to worsen in frequency and intensity. Heat Illness is a serious medical condition resulting from the body's inability to cope with a particular heat load and may include heat cramps, heat exhaustion, heat syncope, and heat stroke. This greatly impacts employees that work outdoors or in other spaces where environmental risk factors for heat illness are present. Under Occupational Safety and Health Administration (OSHA) law, employers are responsible for providing workplaces free of known safety hazards. An employer with workers exposed to high temperatures should establish a complete heat illness prevention program. Human Resources has already developed a Heat Illness Prevention Plan for the Recycling and Refuse Division whose workforce is exposed to high heat working condition during the summer. The plan contains specific measures for high heat events; which include but are not limited to:

- monitor the weather (current and forecast) and adjust workloads accordingly;
- reduce workplace heat exposure by implementing work practice controls (e.g., modified summer hours to accomplish work during cooler periods, shade, etc.);
- train workers to be vigilant for signs of heat illness and respond quickly;
- ensure workers are acclimatized before working in hot environments;
- provide appropriate hydration;
- ensure and encourage rest/cool-down breaks;
- have an emergency plan ready to respond to a heat related illness.

This model may be used to develop plans to protect the health and safety of other members of our outdoor workforce and community members receiving City services (e.g., youth participating in outdoor summer camps) during hot weather.

Equity Considerations

Social and economic inequities, as well as individual characteristics, place some individuals and communities at greater risk than others for the effects of extreme heat. The very young and the elderly are less able to sense and adapt to changes in temperature. Those with conditions such as obesity, diabetes or renal, cardiovascular and respiratory diseases are at higher risk of heat illness, including changes in medication effects and other complications.

Public Engagement & Oversight

Conduct inclusive and equitable public engagement and establish systems for monitoring and accountability to encourage participation and support plan success.

Action C-25	Work with community partners to conduct an inclusive public engagement campaign to reduce emissions and adapt to the impacts from climate change		
Objective	Elevate education and engagement around CAP goals and actions		
Metrics	Number of community impressions, number of participants in CAP programs		
Target	Supports all actions	**Development Stage**	Proposed expansion of various programs
Lead	Public Information Office, Public Works	**City Upfront Cost**	-
Partners	Various Departments, Montgomery County, Boards and Commissions, Stakeholders	**City Operating Cost**	Staff/contracted engagement support Cost share: C-02, C-05, C-09, C-13, C-17, C-18, C-19, C-21, C-24

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
++	++	++	+	+	Informed & Engaged Residents

CAP public engagement doesn't end with plan adoption, success depends on the degree to which community members are actively engaged and empowered to take action to meet CAP goals. The City must collaborate with regional partners and representatives from boards and commissions, the business community, the faith community, neighborhood groups and civic associations, and other community organizations. CAP engagement will require:

- **Community Engagement and Empowerment:** Implementing community actions relies on guidance and involvement from Rockville residents, visitors, business owners and property owners to be successful. Rockville will need to develop an inclusive public engagement campaign that meets people where they are and integrates climate-related needs and opportunities within city program communications and public touchpoints. Engagement can take the form of face-to-face or virtual interaction, mailers, community forums, social media outreach, Rockville Reports, participating in community meetings, and other forums, depending on the needs of the action.

- **GHG Mitigation:** The City will need to initiate several campaigns to support residents and property owners to invest in climate mitigating home energy efficiency improvements, solar and renewable energy system, and electric vehicles as well as choose to incorporate environmentally friendly landscape, solid waste, and

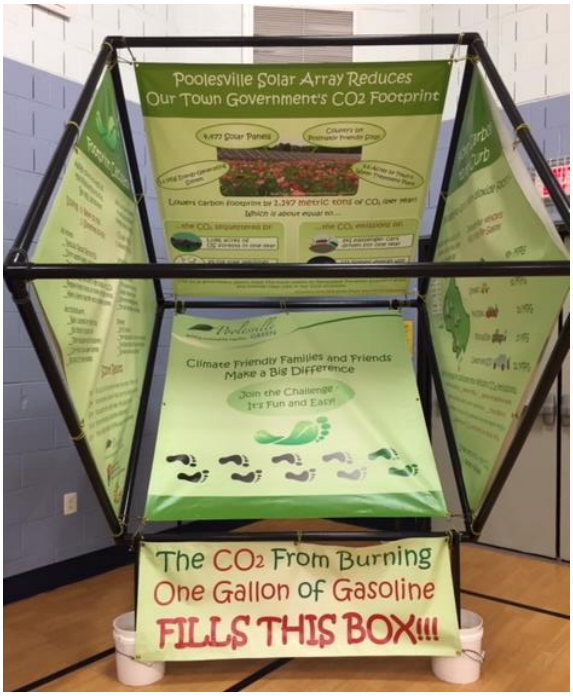
Equity Considerations

Communication and engagement plans can take into account that different cultures and communities, of which the City has many, have different needs and ways of sharing information and participating. To achieve broad resonance, messaging must be culturally relevant, translated into multiple languages, and conducted on a regular basis, and must include various forms of media and approaches to ensure accessibility for diverse audiences.

The City could also consider accommodations for low income or minority residents to allow them to participate in public meetings and programs.

transportations practices into their daily lives. This requires staff and marketing resources for at least six different campaigns that need to be designed to meet diverse audiences.

- **Resiliency**: This City will also need to help community members understand relevant climate risks and participate in programs to help them adapt and be resilient to changes, such as the National Flood Insurance program, emergency warning system, preparing for extreme weather events, improve drainage, locating nearest cooling centers and other ways to reduce health risks on high heat days, strengthening community connections and support systems (such as Rockville's Villages program).



- **Partnerships**: Ultimately, no one person or group or city can solve climate change alone – it will take collaborative action. Rockville often coordinates with Montgomery County, COG, boards and commissions, nonprofits, the "Villages" network, and other State programs to share effective strategies and work with the community. Montgomery County will be a critical partner in the effort. The County is planning to include CAP education and and outreach opportunities in programs at the public school, libraries and Montgomery College. The County will also provide outreach on programs that benefit Rockville, such as building energy benchmarking and energy performance standards, potential building electrification initiatives, Community Choice Energy, solar co-op, transit programs, EV purchasing cooperative, and emergency services. Additionally public engagement on many CAP actions intersect with other quality-of-life, such as health, housing, traffic safety, racial equity, community services that rely on other community partners for outreach.

Action C-26	Develop metrics and performance indicators for climate actions to establish a data-driven assessment and reporting process		
Objective	Develop an approach to measuring and tracking process with periodic reporting to gauge plan performance, identify challenges, and showcase wins		
Metrics	Milestone/Status update		
Target	All actions	**Development Stage**	Proposed
Lead	Public Works	**City Upfront Cost**	-
Partners	All City Departments, COG, Utilities, Montgomery County	**City Operating Cost**	Reporting metrics of some actions may require coordination with the City's ERP

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	++	N	N	Good Governance

It is important to establish metrics, or indicators, to not only track and report progress to leadership and the public, but also to make course corrections and adjustments when needed. Ongoing monitoring and reporting will help support all the actions adopted in the CAP and improve accountability. The City will need to develop a set of metrics that are based on easily-trackable sources of data and a periodic reporting process that balances the need to measure progress with the need to focus the most time and effort on doing the actions in the plan and moving forward. Outcomes-based indicators are preferred when practical, but in many cases, qualitative updates, project status, percent completed or estimated quantities reached may suffice. Example of metrics include:

- **System-Level Metrics**: Measure the overall impact of a combination of strategies (e.g, total residential energy use, community GHG emissions, vehicle miles traveled).
- **Program-Level Metrics**: Measure the impact of a specific activity/program (e.g., facility energy retrofits and energy savings, number of homes receiving weatherization incentives or Rainscapes Rebates, percent of fleet that are ultra-low emission vehicles, number EV charging stations installed, number of solar installations, number of streetlights retrofitted to LED and kWh savings, miles of bike lanes installed, etc.).
- **Milestone/Status Updates**: Illustrate whether or not an action or project has been completed (e.g., adoption of net zero building codes or adoption of Pedestrian Master Plan).

It is important to note that the City relies on a variety of data sources (both internal and external) and some entities have time lags for collection and reporting. For example, the City's communitywide GHG emissions inventory, is currently only updated by COG once every three years. Data on energy efficiency programs depends on utility reporting cycles and building energy benchmarking data is collected and reported by Montgomery County. As the City embarks on Enterprise Resource Planning (ERP) system in the future, some metrics may be included in system setup to efficiently and effectively collect, store, manage and interpret data from many City activities. Some CAP metrics could also be incorporated into annual budget metrics, with a few key project status updates provided to the Mayor and Council.

Equity Considerations

Include metrics that focus on equity and services/actions supporting socially vulnerable populations.

Action M-15 Incorporate climate mitigation and resiliency considerations into the City's budget process

Objective	Incorporate climate mitigation and resiliency goals in budget decision-making processes and explore innovative funding strategies.		
Metrics	Milestone/Status update		
Target	Supports action implementation	**Development Stage**	Proposed
Lead	Finance	**City Upfront Cost**	To Be Determined
Partners	All Departments	**City Operating Cost**	To Be Determined

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	+	N	N	Good Governance, Fiscal Responsibility

The costs of climate mitigation and resiliency actions can have important implications for local budgets that already face many pressures; however, the cost of inaction is greater. Financial markets are beginning to recognize the importance of communities assessing and strategically planning to reduce climate risks. For example, S&P's 2016 ratings criteria for U.S. municipal waterworks, sanitary and drainage utility systems consider specific climate risk assessment strategies, such as supply planning and flood protection, in its assessment of asset adequacy and identification of operational risks. In 2017, the global credit rating agency Moody's Investor Services announced that analysts weigh the impact of climate risks with states' and municipalities' preparedness and planning for these changes when they analyze credit ratings. One Maryland community, Charles County, received a higher bond rating upon adoption of a climate resiliency plan. Having a proactive and multipronged approach to climate change is indicative of City leaderships' overall long-term planning strategy. To implement Rockville's CAP, the City will need to pursue:

- **Innovative funding strategies**: Fully implementing the actions in the CAP will require leveraging traditional and innovative funding streams from both the public and private sectors. Such programs may include, but are not limited to partnerships with other local government on climate energy education and outreach, partnerships with local utilities or other entities for EV charging stations, maximizing EmPOWER Maryland program funds, Federal transportation grants infrastructure funding, FEMA Building Resilient Infrastructure and Communities (BRIC) Program, technical assistance support, or utilizing a solar power purchase agreement to finance solar installations to access Federal tax incentives.
- **Linking climate considerations into the budget process for all departments**: Similar to social and racial equity considerations, climate change considerations should be incorporated into budget decision processes across City government. New plans, policies and projects can be examined to determine how they affect GHG emissions; how they can be modified to reduce GHG emissions where possible; how they are affected by climate change (now and over the program/project lifespan); and how they could be designed to increase resiliency.

Equity Considerations

Screening policies, projects and programs for positive and negative effects on climate emissions and resilience should include examining impact on equity.

Action M-16 Develop an interdepartmental climate action team to implement and track plan progress

Objective	Create a team that meets quarterly to coordinate CAP implementation and assess progress.		
Metrics	Milestone/Status update		
Target	Oversee all actions	**Development Stage**	Proposed
Lead	Public Works	**City Upfront Cost**	To Be Determined
Partners	All Departments	**City Operating Cost**	To Be Determined

GHG Benefit	Resiliency	Feasibility	Health	Equity	Co-Benefits
+	+	++	+	+	Good Governance

Many cities have found that creating an interdepartmental work group or leadership team is helpful to implement climate action plans because the causes and impacts of climate change involve every department in local government. Rockville's CAP includes actions to enhance climate change awareness, knowledge, and technical capacity among City staff and the community. The CAP also includes actions to institutionalize climate change considerations within government processes and actions to implement approaches to measure and report on progress. Responsibility for initiating and ultimately implementing many of the actions will need to be shared and rely on leadership from managers and employees across various City departments. Often there's a learning curve with new initiatives and climate action will be no different. In some case, new staff or training will be needed to implement the actions, in other cases, actions are part of regular business, but involve changes to current processes and practices. Coordination with the City Manager's Office will help ensure that all departments are receiving the support they need, monitoring progress, and that project leads are accountable.

Cooperation on many fronts will be essential to foster opportunities for creativity, collaboration, and innovation among City staff and community partners. Not only is internal coordination needed, Rockville's team will also need to collaborate with state and regional agencies. For instance, team members will need to coordinate with the following to support broader climate goals and programs.

- **Montgomery County Climate Leadership Team**: Includes key staff from various Montgomery County departments, independent agencies, and municipalities that play important roles in combatting climate change through their programs, services, and operations.
- **Metropolitan Washington Council of Governments Climate Energy and Environment Policy Committee (CEEPC)**: Serves as the principal policy adviser on climate change, energy, green building, alternate fuels, solid waste and recycling policy issues, and is responsible for managing implementation of the national capital region climate plan.
- **Maryland Climate Leadership Academy**: Created to increase the capacity of government agencies, infrastructure organizations and businesses to develop and implement sound climate change initiatives.

Equity Considerations

Equity in implementation and program design should be integrated into new processes and practices and can be built upon through the climate leadership team.

VI. Implementation and Next Steps

City Implementation

Developing Rockville's Climate Action Plan is just the beginning of the work. Without dedicated leadership and resources, the Plan will not automatically reduce emissions or protect the community from climate impacts. Rather, the CAP sets a foundation for climate action in the months and years ahead. Implementing many of the actions in this plan will require community conversations, leveraging of private and public resources, advocacy of policy changes beyond Rockville's borders, and difficult decisions and trade-offs based on community values. The City must move with determination to align and orient staffing, technical capacity, processes and decision-making to address climate change. The City will also need to experiment with new approaches, technologies, partnerships and processes and be able to make nimble adjustments to make progress and adjust to our ever-evolving world.

Rockville's first Climate Action Plan charts an aspirational course for achieving a 50% reduction below 2005 emissions by 2030, the first phase in a path to carbon neutrality by mid-century. The actions listed are not meant to be prescriptive, but a starting point to set in motion the programs, plans, and projects that reduce emissions and foster resilience. This plan is meant to be flexible to take advantage of new technologies and other opportunities as they arise. Additional actions at the federal, state, and county level could be leveraged to support the success of this plan. Many actions are under the City's authority yet achieving this goal will require everyone's involvement. The *What Can I Do* section on the following pages lists actions individuals can take that make a difference, with links to resources.

This plan is preceded by Rockville's active sustainability program. Many projects and activities are already underway and will continue in tandem with plan finalization. Several actions require additional resources to move forward and are dependent on budget appropriation. Appendix A provides an overall summary of the CAP; outlining anticipated benefits, lead organization, partner organization(s), and preliminary cost and resources estimates for City implementation. Appendix B provides an Implementation Summary by Action type (project, program, policy, etc.)

Developing a system for regular monitoring of progress should balance the need to focus on implementation. This plan could be updated every ten years, while progress updates could be submitted annually. Assessing progress towards GHG reduction goals is dependent on COG's coordination of community-wide GHG emissions inventories. This process currently occurs once every three years and often lags a year because of extensive data collection requirements. Since climate mitigation and adaptation touch every department, successful plan adoption also entails identifying training needs and laying the groundwork to support interdepartmental coordination and other capacity-building activities.

Although implementation requires resources, especially for the many actions that extend beyond current departmental capacity, many of these actions constitute good stewardship and make financial sense. Many other City initiatives and plans already set in motion have climate rewards. Saving energy reduces operating costs over the long term and preparing for extreme events reduces their impacts. In some cases, incremental grants or financing structures may be available to help offset upfront costs. These actions also have many community benefits such as a cleaner environment, job creation, beautification, and quality of life. Each action should be designed and implemented with the goal of ensuring equity and protecting vulnerable workers and residents. Investing in Rockville's future will reap benefits far beyond those articulated in this plan.

What Can I Do?

Everyone can play a role in contributing to Rockville's Climate Action Plan. It requires both system level changes and individual actions to address climate change. Each person, household, business, or organization has a unique carbon footprint and set of opportunities. The actions each of us can take are different, but the goals are the same: Conserve energy, support renewable energy sources, consider your transportation options, reduce waste, look for ways to enjoy and protect nature, volunteer, and be prepared for changing weather.

Start by calculating your carbon footprint and learn easy first steps by visiting the EPA's Carbon Footprint Calculator (https://www3.epa.gov/carbon-footprint-calculator/). Consider a few ideas below to reduce your carbon footprint and join with others in your community to do the same. Even small steps can make a difference! Subscribe to the City's Environment & Sustainability email newsletter at http://eepurl.com/dtJySD to receive seasonal sustainability tips, reminders, and program updates.

Getting Around

Walk more for your health and the environment. You can even Plog (pick up litter) while you are walking to help keep our neighborhoods clean.

Take a bike or scooter to your destination to reduce car emissions and get some exercise. **More resources: www.rockvillemd.gov/319/Bicycles**

Take Public Transit to reduce air pollution and be more fuel efficient.

Drive smart by reducing idling, servicing your car, or switching to an electric or hybrid car.

Drive less by combining errands, car sharing, vacationing closer to home, or teleworking one or more days a week.

Visit www.montgomerycountymd.gov/commute to learn more about the public transit, car sharing, bike programs, and other ways to reduce your car emissions.

Take one less flight a year and take "staycations" to visit locations closer to home, such as state or national parks, to save money, reduce stress, and significantly reduce your carbon footprint.

Energy Efficiency

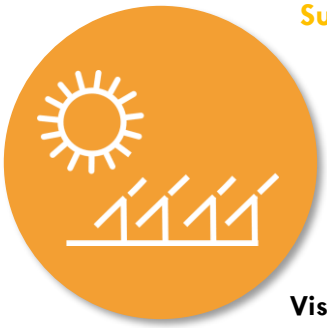
Schedule a energy assessment to receive ideas for home comfort upgrades to make your home more energy efficient. See https://montgomeryenergyconnection.org/ for energy resources.

Monitor your thermostat and set your temperatures slightly higher in the summer and lower in winter. Upgrading to a programmable or smart thermostat can help you monitor your energy usage and save money.

Switch to LED lighting. LED lights use up to 85% less energy and last up to 25 times longer than incandescent lights.

Look for the ENERGY STAR® symbol when buying new appliances. At the end of your appliance's useful life, transition to electric appliances in anticipation of the electric grid becoming greener.

Wash smart and save energy by taking shorter showers, washing laundry with cold water, using a dryer ball, and running the dishwasher only when full. Use larger appliances like washing machines at off-peak hours to lower the energy demand.



Sustainable Energy

Switch to clean or renewable energy sources. You can choose your energy supplier in Maryland, including renewable energy sources such as wind and solar. Ensure that you choose a verified clean energy producer by using Green-e, the trusted global leader in clean energy certification.

Go solar by joining a solar-coop to install rooftop solar. If you're home isn't right for solar, consider community, or shared, solar to receive the same benefits by subscribing to a large commercial project in your utility area.

Visit https://montgomeryenergyconnection.org/ to learn more about how to choose a renewable energy supplier and find solar programs and financing options.

Sustainable Gardening and Lawns

Plant native plants and trees for a biodiverse and resilient ecosystem that absorbs carbon, provides shade, reduces air and water pollution, and provides habitat for native wildlife. Remove non-native invasive plants that crowd out native plants and reduce biodiversity.

Install RainScapes projects such as rain gardens, conservation landscapes, rain barrels, permeable pavers, and pavement removal. Save money by applying for RainScapes Rebates at www.rockvillemd.gov/rainscapes.

Practice sustainable lawn and garden care by reducing synthetic pesticide and fertilizer use, practicing organic lawn care, reducing the size of your lawn and composting yard trim. Learn more at www.montgomerycounty.gov/lawns.

Shop at the Farmers Market. The farm-fresh fruits, vegetables, plants, cut flowers, preserves, honey, herbs, baked goods and other items that you find at the Rockville Farmers Market are fresher and travel a shorter distance than similar grocery store products. You can find more information at https://www.rockvillemd.gov/664/Farmers-Market.

Join a CSA, or Community Supported Agriculture (CSA), to get a once-a-week or biweekly box full of local fruits and veggies that are in season delivered to your door or that you pick up. Learn more at https://montgomerycountymd.gov/agservices/farm-to-table.html.

Reduce Waste and Consumption

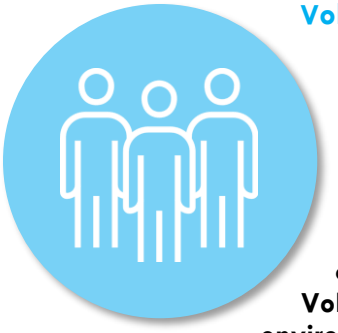
Reduce and reuse by avoiding single use materials, donating, shopping at second-hand stores, yard sales, and using neighborhood free or buy/sell/trade groups.

Recycle right by learning what items can be recycled at www.rockvillemd.gov/recycling-refuse. When in doubt, throw it out. Make sure hazardous waste, electronics and metal are disposed of properly.

Gift differently by giving experiences, buying local, volunteering or donating in someone's name, and minimizing wrapping waste.

Reduce food waste and save money by meal planning, only buying the ingredients you need, and using reusable meal containers. Learn more about food composting at https://www.montgomerycountymd.gov/sws/foodwaste/.

Practice Meatless Mondays. Every Monday, choose a vegetarian meal over a meal that includes meat. A complete plant-based diet is not for everyone, but a small reduction in meat consumption one day a week can be a healthy choice that's also good for the environment.



Volunteer

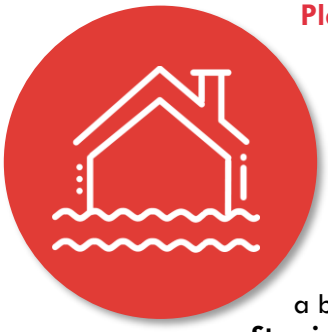
Help Rockville's environment by joining stream and trail cleanups, non-native invasive removals, and other nature-based volunteer opportunities.

Join a city board or commission to lend your expertise, thoughts, ideas, and opinions to shape Rockville's future.

Help a neighbor, senior or other vulnerable community members by joining or starting a "Rockville Village" to foster social connections and coordinate volunteer help. Learn more at www.rockvillemd.gov/villages.

Volunteer or donate to local assistance programs and social and environmental justice efforts. Underserved communities are disproportionately affected by climate change. For a list of City assistance programs, visit https://www.rockvillemd.gov/385/Donation-Sponsorship-Programs.

Visit www.rockvillemd.gov/volunteer to find volunteer opportunities with the city.



Plan

Purchase flood insurance and flood-proof your home. Visit the National Flood Insurance Program at https://www.floodsmart.gov/ to evaluate your risk and then, depending on what you learn, buy insurance and make home improvements.

Build an emergency preparedness kit to prepare for climate disasters by having basic household items on hand, such as nonperishable food, water, a battery-operated radio, a flashlight, first aid materials, extra batteries, and a backup of critical files.

Stay informed and reduce risks from high heat days, storms, insect borne illnesses and harmful algae blooms. Register with the Alert Montgomery System for immediate emergency notifications. Follow City of Rockville and Montgomery County on social media for non-emergency updates.

Build community connections to help vulnerable neighbors, support community shelters and cooling centers, and ensure pets are hydrated and cared for.

Visit www.rockvillemd.gov/272/Emergency-Preparedness for emergency preparedness tips.

VII. Glossary

Abatement: Reducing the degree or intensity of greenhouse-gas emissions.

Adaptive Capacity: The capability of people, systems, and assets to cope with a climate hazard.

Battery-Powered Electric Vehicle (BEV): A vehicle that gets all its power from batteries and electric motors. It contains no internal combustion engine (ICE). The electric motor uses batteries that are recharged by plugging in to an electric power source (a wall socket or EV charger).

Baseline: Climate conditions or greenhouse gas (GHG) emissions snapshot with which to begin tracking adaptation or reduction progress.

Carbon Dioxide Equivalent: A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as "million metric tons of carbon dioxide equivalents ($MMTCO_2Eq$)." The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP.

Carbon-free: Sources of energy that do not emit greenhouse gases, including wind, solar, and nuclear; used interchangeably with the term “decarbonized” in reference to energy types.

Carbon Sequestration: The process of removing carbon from the atmosphere and depositing it in a reservoir.

Clean Energy: Energy from renewable, non-carbon-emitting sources; this excludes nuclear and biomass generation.

Climate: In a narrow sense, climate is usually defined as the "average weather," or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands of years. The classical period is 3 decades, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system.

Climate Change: Climate change refers to any significant change in the measures of climate lasting for an extended period of time. Climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer.

Co-Benefits: Actions that have multiple benefits. For the Climate Action Plan, adaptation strategies that will also reduce greenhouse gases or vice versa are co-benefits. This term can also be used to describe the additional economic and public health benefits of an action.

Electric Vehicle (EV): A substitute for gas-powered vehicles that run on motors powered by electricity. Electric vehicles do not release emissions but can contribute to greenhouse gas emissions if the electricity they use does not come from carbon neutral sources.

Emissions: The release of a substance (usually a gas when referring to the subject of climate change) into the atmosphere.

Energy Burden: The percentage of household income that goes toward utility bills.

Energy Use Intensity (EUI): The measurement of the energy used per square foot per year. It is calculated by dividing the total energy consumed by the building in on year (measured in thousand Btu, kBtu) by the floor area of the building.

Environmental Racism: The disproportionate impact of environmental hazards such as air pollution on people of color and "energy burden" - percentage of household income that goes toward utility bills.

Environmental Stewardship: Increased creation, preservation, or restoration of natural environments.

Extreme Weather: A weather event that is rare at a particular place and time of year, including, for example, heat waves, cold waves, heavy rains, periods of drought and flooding, and severe storms.

Fossil Fuels: A general term for organic materials formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the earth's crust over hundreds of millions of years.

Fugitive emissions: Greenhouse-gas emissions as by-products or waste or loss in the process of fuel production, storage, or transport, such as methane given off during oil and gas drilling and refining, or leakage of natural gas from pipelines.

Greenhouse Gases: The atmospheric gases responsible for causing global warming and climate change. The major GHGs are carbon dioxide (CO2), methane (CH4) and nitrous oxide (N20). Less prevalent --but very powerful -- greenhouse gases are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6).

Heat Island: The tendency for higher air temperatures to persist in urban areas as a result of heat absorbed and emitted by buildings and asphalt, tending to make cities warmer than the surrounding rural areas.

Heat Stress: The negative health impacts, such as heat stroke or heat exhaustion, caused by exposure to extreme heat or long periods in hot environments.

Hybrid Electric Vehicle (HEV): A type of hybrid vehicle and electric vehicle that combines a conventional internal combustion engine (ICE) propulsion system with an electric propulsion system (hybrid vehicle drivetrain).

International Council of Local Environmental Initiatives (ICLEI): An international non-government organization that promotes sustainable development and provides technical consulting to local governments to meet sustainability objectives.

Intergovernmental Panel on Climate Change (IPCC): Established in 1988 by the World Meteorological Organization and the UN Environment Programme, the IPCC surveys world-wide scientific and technical literature and publishes assessment reports that are widely recognized as the most credible existing sources of information on climate change.

Metric Ton: Common international measurement for the quantity of greenhouse gas emissions. A metric ton is equal to 2205 lbs or 1.1 short tons.

Micro-mobility: Transportation by lightweight, low-speed vehicles such as scooters or bicycles, either mechanical or electric.

Mitigation: In the context of climate change, a human intervention to reduce the sources or enhance the sinks of greenhouse gases. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to solar energy or wind power, improving the insulation of buildings, and expanding forests and other "sinks" to remove greater amounts of carbon dioxide from the atmosphere.

Net Zero: A target of completely negating the amount of greenhouse gases produced by human activity, to be achieved by reducing emissions and implementing methods of absorbing carbon dioxide from the atmosphere.

Non-Native Invasive Species (NNI): A non-native organism whose introduction within a particular ecosystem causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health.

Plug-In Hybrid Electric Vehicle (PHEV) or Plug-In Hybrid: Uses an electric motor and gas engine to operate. Its electric motor uses batteries that are recharged by plugging in to an electric power source (a wall socket or EV charger). The gas-powered motor can work together with the electric motor, or separately on its own, to power the powertrain.

Preparedness: Actions taken to build, apply, and sustain the capabilities necessary to prevent, protect against, and ameliorate negative effects.

Public Health: Increased life expectancy or reduced incidents of diseases or deaths attributed to air quality (indoor or outdoor), weather, poor sanitation, or lack of access to nutrients.

Racial Equity: When race can no longer be used to predict life outcomes.

Resilience: A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.

Risk: Risks are threats to life, health and safety, the environment, economic well-being, and other things of value. Risks are often evaluated in terms of how likely they are to occur (probability) and the damages that would result if they did happen (consequences).

Sensitivity Level: of negative impact to people, systems, and assets from a climate hazard.

Social Justice: When all people have access to the same rights and systems, there is a fair distribution of resources, and life outcomes are improved for all groups.

Underrepresented Community: A community that is not represented in City or local leadership proportionately to its demographic percentage of the total City population.

Vehicle Miles Traveled (VMT): VMT is a measure of the total distance traveled by cars; usually measured on an annual basis.

Vulnerability: The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

Weather: Atmospheric condition at any given time or place. It is measured in terms of such things as wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation. In most places, weather can change from hour-to-hour, day-to-day, and season-to-season.

Zero Emission Vehicles: Vehicles powered by electricity or other clean fuel technologies, including hydrogen fuel cells.

VIII. Appendices

Appendix A: Rockville Climate Action Plan Cost-Benefit Summary

Category	Action ID	Action	Benefits (+++ High, ++ Medium, + Low, N Neutral, - Negative)						Lead	Partners	Estimated City Investment
			GHG	Resiliency	Feasibility	Health	Equity	Co-Benefits			
Energy Efficiency	C-01	Advocate for Montgomery County's Building Energy Performance Standard (BEPS) for existing commercial and multifamily buildings	+++	+	++	+	-	Economic	Montgomery County	Public Works, Pepco, Washington Gas, Planning and Development Services	No direct implementation cost See M-01 for City facility compliance cost
	C-02	Expand the low and moderate income (LMI) home repair and weatherization program to increase energy efficiency, resiliency and renewable energy opportunities	+	++	++	++	+++	Housing Economic	Housing and Community Development	Public Works, Maryland Energy Administration, Pepco, Washington Gas, Housing non-profits	Low LOS: $100,000 per year +1 FTE High LOS: $250,000 per year +2.5 FTE (includes solar). Shared resources: C-05, C-09, C-20
	C-03	Adopt net zero building codes for new construction	++	++	++	+	N	Economic	Planning and Development Services	Public Works, Montgomery County, Development Community	Operating: 1 FTE/Consulting support Investment in staff capacity and training Shared resources with C—09, C-20
	C-04	Opt into Montgomery County's point of sale energy disclosure (Chapter 40, Real Property, Section 40-13B)	+	N	+++	N	+	Housing	Public Works	Montgomery County's Office of Consumer Protection	N.A.

Category	Action ID	Action	Benefits (+++ High, ++ Medium, + Low, N Neutral, - Negative)						Lead	Partners	Estimated City Investment
			GHG	Resiliency	Feasibility	Health	Equity	Co-Benefits			
	C-05	Expand the home energy efficiency outreach program to increase participation in utility energy audits and rebates	+	+	++	++	++	Housing, Economic	Public Works	Montgomery County, Environment Commission, Nonprofits, Pepco, Washington Gas, Housing and Community Development	Low LOS: $5,000 per year +.5 FTE (multilingual outreach materials and staff support) High LOS: $15,000 per year +1 FTE (includes City incentives) Shared resources with C-02, C-09
	C-06	Coordinate with Montgomery County on electrification incentives for existing building systems	+++	+	+	+	+	Housing Economic	Maryland, Montgomery County, Pepco	Public Works, Planning and Development Services	Shared resources: C-02, C-05
	M-01	Complete energy assessments of City facilities and develop a strategic plan to reduce facility energy consumption	+	+	++	+	+	Efficient and Effective Services, Utility Savings	Recreation and Parks	Public Works	Phased: $11,000/facility for a consultant audit + costs of energy measures. Grouped: Up to 6 at $66,000 0.25 FTE Shared resources with M-04, M-07, C-22, M-11 Long-term savings
	M-02	Convert City-owned streetlights to energy efficient LED (light-emitting diode) (CIP TA22)	+	+	+	+	+	Safe and Livable Neighborhoods, Stewardship of infrastructure, Utility savings	Public Works	Pepco, Maryland Energy Administration	CIP: FY 2023: $1million FY 24/FY 25 total unfunded: $2.2 Million Savings dependent on Pepco rebates and tariffs
	M-03	Advocate for a Pepco-owned streetlight LED conversion agreement that serves the public interest	+	+	+	+	+	Safe and Livable Neighborhoods, Stewardship of infrastructure	Pepco & Maryland Public Service Commission	Public Works	Costs, savings, depend on Pepco rebates and tariffs

Category	Action ID	Action	Benefits (+++ High, ++ Medium, + Low, N Neutral, - Negative)						Lead	Partners	Estimated City Investment
			GHG	Resiliency	Feasibility	Health	Equity	Co-Benefits			
Renewable Energy	C-07	Advocate to increase the Maryland Renewable Portfolio Standard by 2030	+++	N	+	TBD	+	Environment	Public Works	Environment Commission	-
	C-08	Coordinate with Montgomery County on development of the Community Choice Energy Program to aggregate green power purchasing	+++	N	++	TBD	+	Environment	Montgomery County, Maryland Public Service Commission	Public Works	-
	C-09	Promote private solar and geothermal installations through the solar co-op program, streamlined permitting, and expanding access for low-to-moderate income residents	++	+	++	N	+	Economic Environment	Public Works, Planning and Development Services, Housing and Community Development	Montgomery County, Non-profits, Montgomery County Green Bank	To Be Determined Shared resources: C-02, C-03, C-05,
	M-04	Identify and install feasible solar photovoltaic systems on city property	+	+	+	N	N	Economic Environment	Recreation and Parks	Public Works, solar development, Maryland Energy Administration (MEA)	Pending MEA study. Solar power purchase agreement has no/low upfront costs. 0.25 FTE Operating: contract mgmt. + electricity purchase
	M-05	Purchase renewable energy certificates (RECs) for municipal electricity	+	N	++	N	N	Environment	Montgomery County (cooperative purchase)	Public Works, Recreation and Parks	Annual operating: $20,000 to $85,000 (fluctuates with market conditions)
Transportation	C-10	Work with WMATA, MDOT, and Montgomery County to maximize transit accessibility and ridership and enhance mobility options	++	+	+	+	+	Mobility Economic Environment	Montgomery County, WMATA, MDOT	Public Works, Planning and Development Services	Costs included in various projects and programs
	C-11	Develop a Rockville Community Electric Vehicle (EV) Readiness Plan	+	+	++	+	+	Mobility Economic Environment	Public Works	Planning and Development Services, Recreation and Parks	One-time consulting study $100,000
	C-12	Require new developments and redevelopments to be electric vehicle-ready	+	N	++	N	+	Mobility	Planning and Development Services	Public Works	-

Category	Action ID	Action	Benefits (+++ High, ++ Medium, + Low, N Neutral, - Negative)						Lead	Partners	Estimated City Investment
			GHG	Resiliency	Feasibility	Health	Equity	Co-Benefits			
	C-13	Promote a regional electric vehicle purchasing cooperative (EVPC)	++	N	++	+	+	Mobility Economic	COG, Montgomery County	Public Works	Utilize existing sustainability outreach resources
	C-14	Expand active transportation and shared micro-mobility network by implementing improvements in the Bicycle Master Plan and Vision Zero Plan	++	+	++	++	++	Mobility Safety Economic	Public Works		Costs included in various transportation projects and programs
	C-15	Adopt and implement a Pedestrian Master Plan	+	+	++	++	++	Mobility Safety	Public Works		To Be Determined
	M-06	Convert the City fleet to cleaner and more efficient fuel sources	+	+	++	+	+	Environment	Public Works	All departments	Upfront: see M-07 Operating: Ranges from $15,000/year to $175,000+/year for heavy duty; staff training costs Potential long-term savings in operations and maintenance
	M-07	Establish a new Capital Improvement Project (CIP) to expand electric vehicle charging infrastructure on City property to serve employees, fleet and the community	+	+	++	+	+	Mobility Economic Environment	Recreation and Parks	Public Works	CIP: $644,625 to $1,083,475 (depending on incentives and site conditions) 0.5 FTE Operating: To Be Determined to include software, electricity costs. May be offset by fuel savings Planning cost-share with C-11
	M-08	Update City teleworking and transportation benefit policies to encourage City employees to reduce vehicle miles traveled (VMT)	+	++	++	+	+	Mobility	Human Resources	All departments	Depends on level of transit incentives Cost share: M-07

Category	Action ID	Action	Benefits (+++ High, ++ Medium, + Low, N Neutral, - Negative)						Lead	Partners	Estimated City Investment
			GHG	Resiliency	Feasibility	Health	Equity	Co-Benefits			
Land Management	C-16	Implement the Comprehensive Plan to steer the most-dense development/ redevelopment to mixed-use, transit-served locations to reduce VMT and conserve/restore environmental areas	++	++	+	++	+	Mobility, Economic, Environment	Planning and Development Services	Planning Commission, Public Works, Housing and Community Development, Rockville Economic Development Inc. (REDI), Rockville Chamber of Commerce	Capital and implementation costs identified in a separate process. Cost share with CAP actions
	C-17	Expand education and incentives to support tree planting and maintenance, environmentally friendly landscape conversions, and management of non-native invasive plants on private property	+	++	++	+	+	Safe and Livable Neighborhoods, Environment	Public Works	Recreation and Parks, Planning and Development Services, Community Volunteers	Low LOS: $15,000 per year High LOS: $30,000 per year + 1 FTE
	M-09	Develop a Green Space Management Plan for public lands to assess and restore trees, forests, meadows, stream valleys and wetlands	+	++	++	+	+	Environment, Stewardship of Infrastructure	Recreation and Parks	Public Works	Operating: One-time consulting services $115,000 Implementation costs to be estimated in plan.
Materials and Waste	C-18	Develop a food waste composting program for residents	+	N	+	+	+	Environment	Public Works	Recreation and Parks, private contractor	One time: $6,000/site (bins + site work, signs) Operating: $10,000/site + outreach support Cost share: C-19, C-25
	C-19	Expand residential recycling and waste reduction outreach program to increase compliance and waste diversion	+	N	++	N	N	Environment	Public Works	Public Information Office, volunteers, Montgomery County	Operating: $5,000 + outreach support Cost share: C-18, C-25
	M-10	Develop a City sustainable procurement policy	+	N	++	+	+	Environment, Economic	Procurement	Various Departments	

Category	Action ID	Action	Benefits (+++ High, ++ Medium, + Low, N Neutral, - Negative)						Lead	Partners	Estimated City Investment
			GHG	Resiliency	Feasibility	Health	Equity	Co-Benefits			
Resiliency	C-20	Incorporate climate resilient building and infrastructure design features in new buildings and retrofits	+	++	++	++	+	Economic, Housing, Safe and Livable Neighborhoods, Stewardship of Infrastructure	Planning and Development Services	Public Works	To Be Determined Coordinate with C-03, C-22, C-24, M-09, and M-13
	C-21	Partner with Federal Emergency Management Agency (FEMA) to update the Flood Insurance Rate Maps (100-year Floodplain Maps) used to implement the National Flood Insurance Program	N	++	+++	+	+	Economic, Housing, Stewardship of Infrastructure, Safe & Livable Neighborhoods	Public Works	FEMA, Public Information Office, Montgomery County, Maryland Department of the Environment	Utilize existing resources
	C-22	Work with Montgomery County and community partners to provide cooling centers, resilience hubs, and other services to strengthen community resiliency	N	+++	++	++	++	Save and Livable Neighborhoods, Efficient and Effective Services	Recreation and Parks, Housing and Community Development	Public Information Office, Public Works, Montgomery County	To Be Determined
	C-23	Work with Montgomery County and community partners to measure and map urban heat islands to mitigate exposure to extreme heat	N	++	+	++	++	Economic, Mobility, Safe & Livable Neighborhoods, Efficient & Effective Services	Public Works	Montgomery County, community volunteers	Montgomery County seeking grant; may require City cost-share
	C-24	Increase tree planting, green, cool and photovoltaic roofs, and cool pavements on public and private property	+	++	++	++	+	Safe and Livable Neighborhoods, Economic	Public Works, Planning and Development Services	Parks and Recreation	To Be Determined Share resources with C-03, C-09, C-17, M-09
	M-11	Continue assessing the vulnerability of Rockville's critical infrastructure, facilities and services, and prioritize areas for improved climate resiliency	N	+++	++	+	+	Safe and Livable Neighborhoods, Stewardship of Infrastructure, Efficient and Effective Services	Public Works, Police, Recreation and Parks	Montgomery County	Upfront: $180,000 for consulting services for new Emergency Operation Plan and Continuity of Operation Plan Coordination with M-14 M-13, M-10, and M-09

Category	Action ID	Action	Benefits (+++ High, ++ Medium, + Low, N Neutral, - Negative)						Lead	Partners	Estimated City Investment
			GHG	Resiliency	Feasibility	Health	Equity	Co-Benefits			
	M-12	Advocate for state and federal authorities to update stormwater infrastructure design, operations and maintenance standards to accommodate new rainfall/ storm event projections and help reduce projected flooding issues	N	++	++	+	+	Safe and Livable Neighborhoods, Stewardship of Infrastructure	Public Works	Maryland Agencies	Utilize existing resources
	M-13	Assess Rockville's risk of flooding and develop a Flood Mitigation Plan to reduce or mitigate flooding impacts	N	+++	++	+	+	Safe and Livable Neighborhoods, Stewardship of Infrastructure	Public Works		Operating: One-time consulting services: $1,500,000
	M-14	Develop and implement Heat Illness Prevention Plans for various City services and operations	N	++	++	++	+	Efficient and Effective City Service	Human Resources	All Departments	Utilize existing resources
Public Engagement and Oversight	C-25	Work with community partners to conduct an inclusive public engagement campaign to reduce emissions and adapt to the impacts from climate change	++	++	++	+	+	Informed and Engaged Residents	Public Works	Public Information Office, Departments, Montgomery Co., Boards, Commissions, Stakeholders	Operating: Staff and contracted support Cost share: C-02, C-05, C-09, C-13, C-17, C-18, C-19, C-21, C-24
	C-26	Develop metrics and performance indicators for climate actions to establish a data-driven assessment and reporting process	+	+	++	N	N	Good Governance	Public Works	All City Departments, COG, Utilities, Montgomery County	Some reporting metrics may require coordination with the City's ERP (Enterprise Resource Planning) CIP
	M-15	Incorporate climate mitigation and resiliency considerations into the City's budget prioritization process	+	+	++	N	N	Good Governance, Fiscal Responsibility	Finance	All Departments	-
	M-16	Develop an interdepartmental climate action team to implement and track plan progress	+	+	++	+	+	Good Governance	Public Works	All Departments	-

Appendix B: Rockville Climate Action Plan Implementation Summary

Type	Action ID	Action
Projects	**C-21**	Partner with Federal Emergency Management Agency (FEMA) to update the Flood Insurance Rate Maps (100-year Floodplain Maps) used to implement the National Flood Insurance Program (NFIP)
	C-23	Work with Montgomery County and community partners to measure and map urban heat islands to mitigate exposure to extreme heat
	M-01	Complete energy assessments of City facilities and develop a strategic plan to reduce facility energy consumption
	M-02	Convert City-owned streetlights to energy efficiency LED (light-emitting diode) (CIP TA22)
	M-04	Identify and install feasible solar photovoltaic systems on City property
	M-06	Convert the city fleet to cleaner and more efficient fuel sources
	M-07	Establish a new Capital Improvement Project to expand electric vehicle charging infrastructure on City property to serve employees, fleet and the community
Programs	**C-02**	Expand the low and moderate income (LMI) home repair and weatherization program to increase energy efficiency, resiliency, and renewable energy opportunities
	C-17	Expand education and incentives to support tree planting and maintenance, environmentally friendly landscape conversions, and management of non-native invasive plants on private property
	C-18	Develop a food waste composting program for residents
Policies	**C-03**	Adopt net zero building codes for new construction
	C-04	Opt into Montgomery County's point of sale energy disclosure (Chapter 40, Real Property, Section 40-13B)
	C-12	Require new developments and redevelopments to be electric vehicle-ready
	C-20	Incorporate climate resilient building and infrastructure design features in new buildings and retrofits
	C-24	Increase tree planting, green, cool and photovoltaic roofs, and cool pavements on public and private property
	M-10	Develop a City sustainable procurement policy
Plans	**C-11**	Develop a Rockville Community Electric Vehicle (EV) Readiness Plan
	C-15	Adopt and implement a Pedestrian Master Plan
	M-09	Develop a Green Space Management Plan for public lands to assess and restore trees, forests, meadows, stream valleys and wetlands
	M-11	Continue assessing the vulnerability of Rockville's critical infrastructure, facilities and services, and prioritize areas for improved climate resiliency
	M-13	Assess Rockville's risk of flooding and develop a Flood Mitigation Plan to reduce or mitigate flooding impacts
	M-14	Develop and implement Heat Illness Prevention Plans for various City services and operations

Type	Action ID	Action
Plan Implementation	**C-09**	Promote private solar and geothermal installations (e.g., solar co-op, streamlined permitting, including expanding access for low-to-moderate income residents)
	C-10	Work with WMATA, MDOT, and Montgomery County to maximize transit accessibility and ridership and enhance mobility options
	C-14	Expand active transportation and shared micro-mobility network by implementing improvements in the Bicycle Master Plan and Vision Zero Plan
	C-16	Implement Comprehensive Plan to steer the most-dense development/redevelopment to mixed-use, transit-served locations to reduce VMT and conserve/restore environmental areas
	C-22	Work with Montgomery County and community partners to provide cooling centers, resilience hubs, and other services to strengthen community resiliency
	C-26	Develop metrics and performance indicators for climate actions to establish a data-driven assessment and reporting process
	M-05	Purchase renewable energy certificates (RECs) for municipal electricity
	M-08	Update City teleworking and transportation benefit policies to encourage City employees to reduce vehicle miles traveled (VMT)
	M-15	Incorporate climate mitigation and resiliency considerations into the City's budget prioritization process
	M-16	Develop an interdepartmental climate action team to implement and track progress
Engagement	**C-05**	Expand home energy efficiency outreach program to increase participation in utility energy audits and utility rebates
	C-06	Coordinate with Montgomery County on electrification incentives for existing buildings
	C-13	Promote a regional electric vehicle purchasing cooperative (EVPC)
	C-19	Expand residential recycling and waste reduction outreach program to increase compliance and waste diversion
	C-25	Work with community partners to conduct an inclusive public engagement campaign to reduce emissions and adapt to the impacts from climate change
Advocacy	**C-01**	Advocate for Montgomery County to adopt a Building Energy Performance Standard (BEPS) for existing commercial and multifamily buildings
	C-07	Advocate to increase the Maryland Renewable Portfolio Standard by 2030
	C-08	Coordinate with Montgomery County on development of the Community Choice Energy Program to aggregate green power purchasing
	M-03	Advocate for a Pepco-owned streetlight LED conversion agreement that serves the public interest
	M-12	Advocate for state and federal authorities to update stormwater infrastructure design, operations and maintenance standards to accommodate new rainfall/ storm event projections and help reduce projected flooding issues