

# Baltimore-Columbia-Towson Metropolitan Statistical Area Climate Pollution Reduction Implementation Grant Proposal

Application Title: Reduce, Electrify, Decarbonize & Utilize Clean Energy  
(REDUCE)

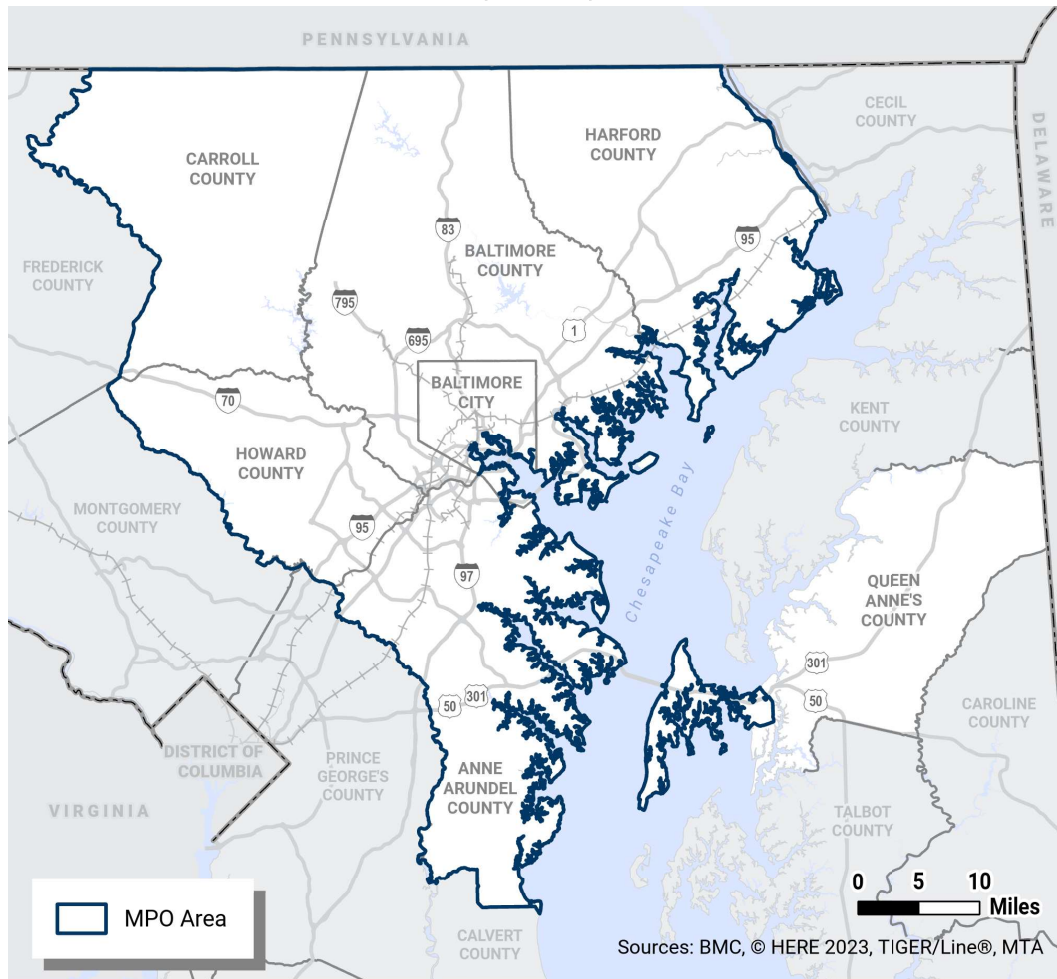


Figure 1: Map of Baltimore-Columbia-Towson MSA Geographic Area

**Type of Application:** Coalition

**Lead Applicant:** Baltimore City

**Coalition Members:** Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne's Counties

**Funding Requested:** \$60,000,000,

**GHG Reduction Measure:** REDUCING emission in the transportation, buildings and energy and waste section, complemented by measures to advance carbon sequestration through nature-based solutions, foster authentic, meaningful equitable engagement, advance a robust climate-ready workforce and facilitate new investments for climate pollution reduction.

**Expected Total Cumulative GHG Emission Reductions:** 280 metric tons of CO<sub>2</sub>e from 2025 to 2050.

**Applicable PCAP:** Available on EPA's CPRG website ([Priority Climate Action Plan for the Baltimore Region](https://www.epa.gov/priority-climate-action-plan-for-the-baltimore-region) ([epa.gov](https://www.epa.gov))) or by clicking [here](#).

**SECTION 1: Overall Project Summary and Approach (45 total possible points)**

The seven (7) jurisdictions in the Baltimore-Columbia-Towson Metropolitan Statistical Area or MSA (hereafter referred to as Baltimore MSA) have collaboratively developed this proposal to **Reduce, Electrify, Decarbonize & Utilize Clean Energy** – or REDUCE – climate pollution across the region. We request **\$60,000,000** (Tier C) to avoid the emission of **14 million metric tons of carbon dioxide equivalent** (MMTCO<sub>2</sub>e) between 2025 and 2030 and **266 MM TCO<sub>2</sub>e** from 2030 to 2050. In total, this investment will prevent **280 MM TCO<sub>2</sub>e** from entering the environment, at the cost of 23-cents per MTCO<sub>2</sub>e during the 26-year period. This proposal refers to measures outlined in the MSA-specific [Primary Climate Action Plan](#) as well as the State of [Maryland's Climate Pollution Reduction Plan](#) that are applicable to the region. No duplicative investments exist between the State of Maryland PCAP or CPRG proposal and that of the REDUCE Coalition for the Baltimore MSA.

**Demographic Profile of the Region:** The REDUCE coalition includes lead applicant, Baltimore City, along with Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne's Counties as coalition partners. According to 2022 American Community Survey Data, the Baltimore MSA population is approximately 2.8 million, with 1,126,216 households, and 1,201,057 housing units. Current projections estimate a nearly 3% growth in population and number of households by 2025. Demographic data across the region, from the U.S. Census Bureau, is summarized in **Table 1: Baltimore Msa Demographic Profile**. These data reflect a geographically, racially, and socioeconomically diverse MSA with urban, suburban and rural communities experiencing many different kinds of climate pollution threats.

TABLE 1: BALTIMORE MSA DEMOGRAPHIC PROFILE							
Jurisdiction	Total Population (2023)	Median Household Income	Poverty Percent	Racial Demographics *			
				AA	AS	HLA	NWH
Anne Arundel County	594,582	\$116,009	6.4%	19.8%	4.6%	9.4%	63%
Baltimore City	565,239	\$58,349	18.9%	62.3%	2.8%	6.3%	27.2%
Baltimore County	844,703	\$88,157	11.0%	31.9%	6.6%	6.6%	53.1%
Carroll County	176,639	\$111,672	5.5%	4.4%	2.5%	4.6%	90.4%
Harford County	264,644	\$106,417	7.3%	16%	3.2%	5.3%	73.2%
Howard County	335,366	\$140,971	5.7%	21.3%	20.5%	7.9%	47.5%
Queen Anne's County	52,508	\$108,332	6.5%	6.2%	1.3%	4.9%	85.6%

\*AS = Asian American; AA = African American/Black; HLA = Hispanic/Latino; NWH = non-Hispanic White

Source: U.S. Census Bureau: Quick Facts Statistics for Counties in Maryland. QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Income and Poverty Estimates, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits.

As the lead applicant for the MSA's CPRG non-competitive planning grant, the Baltimore Metropolitan Council's (BMC) regional coordinating capacity and analytic acumen will be leveraged to for this CPRG implementation grant proposal. BMC currently facilitates many different work groups, committees and coalitions to foster greater collaboration among local governments in the Baltimore MSA. REDUCE coalition members also worked closely with Maryland's Department of Environment and other state agencies leading climate mitigation and adaptation strategies to draft this proposal. Where relevant, we highlight alignment or complementary actions between the State of Maryland's Climate Pollution

Reduction Grant proposal, the State's Climate Pollution Reduction Plan and other federal, state or local funding mechanisms. In the pages to follow, we detail how each reduction measure will be achieved through climate pollution reduction inputs and activities which lead to outputs and outcomes and impacts for public health. Expected outcomes from program activities in this proposal support EPA's Strategic Goal #1 by reducing emissions caused by waste landfilling and incineration, Goal #2 by embedding environmental justice into all proposed programming and Goal #6 by providing resources and workshops to reduce waste.

**Roles and Responsibilities of Each Coalition Member:** As the lead applicant, Baltimore City will take responsibility for all features and milestones of the grant implementation, prioritize time-sensitive administrative tasks related to executing the necessary competitive procurement processes, subawards and facilitating efficient fiscal management of the grant funds to support climate pollution reduction regionally. Milestones we intend to meet within the first year of funding and throughout the period of performance are detailed in the proposed timeline in **Figures 3 and 4**. Tasks and milestones associated with the reduction measures are further detailed in **SECTION 3 - Environmental Results** of this proposal.

A Memorandum of Agreement has been drafted and will soon be finalized between the lead applicant (Mayor and City Council of Baltimore City) and each of the local government coalition members. The purpose of the MOA is to memorialize the collaboration and to outline the agreed upon roles, responsibilities and commitments each MSA Coalition Partner of the Baltimore-Columbia-Towson Metropolitan Statistical Area MSA will be providing regarding this CPRG competition proposal. Each coalition member has agreed to:

1. Support, to the extent resources, capacity and time allows, the activities, inputs and outputs that help the State of Maryland and each local government in the Baltimore-Columbia-Towson MSA reduce the emission of greenhouse gasses, criteria air pollutants and where applicable, other co-pollutants.
2. Advance the actions detailed in the CPRG competition proposal including fundamental goals to:
  - Authentically, meaningfully engage communities, stakeholders, constituencies and individuals in the Baltimore-Columbia-Towson MSA in pursuit of the target emission reductions
  - Deploy community-level investments that mitigate the effects of climate change, reduce climate pollution and support positive climate behavior changes
  - Implementing waste reduction and diversion approaches outlined in the REDUCE Coalition competitive CPRG proposal
  - Contribute to pilots, projects, programs, initiatives or other efforts that support the financing of climate pollution reduction models
  - Advance a workforce primed to tackle complex climate challenges

Coalition partners with additional resources to contribute in the form of matching funds, in-kind support, staff time or future operating or capital budget costs - have been identified in the MOA. The draft MOA text is included in **Appendix C2: Other Attachments - Draft Memorandum of Agreement**.

**a. Description of GHG reduction measures (20 points)**

The regional REDUCE coalition centered this proposal on seven (7) climate pollution reduction measures related to transportation, buildings/energy, waste-derived emissions, carbon sequestration, engagement and increasing capacity to achieve emission reduction targets from the MSA's Priority Climate Action Plan. **TABLE 2: Reduction Measures**, outlines these measures to REDUCE climate pollution by 2030 and projected reductions by 2050. An eighth measure was added to establish a Climate Pollution Reduction Fund (CPRF) for new revenue sources raised from the implementation of certain REDUCE actions. These funds will be reallocated to advance future climate pollution reduction.

TABLE 2: REDUCTION MEASURES			
Number	Measure	Reduction Target (% of Total)	
		2030	2050
<b>MEASURE (M1)</b>	Reduce VMTs	5%	25%
<b>MEASURE 2 (M2)</b>	Electrifying Cars And Trucks Including: <ul style="list-style-type: none"> <li>• Electric Passenger Vehicle Adoption</li> <li>• Electric Heavy Duty Vehicle Adoption</li> </ul>	<ul style="list-style-type: none"> <li>• 17%</li> <li>• 27.5%</li> </ul>	<ul style="list-style-type: none"> <li>• 99%</li> <li>• 99%</li> </ul>
<b>MEASURE 3 (M3)</b>	Reduce the Average Buildings & Energy Related Emissions	48%	82%
<b>MEASURE 4 (M4)</b>	Reduce Municipal Solid Waste Emissions	65%	90%
<b>MEASURE 5 (M5)</b>	Sequester Carbon Dioxide Through Nature-Based Solutions	5%*	25%*
<b>MEASURE 6 (M6)</b>	Engage Residents in the Baltimore MSA through CPRG	50% <sup>a</sup>	75%
<b>MEASURE 7 (M7)</b>	Increase Climate Capacity Across Local Governments in the REDUCE Coalition	50% <sup>b</sup>	75% <sup>b</sup>
<b>MEASURE 8 (M8)</b>	Generate New Climate Pollution Reduction Revenue	10% <sup>c</sup>	50% <sup>c</sup>

*a Refers to the proportion of residents engaged across the region, 50% of the total population of 2.8 million equals 1.4 million people engaged*

*b Refers to specific climate governance measures including staff, budgetary commitments, legislation and organizational leadership.*

*c Refers to the amount of revenue to be raised by the proposed Climate Pollution Reduction Fund in relation to the total funding request. 10.% of \$50 million equals \$5 million raised during the period of performance for CPRG*

Measures 1-8 link to programmatic CPRG strategies, detailed in **Table 3: REDUCE STRATEGIES**, selected to provide communities, local governments or systems with climate pollution reduction amenities or investments that encourage positive climate behavior change, foster regional systems change while addressing environmental justice challenges faced by underserved and overburdened communities. Authentic, meaningful engagement is a critical feature of each reduction measure, with tailored approaches to engage, incentivize and continuously ideate with target audiences or intended beneficiaries of CPRG funding. Before deploying the REDUCE strategies, the Baltimore MSA will work in communities to host engagement seminars, ensuring that the strategies deployed are culturally appropriate and informed by the needs of communities who bear disproportionate environmental burdens. Feedback given in the engagement seminars will inform an iterative approach to program design and will mark the first step in the on-going education and outreach planned for the grant period.

In addition, in order to formalize the collaboration of the Baltimore MSA, the program managers will establish the management structure for the grant: clarifying member roles, leadership responsibilities, establishing decision-making procedures, building regular meeting schedules and routine communications, and coordinating boots-on-the-ground outreach across jurisdiction lines. In addition, participating jurisdictions will establish a system for collecting uniform metrics across the region. A comprehensive regional outreach plan will be created and carried out so that community voices, especially those from disadvantaged communities, can influence the implementation of climate pollution reduction strategies of the broader region. This regional outreach will incorporate and expand upon the hyper-local outreach conducted as part of each emissions reduction project.

As part of the grant support structure, the Baltimore MSA plans to contract outreach coordination services that specialize in hiring and organizing outreach teams to conduct grassroots outreach to EJ communities prioritized for REDUCE programs. The field outreach strategies will focus on sharing information about residential eco-amenities (Strategy B), answering questions about the programs, addressing misinformation about climate change, assisting with program enrollment and tracking user experience, feedback and relevant metrics. Possible tactics include canvassing, text-message campaigns,



workshops/demonstrations and door-knocking. The outreach consultants will also be responsible for ensuring that programmatic metrics collected across the region are uniform in quality and cadence. A detailed Gantt Chart with milestones for engagement activity is available in **Appendix D1: GHG Emission Calculations**. The timeline for implementation and additional milestones for REDUCE will align with the necessary engagement cadence to ensure implementation is equitable, collaborative and impactful.

To complement the outreach efforts, the Baltimore MSA will work with communications experts to launch a community-based social marketing campaign designed to increase participation in REDUCE programs. The campaign will include the development of engaging educational and marketing materials that highlight the environmental benefits, cost savings, and convenience of REDUCE programming. All marketing materials and incentives developed will be informed by the community engaged seminars, ensuring the content and methods of information dissemination resonates with the target populations.

**b. Demonstration of Funding Need (10 points)**

Each REDUCE coalition member has pursued different funding opportunities to support climate pollution reduction including local government operating funds, funding from the State of Maryland, federal grant opportunities, federal appropriations, cooperative agreements, grants supported under the Infrastructure Investment and Jobs Act, and philanthropic funding. In 2022, Maryland's General Assembly passed the [Climate Solutions Now Act \(CSNA\)](#), setting the most ambitious national emission reduction targets among states. Commitments in CSNA necessitate an estimated \$1 billion in annual funding across Maryland, some of which will be met by state, local government and federal funding sources such as CPRG. To meet CSNA targets, [\\$90 million in climate investments](#) were dedicated in the state's budget in 2024, still leaving an astounding 9-figure funding gap.

State and local partners have pursued funding through federal sources that overlap with the climate pollution reduction goals of CPRG, namely Solar for All, which will provide significant investments for residential clean energy adoption through rooftop solar. Of the 7 MSA partner jurisdictions, 6 have or will receive Energy Efficiency and Conservation Block Grants (EECBG). Jurisdictions in the MSA have also pursued the Federal Charging and Fueling Infrastructure Grant (CFI), FEMA BRIC funding, the Buildings Upgrade Prize and NOAA's Resilience Challenge Funds. The Greenhouse Gas Reduction fund (GGRF) is also anticipated to provide substantial resources to decarbonize, electrify or otherwise REDUCE climate pollution reduction. Funds requested in this proposal will complement these federal investments to remove financial, logistic and administrative barriers for LIDAC communities, reduce energy burdens and connect the allocation of these once in a generation investments with participatory implementation models. Given the substantial investment needed to reduce climate pollution across the State of Maryland, competing local funding priorities complicated by local budget deficits and the funding allocation limits of certain types of grants, these investments alone are not sufficient to meet regional and statewide greenhouse gas reduction targets. CPRG funded is necessary, timely and well aligned with Maryland's and the Baltimore MSA's climate priorities/

**c. Transformative Impact (15 points)**

Local government-led climate action is essential to reducing climate pollution across Maryland and achieving CSNA, PCAP and other climate-related goals while alleviating the unjust, unfair burdens placed on environmentally burdened regions across the state. The REDUCE coalition partners will support community-level programming to prioritize the benefits of climate pollution reduction for communities across Maryland with the most need, such as LIDAC areas, vulnerable populations and

those at high-risk of climate related impacts or environmental exposures. Concomitantly, REDUCEing will provide financial support for spurring regional opportunities to recirculate would-be waste materials back into the economy - laying the foundation for regional circular economies of scale. To complement climate pollution reduction and decarbonization activities, REDUCE aims to maximize the co-benefits of nature-based solutions to sequester carbon, seek new, future untapped revenue sources to REDUCE and continually train, educate, and motivate a regional climate workforce through a diverse set of career pathways. This proposal focuses on 5 primary REDUCE strategies: (1) Authentic, Meaningful Engagement, (2) Community-level Emission Reductions, (3) Regional Waste-Related Emission Reductions, (4) Climate Financing and (5) Advancing a Climate-Ready Workforce. Each strategy, its corresponding funding request and related reduction measures are summarized in **TABLE 2: REDUCE STRATEGIES**.

TABLE 3: REDUCE STRATEGIES		
Strategy & Description	Funding & Measures	Measure
Strategy A: Authentic, Meaningful Engagement	\$ 7.6 M	M1 - M7
Strategy B: Community-level Climate Pollution Reduction	\$37 M	M1 - M6
Strategy C: Regional Waste-Related Emission Reductions	\$12 M	M4, M5, M8
Strategy D: Climate Financing	\$1.4 M	M1, M2, M4, M8
Strategy E: Climate-Ready Workforce	\$2.0 M	M1, M2, M6, M7

What makes the REDUCE strategies transformative? A combination of a textured understanding of community-level environmental justice needs, strategies centered on behavior change science, community-led implementation leveraging the latest climate science research, data, and analysis. Behavior change science is central to the five strategies that frame this proposal and our approach to climate pollution reduction. Whitmarsh and collages note in their 2021 article that:

*“Behaviour change is a central element of addressing the climate crisis. Most of the interventions required to reach global emission reduction targets (i.e., climate mitigation) require at least some behavioural change and adapting to the growing impacts of climate change similarly requires significant lifestyle and societal change.”<sup>1</sup>*

In the context of this proposal, positive climate behavior change is viewed as a communal act, requiring billions of small to large actions from millions of people in the region over the next several years to align with the outlined measures and targets. To promote positive climate behavior change, we plan to follow EPA’s guidance on driving positive behavior change through messaging, social marketing, remove barriers to desired behavior, connect EJ communities to the benefits of and motivators for climate pollution reduction behaviors.<sup>2</sup> Furthermore, actions outlined in this funding proposal scale successful models for climate pollution reduction demonstrated in one region, aiming to duplicate that success among REDUCE coalition partners. In doing so, we foster peer learning among our local government colleagues, learn from one another’s mistakes or challenges while iteratively collecting data to augment programming as needed. Descriptions of Strategies A through E follow. More detailed descriptions on the specific actions which fall under each strategy are explained in **SECTION 3: Environmental Results - Outputs, Outcomes and Performance Measures** and a complete list of community projects supported under this proposal is

<sup>1</sup> [Behaviour change to address climate change - ScienceDirect](#)

<sup>2</sup> [Creating Messages that Drive Behavior Change | US EPA](#)

in **Appendix B GHG Emission Technical Details, Table 12: Ecologic Amenities for Communities**. CPRG funding in particular allows the Baltimore MSA governments to implement polysolutions - or those solutions that solve more than one problem at a time - to maximize impact.

**Strategy A: Authentic, Meaningful Engagement** - To REDUCE climate pollution, the Baltimore MSA will employ behavior change science combined with evidence-based participatory models of engagement to implement strategies B-E in transformative ways. Each local government in the MSA has led varying levels of engagement, from community-centered programming to seeking feedback to inform climate action or similar plans. Examples of this engagement include the completion of [Baltimore City's 2019 Sustainability Plan](#), [2023 Disaster Preparedness Plan updates](#) and [2024 Climate Action Plan](#). More than 60,000 interactions take place every year in the city to inform residents of climate work taking place citywide, solicit feedback and input that is intentionally integrated into future implementation. As the lead applicant, Baltimore City models robust, transformative engagement approaches for the coalition partners to replicate. Though a tremendous amount of engagement has taken place over the past decade or more across the Baltimore MSA, authentic and meaningful engagement does not end. Each coalition partner will also be learning and teaching one another to deploy engagement approaches that work for different regions, cultural or subjective norms and contexts.

REDUCE strategies in this regard will also benefit from close partnership with academic and research institutions in the region. Specifically, Johns Hopkins University, Morgan State University (a HBCU), and the University of Maryland Baltimore County (an MSI) are lead partners on the [Baltimore Social-Environmental Collaborative](#) (BSEC) Urban Integrated Field Lab, a five year, \$25 million climate research initiative sponsored by the Department of Energy. BSEC includes partnership with community organizations and local governments across the Baltimore region, with the goal of co-designing the climate science required for equitable action. This includes participatory decision-making processes and frameworks designed by decision scientists that will be applied to REDUCE priority areas.

Engagement strategies in this proposal, will also be considerate of varying literacy levels among different populations, language barriers and the need to translate materials into a minimum of 5 languages for non-English speaking communities (Spanish, French, Chinese, Korean and Arabic or others as needed).

**Behavior Change Context:** In the context of this proposal, positive climate behavior change is viewed as a communal act, requiring action, involvement and buy-in from millions of people in the region. The western, educated, industrialized, rich and developed (WEIRD) context from which those in the U.S. operate must also be taken into consideration, while addressing the widening socioeconomic gap regionally and state wide. As WEIRD cohort members, behavior change sciences must take into account the cultural norms associated with U.S. based demographic groups, and variations among disparate demographics based on age, race, gender, socioeconomic status, education, occupation and other factors. Behavioral barriers to climate actions are plentiful, yet initiatives to remove these barriers are scant. The proposed REDUCE measures and strategies have been informed by many years of iterative engagement, feedback and input from communities across the region. From the update of [Baltimore County's Master Plan 2030](#), to [Howard County's 2023 Climate Forward: Climate Action and Resiliency Plan](#), and several climate related plans across the City of Baltimore - thousands of engagements have fed into the REDUCE proposal.

**Local Government Engagement:** A major focus of Howard County Climate Forward is a deep level of engagement from nearly every department, bureau, and office within County government. This

interdepartmental cooperation informed the development of a comprehensive climate action and resiliency plan and will continue during implementation utilizing an internal Climate Action Subcabinet and staff work groups. Climate Forward emphasizes equity, inclusion, and justice in every initiative. Howard County has modeled a mobilizing tactic reaching thousands - starting with their local government staff. As some of the largest employers in our region, local governments are primed to expose our workforces to climate mitigating behaviors such as telework, more active work-related commuter patterns, and waste reduction behavior while in local government buildings. Baltimore City's Office of Sustainability works closely with the Mayor's Office to support a Sustainability & Resiliency Subcabinet consisting of more than 100 city agency staff, six topical working groups and routine working meetings. The Resilience Authority of Anne Arundel County and Annapolis represent a new model for climate governments to proactively mitigate climate-related risks. Collectively, these models for robust climate leadership will be used to replicate their success across the region.

**Education, Engagement and Navigation Support for Residential Decarbonization:** Partners, who have worked closely with the Baltimore City Government on this EPA's CPRG proposal have expressed enthusiasm about the opportunity to collaborate on implementation of REDUCE actions. These partners will operate as a greenhouse gas reduction resource hubs positioned to support residents in decarbonizing their homes by conducting community-based education, providing individualized guidance and assistance with navigating available resources, braiding funding sources such as GGFR, Solar for All and others, and filling funding gaps. A focus of this resource hub model will be on ensuring that home decarbonization is affordable and accessible for low and moderate-income residents, LIDAC, or otherwise high-energy burdened communities. Programmatic offerings in its capacity as a greenhouse gas reduction resource hub will focus on expanding access to comprehensive energy efficiency, electrification, solar, cool roof, and workforce development services. Throughout this model, the REDUCE Coalition will take a community-driven approach to conducting outreach, community engagement, energy education, resource navigation, and providing tailored guidance to each resident. Community-level REDUCE Ambassadors will also be deployed across the region to connect with, educate and motivate others to engage in climate pollution reduction actions as trusted messengers.

**Strategy B: Community-Level Climate Pollution Reduction** - Work proposed under this strategy will focus on 'ecologic amenities' ranging from renewable energy investments for households to direct services at the individual, community and regional level. We categorized ecologic or eco amenities into 3 groups : (1) environmental amenities, (2) climate mitigation or adaptation amenities and (3) sustainability amenities. These ecoamenities are key features which can drive community development or investment while impacting residents' quality of life and health outcomes. Conversely, disamenities are aspects of communities or the built environment residents perennially raise concerns about. We have codified these amenities based on extensive community engagement, feedback, input, and insights over many years. Within the past 2-years, public surveys, community and virtual events capture the concerns about climate or environmental justice research and evidence-based understandings of how built-environment fixtures impact public health, social and climate outcomes.

All ecoamenities defined in this proposal will be prioritized for select environmental justice communities across the region in such a manner that alleviates the negative social and environmental impacts of disamenities. Disamenities, as addressed here, are broadly defined as systems, development, services or the lack thereof, or planning processes that threaten equitable access to environmental, climate or sustainability amenities for environmental justice communities. Disamenities can include excessive traffic

and related emissions or noise pollution, light pollution, neighborhood blight, dumping, issues with constant trash, debris and litter – among many other community-level design aspects. Additional descriptions of ecoamenities under this strategy follow.

**Environmental amenities** include natural, living or manmade elements of the built environment that relate to enhanced comfort among residents or community-wide benefits ranging from beautification, cooling or mitigating extreme heat, placemaking or fostering social cohesion. Features of the built environment which spur economic activity, sustainable business practices, retail stores or other commercial spaces could potentially be supported with these grant funds to align business practices with PCAP, CCAP and local climate goals.

**Climate mitigation and adaptation amenities** include community-level infrastructure to mitigate the impacts of climate pollution on environmental justice communities or aid disadvantaged communities in adapting to past, current and future climate change. These features focus on renewable energy, energy efficiency and electrification or other measures intended to reduce climate pollution such as EV or renewable energy adoption or embedding nature based solutions into target areas.

**Sustainability amenities** in this proposal are defined as services provided to maintain, advance or enhance accessibility to one of the prior mentioned environmental or climate amenities or support positive climate behaviors such as recycling, composting, walking, biking, tree maintenance or other behaviors. These amenities will range in terms of the types of emissions they help reduce, and include the distribution of free transit passes, rebates for the purchase of micro mobility devices, and food waste diversion services.

Target geographic areas for these investments are reflected by the zip codes in **Appendix C3 Table 1**. Using EPA's EJ Screen Mapping Tool, more than 200 census tracts were identified to meet at least one environmental justice criteria. These census tracts fell among more than 30 priority zip codes in the Baltimore region. Data, local knowledge about population needs and/or environmental exposures plus a closer look at the social vulnerabilities for communities across the MSA yielded a list of priority zip codes where community-level climate pollution reduction investments will be deployed. Each of the zip codes were assessed based on several environmental justice and supplemental indexes in the EPA EJ Mapping tool. Exposure to particulate matter, ozone, air toxins, hazardous waste among many other exposures were considered along with socioeconomic indicators. **Appendix C3** provides justification for the selection of each zip code included in the target areas along with a snapshot of the population size, number of households, per capita income, and notable summary demographics. **Appendix C3** also includes reports generated from EPA's EJ Mapping tool for zip codes which are the focus of this proposal.

**Prioritizing investments for Environmental Justice communities: Appendix B, Table 4: Reduce Geographic Tiers** shows that each zip code selected has been assigned a 'REDUCE Tier' lettered A through F, with zip codes in Tier A reflecting the greatest need or climate pollution-related vulnerability (90th percentile or higher for environmental and socioeconomic indexes), and zip codes in Tier F reflecting the least need - based on EPA EJ data. **Table 12: Eco Amenities for Communities (Appendix B)** shows that Measures 1 through 6 are each associated with six specific Actions, and each Action is allocated to a Tier (A through F). Residents, households or community-based organizations in Tier-A zip codes are eligible to receive investments for all Actions, Tier-B zip codes for all Actions except those labeled Tier A, Tier C zip codes can receive investments for action in Tiers C-F etc. Tier-F Actions may be implemented in all zip codes; however, Tier-F (least-need) zip codes are limited to Tier F Actions and are not eligible to receive CPRG funds for other Actions. **Table 4: Reduce Geographic Tiers** provides an

approximation of the expected relative impact distribution between the Tiers. These numbers only serve illustrative purposes and do not provide firm guidelines. Operationally, implementation of the community-level climate pollution reduction goals under the REDUCE Coalition will begin with broad-reaching regional engagement, marketing and outreach activities or initiatives (Tier F Actions) in all zip codes. As implementation progresses, more targeted CPRG investments providing the most benefit to individuals, households or communities will be prioritized for higher tiers.

Why do we Tier target zip codes? REDUCE coalition members are immensely dedicated to driving CPRG investments to our regional residents who have perennially been subjected to unfair, unjust environmental exposures. REDUCE Tiers provide a methodology for reserving the most beneficial climate pollution reduction investments for communities on the frontlines of climate change. Tiering zip codes provides a formula for the prioritization of environmental justice communities.

**Strategy C: Regional Waste-Related Emission Reductions** - Funding requested under this strategy will focus on preventing, diverting and recycling, reusing and repurposing would-be waste materials into the local economy. Aspirations for a circular economy will be at the center of this regional work to close the loop on materials in our waste stream that lead to the highest level of emissions – organics. Additionally, these funds will be used to avoid carbon-intensive waste management processing such as waste incineration. The Baltimore MSA plans to reduce GHG emissions from improperly managed food waste through three main objectives: increasing local compost processing capacity, increasing food waste collection capacity, and deploying diversified outreach and behavior change strategies. The success of the objectives will be measured across three areas of focus: outreach, tonnage diversion, and GHG reduction. The objectives, tasks, and milestones of each food waste initiative are detailed in the REDUCE project Gantt chart with measurable outputs and outcomes detailed further in **SECTION 3a: Description of GHG Reduction Measures**.

**Strategy D: Climate Financing** - Long-term planning for climate investment is critical to achieve climate pollution reduction targets. EPA's historic level of investment through CPRG, though remarkable, requires revenue generating models to sustain future climate pollution reduction investments in perpetuity. Climate financing strategies, mechanisms and models are essential to continue funding critical climate pollution reduction activities. The climate financing approach proposes regional strategies to secure future climate investments through public or other sources. To effectively manage future climate investments through innovative financing models, the Baltimore MSA's REDUCE Coalition will establish a Climate Pollution Reduction Fund - CPRF - intended to collect, manage and reallocate funds to invest in ongoing REDUCE actions beyond the specified period of performance for CPRG. This fund will allow for the flexible allocation of monies needed to support future climate mitigation and adaptation projects. Financing mechanisms outlined in this proposal seeks to identify an increase in future revenues through 2050 with four goals.

**Goal 1: Create a Climate Pollution Reduction Fund (CPRF)** To achieve this goal the Resilience Authority of Anne Arundel County and Annapolis will develop a financing playbook or blueprint for the Baltimore MSA with a focus on prioritizing future implementation to create a pipeline of projects with many sustainable funding opportunities across federal, state and local partners. With support from a regional Climate Finance Officer, the REDUCE coalition members would develop a portfolio based on the anticipated timing of impacts and the corresponding need for investment detailed in existing local government plans. In the short-term, the partners will likely focus on funding priority projects with grant funds, specifically from programs within the Bipartisan Infrastructure Law (BIL) and Inflation Reduction



Act (IRA) legislation. Once an actionable grant funding strategy is established, the next step will be to develop a more comprehensive long-term revenue plan focused on establishing strategies for identifying, investing, and leveraging long-term revenue streams, including the new Internal Revenue Service (IRS) elective pay mechanism, innovative taxes and fees, as well as asset-based revenues.

**Goal 2: Resilience Authority - Scaling the Model Regionally:** The City of Annapolis and Anne Arundel County established the nation's first Resilience Authority (RA) - enabled by [Maryland Senate Bill 0457 - Local Governments - Resilience Authorities - Authorization](#).<sup>3</sup> As a unique, quasi-government entity, the RA has the ability to issue bonds to raise funds, support regional resilience initiatives and act nimbly to mitigate the impacts of a changing climate. The RA will expand its current impact by working closely with each jurisdiction on the region to inform climate financing strategies, build climate financing competencies and assess how existing investments can best be leveraged. Each jurisdiction will assess whether and how a similar structure such as the Resilience Authority would provide innovative financing and capacity to implement climate resilience programming and infrastructure projects in the context of local control and authority to act.

Though counties continue to lead resilience infrastructure financing and implementation efforts, success will require innovative partnerships with active coalitions, including the private sector. This must include essential placement of financing mechanisms such as consistent and coordinated regulations, innovative procurement systems, and economic development policies and programs consistent with resilience goals and priorities. Immediate opportunities exist to leverage funding that reduces pressure on County/City general funds and operating budgets, including grant opportunities, publicly owned assets, and targeted financing to recapture value generated by resilience projects. In addition to its core functions, an authority could be an innovation hub that acts as the community's center of thought for climate discourse and advances cutting-edge opportunities — including the use of insurance products to fund resilience projects countywide; expanding project cash-flows by linking resilience with renewable energy; and incentivizing private investment through joint development and asset-based financing.

**Goal 3: Leveraging Local Government Budget Funds:** Capital and operating budgets for local governments reflect prime opportunities to filter annual budgetary needs through a climate lens. The RA will develop a playbook that provides partners with a model to evaluate local government budgets and determine a "Resilience Benefit Factor" for capital improvement projects so that the PCAP is truly prioritized. The playbook will guide the regional Climate Finance Officer in their annual analysis of capital and operating budgets for each of the local governments in the Baltimore MSA to find opportunities to align funding priorities for regional and statewide climate priorities. The RA will work with local governments to support processes that prioritizes local government budgets for climate change solutions. Routine convenings with area private and philanthropic funders will also be conducted to provide updates on the resources needed to continue to fund climate pollution initiatives.

**Goal 4: REDUCEing through new Revenue Streams:** As poly solutionists, the REDUCE coalition partners are eager to solve multiple climate challenges in all interventions supported under CPRG. We propose 3 new revenue generating mechanisms that REDUCE by supporting Measures 1, 2, 3 and 5 while generating much-needed funding. These include:

1. Clean Corridors for REDUCEing in Communities: Supporting community-based electric charging hubs. Revenue generated from these charging hubs will go directly to the CPRF to support future behavior change incentives related to reducing vehicle miles traveled.
2. Ads for Adding Climate Value: With a goal to modernize bus stops with polysolution, we will work with the Maryland Department of Transportation (MDOT), and local DOTs to equip bus stops throughout the region with cooling infrastructure designed for outdoor environments, enhanced

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<sup>3</sup> Maryland General Assembly - SB-457- Local Governments - Resilience Authorities - Authorization. 2020<https://mgaleg.maryland.gov/2020RS/bills/sb/sb0457E.pdf>

shade structure to allow for cooling for those navigating public transit systems, digital screens or kiosks to provide real-time updates of when busses or trains will arrive, and share a list of local micro mobility options. These features will be powered by solar panels, and bus stops will be equipped with charging infrastructure for mobile devices such as phones and tablets. Digital ads will be sold and revenue from these sales will go directly to the Climate Pollution Reduction Fund.

3. Climate Pollution Reduction Revenue Sources: Successfully financing in the long-term will require a suite of funding resources to support a variety of infrastructure and programmatic needs. Existing local revenues are limited, and as a result any new projects will require new or expanded funding resources. The Baltimore MSA will engage in a process to estimate the expected increases in public funding necessary to implement the project portfolio and to facilitate an ongoing conversation among the jurisdictions and partners regarding revenue options moving forward.

**Strategy E: Climate Ready Workforce** - The skills, acumen and knowledge needed to move forward climate goals are varied, and often specific to the discipline, region and/or role being filled. The Baltimore Metropolitan Council (BMC) leveraged non-competitive CPRG funds awarded to the Baltimore-MSA to enhance climate literacy among local government climate leaders, staff and workforces. To take this work further, CPRG implementation funds will be used to bridge a growing occupation divide and misunderstanding between different workforces in the climate space, and several climate competencies among regional climate leaders and provide professional development resources. Through expanded training for local government staff, these funds will ensure that the coalition members have the knowledge, skills, and certifications to lead the implementation of each REDUCE strategy. Moreover, this training will help develop career advancement pathways that support the coalition's broader job quality and community benefits strategy.

REDUCE strategies are primed to create high-quality jobs through local government employment opportunities and various [Equity-Centered Workforce Development models](#).<sup>4</sup> As such, these funds will also support pre-apprenticeship workforce training programs that create pathways to careers in climate pollution reduction, including EV maintenance, cool roofing, solar installation, weatherization, electrification, composting, and landscape management. The training programs will focus on expanding access to careers for individuals facing barriers to employment, and will include wraparound case management and supportive services, job readiness support, industry-recognized certifications, hands-on learning, and job placement assistance.

Collectively, these REDUCE strategies provide a vision for a more sustainable and equitable region, counties and cities across Maryland. The City of Baltimore is excited to partner with regional municipal partners to leverage CPRG investments. Additional information about project funding for Strategies A-E and their related measures are detailed in **Appendix A: Budget Narrative and Justification**.

## **SECTION 2: Impact of GHG Reduction Measures (60 total possible points)**

The Baltimore MSA released an estimated **32,198,072 MTCO<sub>2</sub>e** in 2021 based on a regional greenhouse gas inventory (GHGI) conducted by ICLEI. The majority of emissions across the region (45%) are attributed to transportation-related sources or vehicle miles traveled (VMT). Residential energy use contributed to 20.9% of emissions across the region, followed by 19.7% for commercial energy uses and 3.5% for industrial energy uses. Process and fugitive emissions comprised 6.5%, waste and wastewater contributed to 3.2% of regional emissions. **Table 5: Summary of Baltimore MSA Emissions by Sector**,

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<sup>4</sup> Arbor Day Foundation and Power Corps PHL: Community Forestry Implementation Template: [adf-ira-roadmap-template-equity-centered-workforce-development.pdf \(arborday.org\)](#)

displays the sector specific MTCO<sub>2</sub>e and **Figure 1: Metric Tons CO<sub>2</sub>e By Sector** depicts these data. The complete Baltimore MSA regional inventory is accessible in **Appendix B, Table 9**, and business as usual scenarios are reflected in **Table 10: BAU Emissions, Net Reductions per Action, & Remaining Emissions after Implementation (MTCO<sub>2</sub>e)**, **Appendix B**.

TABLE 5: SUMMARY OF BALTIMORE MSA EMISSIONS BY SECTOR (2021)	
Sector	Metric Tons of CO <sub>2</sub> e
Transportation & Mobile Sources	14,651,004
Solid Waste	719,585
Water & Wastewater	325,157
AFOLU	231,143
Commercial Energy	6,356,377
Industrial Energy	1,140,150
Residential Energy	6,737,837
Process & Fugitive Emissions	2,036,815
<b>Total</b>	<b>32,198,072</b>

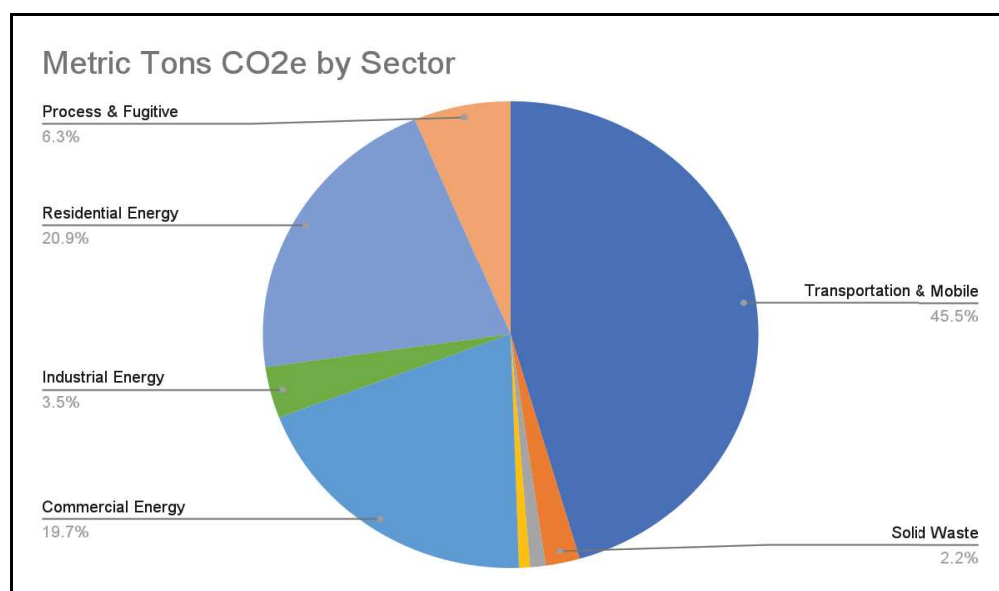


Figure 2: Metric Tons of CO<sub>2</sub> by Sector

**a. Magnitude of GHG Reductions from 2025 through 2030 (20 possible points)**

With support from EPA's climate pollution reduction funds, coalition partners aim to achieve a GHG emissions reduction of **10 MMTCO<sub>2</sub>e** by 2030 compared to the 2021 baseline of 32 MMTCO<sub>2</sub>e - a **33.6% decline**. This estimated target includes BAU reductions and aligns with the statewide goal of reducing emissions by 60%, compared to a 2006 baseline. Cumulatively, the actions proposed here are estimated to result in the avoidance of **14.3 MMTCO<sub>2</sub>e** from 2025 to 2030. The REDUCE proposal will implement the actions in **Table 12: Ecologic Amenities For Communities, in Appendix B**, among the priority low-income, disadvantaged and underserved zip codes listed in **Appendix C3**. For Measures 1 through 5, the sector-specific MTCO<sub>2</sub>e released in 2021, the estimated cumulative MTCO<sub>2</sub>e reduction by 2030 and 2050, and the actions that will be implemented to achieve these reductions are described under their respective sections. Measures 6-8 relate to complementary goals, strategies and actions that will bolster the MSA's ability to achieve the targets detailed in measures 1-5

and do not have GHG reduce targets associated with them, but do have several measures and metrics to track progress. **Table 8: Performance Measures and Metrics in Appendix B**, lists all measures and metrics that would be tracked during implementation. Narrative text for strategies A-E describe how measure 6-8 will be incorporated into the MSA's CPRG implementation process. Inputs, programs, initiatives or activities related to meeting the reduction targets for Measures 1 through 6 are detailed in **Figures 3 and 4 Inputs, Measures, Outputs, Outcomes and Impacts in SECTION 3**, with each of these measures having 6 corresponding tiered (A-F) actions.

**MEASURES 1 AND 2 COMBINED ARE AIMING TO REDUCE TRANSPORTATION-RELATED EMISSIONS BY 5% BY 2030, AND BY 91% BY 2050**

**MEASURE 1: REDUCE VMTs BY 25% BY 2050**

- VMT Reduction – 25% by 2050 – Gasoline: The 2021 regional GHGI indicated that gasoline-powered vehicles contribute a total of **24 billion VMT** and make up **32.5% (10.5 MMTCO<sub>2</sub>e)** of all regional emissions. A 25% reduction in VMT of gasoline-powered (or passenger) vehicles by 2050 will result in a cumulative reduction of **2,089,891 MTCO<sub>2</sub>e** from 2025 to 2030, and a **27,587,670 MTCO<sub>2</sub>e** cumulative reduction from 2025 to 2050.
- VMT Reduction – 25% by 2050 – Diesel: Diesel-powered vehicles contribute a total of **2.2 billion VMT** and an estimated **9.7% (3.12 MMTCO<sub>2</sub>e)** of all regional emissions, according to the 2021 GHGI. Emission reductions related to diesel-powered vehicles require legislation, but local jurisdictions have the authority to implement actions that increase the electric charging infrastructure across the region. Cumulatively, the region will avoid emitting **713,067 MTCO<sub>2</sub>e** from 2025 to 2030, and **11.9 MM TCO<sub>2</sub>e** by 2050, with perennial implementation of actions to meet this target.

Actions M1 - A through M1 - F relate to increasing telework person-hours, supporting more participation in the Maryland Commuter Choice program, deploying free transit passes and designing 'Cool Bus Stops' to increase transit ridership, building infrastructure to advance "Complete Streets", and providing micro mobility incentives/rebates for bikes, e-bike, or scooters.

**MEASURE 2: ELECTRIFYING CARS AND TRUCKS - 17% ELECTRIC VEHICLE ADOPTION BY 2030, 99% BY 2050; 27.5% HEAVY DUTY VEHICLE ADOPTION BY 2030, 99% BY 2050**

Maryland's 2023 Climate Pollution Reduction Plan (CPRP) outlines an Advanced Clean Cars II rule, requiring that 100% of new cars, light-duty trucks, and sport utility vehicles (SUVs) sold in Maryland to be zero emission vehicles (ZEVs) by 2035.<sup>5</sup> The State also has an Advanced Clean Trucks rule requiring certain types of medium and heavy-duty trucks sold in Maryland to be ZEVs. Based on these goals, ICLEI estimates a 17% and 27.5% electric vehicle adoption rates for light and heavy duty vehicles, respectively, across the region by 2030. The combined clean car and truck rules will lead to a total, cumulative reduction in emissions of **6,266,475 MTCO<sub>2</sub>e** from 2025 to 2030 in the region. Electric vehicles contributed **164 million VMT** in 2021 and **81,049 MTCO<sub>2</sub>e – 0.25%** of the total emissions. Given our goal to increase EV adoption by 17% by 2030 for passenger vehicles, we acknowledge an increase in VMT and MTCO<sub>2</sub>e attributed to EVs, as those attributed to internal combustion engines (ICE) decrease. As the energy sources for EV charging continue to be decarbonized, we anticipate emissions attributed to EVs will approach zero. Tire wear among electric vehicles is one consideration we will plan to monitor as new research on the relationship between tire wear among EVs and particulate matter in ambient air becomes more clear. From 2025 to 2030, estimated cumulative emissions reductions from the implementation of the Advanced Clean Cars II and Advanced Clean Trucks rules are **4,129,181 MTCO<sub>2</sub>** and **2,137,294 MTCO<sub>2</sub>**, respectively. Between 2030 and 2050 an estimated **105 MM TCO<sub>2</sub>e** from the implementation of actions under Measure 2 are estimated to be **71 MM TCO<sub>2</sub>e** from light-duty, and **34 MM TCO<sub>2</sub>e** from heavy-duty vehicles.

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<sup>5</sup> [Maryland's Climate Pollution Reduction Plan - Final - Dec 28 2023.pdf](#)

Actions M2 - A through M2 - F aim to increase EV adoption, access and maintenance capacity through education, outreach & engagement, workforce development training for EV technicians, installing EV charging infrastructure for community use, providing EV car-sharing options (given that many households will not benefit from EV rebates) and providing EV rebates to community-based organizations or Community Resiliency Hub partners.

**MEASURE 3: REDUCE BUILDINGS & ENERGY RELATED EMISSIONS BY AN AVERAGE OF 48% BY 2030 AND BY AN AVERAGE OF 82% BY 2050**

Combined, residential, commercial and industrial energy made up 44.1% of all estimated emissions across the region in 2021. A total of **20.9% (6.7 MMTCO<sub>2</sub>e)** of the Baltimore MSA's emissions are from residential energy sources. Within residential energy emissions, **60% (4 MM TCO<sub>2</sub>e)** are from electricity generation and **30% (2 MMTCO<sub>2</sub>e)** from natural gas with the remaining **9% (0.7 MMTCO<sub>2</sub>e)** due to a combination of burning fuel sources such as wood, propane and kerosene. Maryland has several statewide requirements, such as the 100% Clean Power Standard commitment by 2035, statewide renewable energy incentives, a goal to build offshore wind capacity, and Renewable Energy Portfolio Standards. Combined, these existing targets will drive decarbonization across all energy sources. REDUCE meets building and energy decarbonization goals by centering LIDAC communities when prioritizing rooftop solar, electrification, and energy efficiency upgrades for communities experiencing high energy burdens. An estimated total of **4.5 MM TCO<sub>2</sub>e** will be avoided from 2025 to 2030 in the Baltimore MSA as a result of CPRG investments. By 2050, we anticipate seeing **79 MM TCO<sub>2</sub>e** avoided as a result of Measure 3 implementation.

Strategies to reduce emissions related to residential energy will focus on electrification, renewable energy, and energy efficiency measures among single family homes, and multi dwelling units including public housing. The REDUCE coalition will also support these activities among facilities that benefit communities. Actions M3 - A - M3 - F in **Table 12, Appendix B** includes a complete list of these interventions.

**MEASURE 4: REDUCE MUNICIPAL SOLID WASTE EMISSIONS BY 65% BY 2030 AND 90% BY 2050**

Reducing waste-related emissions entails a combination of strategies that prevent, divert or otherwise facilitate the reuse, recycling, refurbishing, or repurposing of potential waste materials. A total of **3.21% (1.04 MMTCO<sub>2</sub>e)** of the regional emissions are due to solid waste (**2.23%; 0.72 MMTCO<sub>2</sub>e**) and wastewater (**1.01%; 0.325 MM TCO<sub>2</sub>e**). These numbers do not reflect 1) emissions related to hauling waste, 2) global warming potential from organic waste, or the inputs, environmental externalities or outputs stemming from the production of food, or 3) embodied carbon from materials entering municipal waste streams, 4) the immense cost municipal solid waste operations have on local governments or 5) the value of materials lost to the local economy when items are disposed of. Though solid waste and waste water reflect a small percentage of the overall regional emissions, this sector accommodates solutions that resonate with many people. While the interest in home electrification, EV adoption, or clean fuel sources may vary from person to person, everyone in the region produces waste, especially food waste. As such, we see more than 2 million opportunities (i.e., households) to change a key climate behavior and use waste as a gateway to exposing residents to other impactful climate mitigation or adaptation behaviors. We estimate a total, cumulative reduction in solid waste-related emissions of **5 MM TCO<sub>2</sub>e** from 2025 to 2050.

**MEASURE 5: SEQUESTER 5 MM TCO<sub>2</sub>e BY 2030**

Nature-based solutions are broadly defined, often including vegetation that sequesters carbon, while providing many co-benefits to communities. These co-benefits range from enhancing community resilience through improved green infrastructure and stormwater management, mitigating the urban heat island effect, fostering biodiversity, and beautifying built environments. The 2021 regional GHGI reflects a carbon sink of roughly **1.45 MM TCO<sub>2</sub>e** or **4.5%** of the total emissions regionally. This number



was not modeled in the current inventory or projections. However, it serves as an estimate for the potential CO<sub>2</sub>e that can be captured by expanding nature-based solutions across the region. Measure 5 includes supporting communities with:

- Expanded tree canopies through planting efforts and by maintaining existing forest
- Protection of public places for water access and passive recreation of natural habitat; protection of watershed forest habitat (for example, see [Queen Anne's County Sea Level Rise and Coastal Vulnerability Assessment and Implementation Plan, March 2016](#))
- Establishing outreach campaign, including demonstration projects, to raise awareness, acceptance, and appreciation of soil health, native plants, reduced mow areas, and meadows
- Protecting passive recreation of natural habitat, including watersheds
- Integrating carbon sequestration elements and emphasis into private property stormwater programs and incentives
- Supporting farmers with incentives and technical assistance in implementing healthy soils practices to sequester carbon
- Using new advances in carbon sequestration, such as biochar as a soil amendment to enhance carbon sequestration potential
- Integrating other co-benefits of climate mitigation and adaptation into projects regionally to foster polysolutions
- Mitigating the health impacts of extreme heat and the urban heat island effect through community-level cooling approaches based on green infrastructure

Measures 6-8 relate to complementary goals, strategies and actions that will bolster the MSA's ability to achieve the targets detailed in measures 1-5. Measure 8 is an approach to enhance the durability of emissions reductions across the Baltimore MSA beyond 2030 through strategic climate financing. The projects intended to feed into the proposed Climate Pollution Reduction Fund (CPRF) are detailed in **SECTION 2: Impact of GHG Reduction Measures.**

Environmental Justice is a foundational feature of this proposal, as the needs of low-income and disadvantaged communities (LIDAC), frontline, underserved and overburdened communities, neighborhoods or populations have informed every aspect of the budget allocation, proposed measures and the implementation approach. In this proposal, we use the terms LIDAC, frontline, underserved and overburdened to describe environmental, racial economic and geographic injustices imposed on marginalized groups across the Baltimore MSA. We use these terms, as applicable, to describe how REDUCE strategies alleviate the unjust and unfair burden environmental exposures, or lack of protective environmental features among target populations. Narrative text for strategies A-E in **SECTION 2** describe how measure 6-8 will be incorporated into the MSA's CPRG implementation process. The full magnitude of the GHG reductions attributed to PCAP Measures 1 through 4 are summarized in **Appendix B, Table 6: GHG Reduction Projections from 2025 to 2030, and 2025 to 2050.**

**Durability of Reductions:** Strategies supported with CPRG funding will pave the way for enabling billions of actions among millions of residents in the Baltimore MSA to meaningfully contribute to climate pollution reduction. The creation of a Climate Pollution Reduction Fund, combined with continuous local, state, private, federal or other investments, climate policy implementation and a ready, willing and well-prepared climate workforce across the region will yield enduring greenhouse gas reductions. To continue and maintain emission reductions supported by CPRG, more new revenue sources will be needed to address climate impacts rather than just reallocating those sources that already exist. Public sector investment is crucial for climate pollution reduction, but sustaining this progress also requires redundancy in funding sources and resilience of the financing systems. Under **Strategy D in SECTION 2**, the RA will develop a financing playbook for the Baltimore MSA with a focus on prioritizing future



implementation and creating a pipeline of projects with many sustainable funding opportunities across federal, state and local partners.

The REDUCE coalition will develop a process to routinely assess, evaluate and prioritize a project portfolio based on the anticipated timing of impacts and the corresponding need for investment. The resulting project portfolio will address short-, mid- and long-term implementation needs and time horizons. Categorizing projects in this way will be critical for creating a sustainable revenue plan. In the short-term, the REDUCE coalition partners will likely focus on funding priority projects with grant funds, specifically from programs within the Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA) legislation, particularly CPRG funding. Once an actionable grant funding strategy is established, the next step will be to develop a more comprehensive long-term revenue plan focused on establishing strategies for identifying, investing, and leveraging long-term revenue streams, including innovative taxes and fees, as well as asset-based revenues. Characteristics of an effective on-going revenue system and plan could include: adequacy of scale, diversity in projects, actions and revenue sources, redundancy in funding sources or needs, fairness linked to democratic processes and values and accountability as fiscal stewards of such funds. Proactive planning for future climate investments are necessary to ensure the climate pollution reduction resulting from these investments are durable and resilient.

Reducing, electrification, decarbonization and the utilization of clean energy - REDUCING - holds the prospect of transforming Maryland to a national and global leader in climate mitigation approaches anchored to environmental justice.

**b. Magnitude of GHG Reductions from 2025 through 2050 (10 possible points)**

CPRG investments will cumulatively avoid **279,955,218 MTCO<sub>2</sub>e** over a 26-year period from 2025 to 2050 in the Baltimore region. We anticipate these cumulative CO<sub>2</sub>e reductions will also lead to significant declines in pollutants that contribute to poor air or water quality, pollutants, hazardous air pollutants and other community-level factors considered 'disamenities'.

**c. Cost Effectiveness of GHG Reductions (15 possible points)**

With an estimated budget of **\$60 million**, we calculate the cost of emission reductions per MTCO<sub>2</sub>e to be **\$4.18** (\$60,000,000/14,323,068 MTCO<sub>2</sub>e) from 2025 to 2030. However, when assessed over the broader 26-year period, the cost of emission reductions will be an estimated **\$0.23** per MTCO<sub>2</sub>e.

**d. Documentation of GHG Reduction Assumptions – Up to 10 additional pages as an appendix to the work plan (see Appendix C of the NOFO) (10 possible points)**

Technical details and tables related to GHG reduction assumptions can be found in **Appendix B: GHG Emission Technical Details and Appendix D1: GHG Reduction Calculations** of this proposal. The technical Appendix includes calculations for GHG reduction estimates, the costs of reductions, and the estimated magnitude of emission reductions from actions associated with Measures 1-5. Calculations related to GHG reduction can be found in.

**SECTION 3: Environmental Results - Outputs, Outcomes and Performance Measures (30 points)**

**a. Expected Outputs and Outcomes (10 possible points)**

Each measure listed in this proposal will have associated inputs, outputs, outcomes, action and impacts. Specific definitions are provided for each. We expand the scope of output and outcomes to provide additional detail and context of the current resources among the REDUCE coalition, the activities we will engage in within the first year of the period of performance, if funds are awarded, and the impact of REDUCE actions beyond the reduction of greenhouse gasses.

- Inputs - Investments, resources, technical support or other direct support provided to local governments or partner organizations either through general operating budgets, grants or other dedicated streams. This will include staff dedicated to any measure. These are shorter term, taking place within the first 3-6 months of the CPRG implementation.

- **Activities** - Range in scope from programming to regional initiatives and coordination needed for implementation of Strategies A-E and their corresponding measures. These are short -to-mid-term, taking place within the first year of the period of performance. Measure 7 and 8 activities relate to administrative and programmatic coordination.
- **Outputs** – EPA defines outputs as “...environmental activity, effort, and/or associated work product related to an environmental goal and objective that will be produced or provided over a period of time or by a specified date.” We expand upon this definition to include the result of activities led by coalition partners such the engagement with residents or stakeholders, the number of people or households served, rebates administered, events, meetings, deliverables met under subawards, contracting or consulting agreements, or other coordination work completed to advance Strategies A-E. Outputs will be mid-to-long-term, achieved during different phases or two years of the period of performance.
- **Outcomes** - Measurable reductions in greenhouse gasses or correlated measures such as vehicle miles traveled, tons of wasted food composted, the number of meals rescued or the amount of greenhouse gasses that were prevented from entering the environment. Outcomes are long-term, taking 2-5 years to achieve. These will include “...the result, effect, or consequence that will occur from carrying out an environmental program or activity that is related to an environmental or programmatic goal or objective.” per EPA’s definition.
- **Impacts** – Overall, long-term effects of implementing the REDUCE strategies regionally, including the environmental improvements associated with greenhouse gas reductions and long-term projected public health outcomes. Impacts go beyond outcomes, referring to the societal benefits resulting from climate pollution reduction, cobenefits and the conception of polysolutions.

The inputs, outputs, activities, outcomes and impacts for each of the eight measures in this proposal are explained in **Figures 3 and 4: Logic Models for REDUCE Inputs, Measures, Outputs, Outcomes and Impacts**

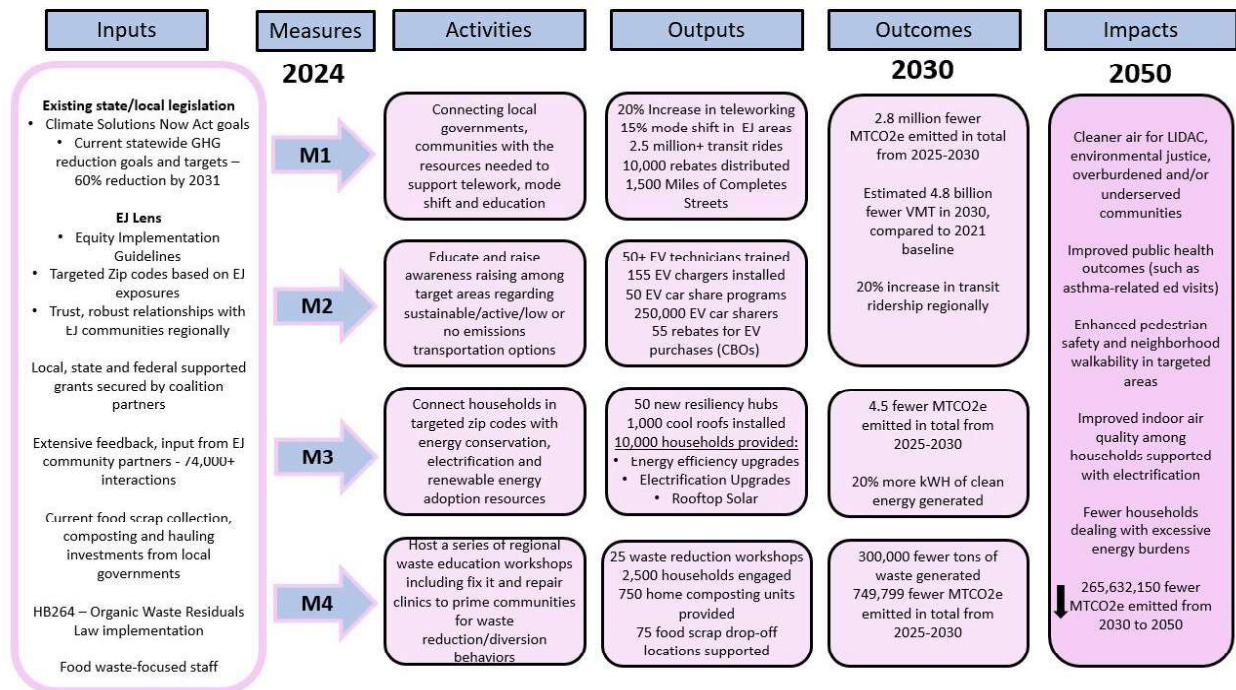


Figure 3: Logic Model for REDUCE Inputs, Measures (1-4), Outputs, Outcomes and Impacts

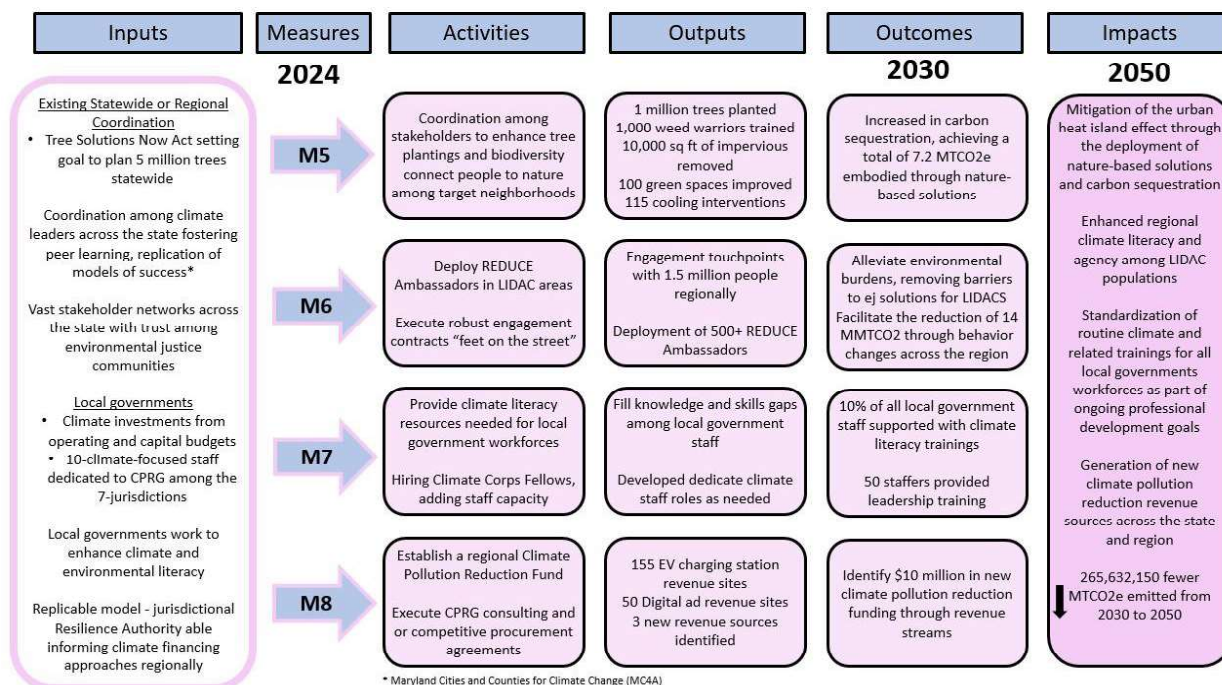


Figure 4: Logic Model for REDUCE Inputs, Measures (5-8), Outputs, Outcomes and Impacts.

Activities will be tracked through close coordination by the Baltimore City program management team, the REDUCE Coalition, consultants, contractors and BMC. The BSEC project will also be a collaborator in evaluation of the outcomes and impact of REDUCE programs. Any subaward provided to coalition partners will include detailed scopes of work, performance management plans, measures and metrics that come with monthly reporting requirements to align reporting needs the cadence for evaluating impacts. All competitive procurements awards and scope will also include a complete list of CPRG related measures, metrics and any data needed to provide detailed reports to EPA's CPRG team. **Table 8: Performance Measures and Metrics, Appendix B** includes a list of activities to be funded if the REDUCE Coalition is awarded measures and metrics. Given the trade-offs inherent in any climate or environmental policy, program or initiative, an analysis of - what concessions we as a region and communities served, are willing to accept when implementing on climate goals, what trade-offs are unacceptable or when factors impacting trade-off need to be reassessed - will be conducted in collaboration with communities through the REDUCE seminars detailed in **SECTION 2**. Analyzing tradeoffs with targeted communities, allows us to unpack the complexities involved in climate-related policies, programs and decisions, equips decision makers (i.e. climate local government leaders) with enhanced tools to incorporate some form of risk tradeoff analysis in their work. An analysis of trade-offs begins with defining wicked problems and anchoring the solution to foundational principles in **TABLE 7: Trade-off Analysis Foundational Principles, Appendix D** and a *Trade-offs Analysis Worksheet* is in **Appendix D4**.

#### b. Performance Measures and Plan (10 possible points)

Performance measures will be tracked according to REDUCE Measures 1-8, with activities, outputs and outcomes informing the metrics, milestones and quantifiable targets to be reported on. In developing these measures, we referenced work led by Baltimore City's Office of Performance and Innovation agency performance management process. Guiding questions framing the specific measures include:

- How is the metric and data collected linked to the REDUCE environmental justice framing?
- Is the metric a good indicator of cost-effective climate pollution reduction?

- Is the metric easy to understand, track and routinely report on? If not, how will reporting challenges be overcome?
  - Does this metric relate to an incentive, nudge, the removal of barriers or otherwise support the desired climate behavior change?
  - Are there unintended consequences or tradeoffs that need to be considered? What tradeoffs are we willing to accept, which trade offs are we not okay with?
  - What are the data sources, are they accessible and reliable? Can the data be compared over time?
- The REDUCE Coalition members will track a total of 30 metrics to assess, measure and report progress summarized in **Figures 3 and 4**, and **Table 8: Performance Measures and Metrics in Appendix B**.

**c. Authorities, Implementation, and Milestones (10 possible points)**

The Baltimore City Office of Sustainability and Department of Public Works will be the primary responsible parties for the implementation of this CPRG grant, if awarded. As per the MOA drafted for each member of the REDUCE coalition to sign, The Mayor and City Council of Baltimore will be the fiscal stewards responsible for overseeing that all measures, related activities, outputs, outcomes and impacts under this proposal are met and that all costs are allocable, applicable and allowable. As the lead applicant, Baltimore City will also be responsible for managing all reporting needs, tracking progress on measures and directing partners on the most appropriate administrative procedures to meet timelines. A subaward will be provided to the Resilience Authority of Anne Arundel County and the City of Annapolis to manage several programmatic aspects of REDUCE, competitive procurement processes in alignment with EPA procurement guidelines, and consulting agreements for measures 1 and 2. Howard County's Office of Sustainability will be subawarded funds to support the expansion of their Alpha Ridge Landfill Composting Facility Expansion. Construction for this facility will begin July 1st, 2025. Subsequent construction and commissioning should take a year or less - putting completion around July 1st, 2026. Other county government partners, though not receiving direct subawards from the CPRG funds, will be involved in the coalition as shared decision makers, and inform, along with the populations each jurisdiction represents, collaborative, participatory implementation approaches for each of the eight measures in the grant proposal.

Baltimore County will dedicate and allocate existing resources and staff-time of the Energy and Sustainability Coordinator of the Department of Environmental Protection and Sustainability. It is estimated that 5% of this position's time on an annual basis can be dedicated to project management and technical analysis to ensure development of the Comprehensive Climate Action Plan under the Baltimore Regional MSA. It is expected that the facilitation of outreach and engagement related to the CPRG will be conducted by the Baltimore County Office of Community Engagement and the Department of Environmental Protection and Sustainability. As such, the County will leverage the existing relationships, networks or other community-based planning structures to authentically and meaningfully engage with residents, particularly those most impacted by climate and environmental injustices.

Carroll, Harford and Queen Anne's Counties will advise on the best approaches to engage, coordinate and collaborate with communities in their jurisdiction. As the County has limited Census block groups, and or tracts exhibiting environmental burdens, the county will inform how best to engage with its residents who are well primed for environmental behavior change through actions under measure 6. Queen Anne's County will also facilitate the exploration of a local-government run tree nursery to save on cost needed to procure tree, plants or other vegetation for greening projects across the region, as this exploration aligns with the County's goals to expand tree planting.

**SECTION 4: Low-Income and Disadvantaged Communities (35 total possible points)**

**a. Community Benefits (25 possible points)**



In the PCAP for the Baltimore MSA, the Climate and Economic Justice Screening Tool and the Environmental Justice Screening and Mapping Tool (Version 2.2) were used to identify LIDAC areas located within the region. Based on data and community summaries from EPA's EJ Screening Mapping Tool, a total of 36 zip codes were selected as target communities to benefit from the proposed investments under Strategy B of this proposal. We estimate a total of 1,012,356 people and 404,977 households among these zip codes, reflecting more than one third of the region's population. The majority of zip codes are considered EJ40 communities. Our analysis compared indicators for categories of environmental burden in combination with socioeconomic vulnerabilities among zip codes that contained Census Tracts designated as disadvantaged based on EPA's Just40 criteria. Some zip codes were selected as target areas based on other factors such as the proportion of Black, Latino or other marginalized racial or ethnic groups in those areas, the proportion of non-English proficient households, average per capita household income, percentage of low-income households, life expectancy or the proportion of people living with disabilities. Environmental burdens considered ranged from air quality, climate change, energy, environmental hazards, health, housing, legacy pollution to transportation.

Each zip code selected to receive investments under CPRG was assigned a REDUCE Tier (A-F) delineating the number of people and households engaged, the estimated emission reductions, and the target average EJ or supplemental percentiles for certain criteria using EPA's EJ Screen Mapping Tool. Those zip codes exhibiting the greatest environmental injustices, environmental burdens or socioeconomic vulnerabilities are ranked into Tier A, meaning these areas are intended to receive the greatest investment from CPRG in the Baltimore region. Lower tiers correlate to lower levels of need, and a smaller proportion of the overall investments under Strategy B dedicated to these areas, households or community stakeholders. According to EPA data, of the 261 disadvantaged tracts in Maryland, an overwhelming majority - 117 (44.8%) - of those are in Baltimore City. Zip codes prioritized for CPRG investment reflect this need, with the majority of these areas selected being in the City of Baltimore and surrounding areas in Anne Arundel and Baltimore Counties.

Maryland Department of Environment's Environmental Justice Screen Tool was also used to understand environmental justice risk at a more granular level. Some Census tracts excluded from EPA's EJ screen tools were quantified as overburdened in Maryland's Tool. A complete list of these zip codes can be accessed in **Appendix C3: List of Climate and Economic Justice Screen Tool (CEJST) Census Tract IDs, Block Group IDs and/or Zip Codes.**

**b. Community Engagement (10 possible points)**

The REDUCE approach to community engagement is informed by the notion that "Deep emission reductions will require significant transitions in technologies and energy systems that must be informed by community-level engagement, input, and analysis" from EPA's strategic plan. We take this commitment seriously and make it actionable. In order to build meaningful and participatory engagement with low-income and disadvantaged communities, the Baltimore MSA plans to hold public engagement seminars intended to:

- Build public understanding of the connections between zero waste, recycling, health, climate change, and local environmental, social, and economic justice and resilience,
- Gather data on residents' attitudes, beliefs, concerns, barriers and motivations as they relate to food activities
- Gather group pledges to foster behavior change around food waste habits

In year one, six seminars will be held with residential focus groups in underserved and disadvantaged communities in the Baltimore MSA. Translation, interpretation services and hybrid attendance options will be provided to eliminate language barriers to participation. Information and data gathered in these sessions will be used to design persuasive, evidence-based eco amenities and outreach strategies that will work for populations in the Baltimore MSA who bear disproportionate environmental burdens. Data will also be used to identify topics for free workshops and other educational engagements to incentivize residents to waste less food, compost food scraps or participate in other emission-reducing behavior when appropriate. Throughout the lifespan of the grant, the Baltimore MSA will continue to conduct boots on the ground outreach to build awareness on the eco-amenities offered and collect feedback to incorporate into program design. Community-based marketing and outreach strategies will also be tracked with metrics that will inform the development of on-going culturally appropriate communications, support, and relationship-building.

These efforts will be further supported by existing partnerships between REDUCE jurisdictions, BMC and BSEC, as it is working to generate the science required for equitable climate action. This includes convening representative roundtables to address key climate risks and priorities and workshop equitable, stakeholder-preferred baskets of strategies. As a research-driven project led by local universities (Johns Hopkins University, Morgan State University, University of Maryland Baltimore County, and others), BSEC brings academic rigor and evaluation strategies to maximize the effectiveness of community engagement strategies. In addition, in order to create an inspirational culture shift, the Baltimore MSA plans to support local art and artists by hosting art competitions or events that focus on creative reuse of hard-to-recycle or dispose-of materials. The nature of the artistic engagement will be determined based on feedback received in the community engagement seminars. The art will be displayed or used in public spaces to build and promote sustainability culture, foster innovation, and improve the built environment.

#### **SECTION 5: Job Quality (5 possible points)**

Consistent with EPA's Workforce Learning Priority Area, we acknowledge the need for ongoing professional development, skills building and equitable, inclusive recruitment strategies while connecting workforces to careers that support climate pollution reduction regionally and statewide. The REDUCE Coalition is committed to ensuring that these funds support the creation of high-quality jobs, as detailed in the U.S. Department of Labor's and Department of Commerce's eight Good Jobs Principles. The Climate Ready Workforce strategy will create training pathways that expand access to family-sustaining jobs and support ongoing career advancement. The coalition is partnering with unions, such as LiUNA, to ensure that their expertise is incorporated in the design and implementation of this job quality strategy. The coalition members will work to incorporate the Good Jobs Principles into the implementation of the REDUCE strategies, in alignment with applicable law. This will include the screening of contractors and subcontractors, local hiring, expanding access to supportive services for employees entering these careers, and second chance hiring. The coalition will ensure that this job quality lens is incorporated across grant implementation to ensure broader community benefits.

#### **SECTION 6: Programmatic Capability and Past Performance (30 total possible points)**

##### **a. Past Performance (10 possible points)**

As the lead applicant, Baltimore City has detailed its role as a responsible fiscal steward, reporting entity of past federal awards from EPA. Coalition partners and their respective federal grant management roles are also captured here as the local governments partners will be subawarded some level of the funding.



**Baltimore City:** The city's procurement teams are entrusted with the comprehensive oversight of agency programs. This role extends to ensuring the judicious expenditure of grant monies within specified timeframes, the attainment of stated goals, and meticulous adherence to compliance requirements. All grants, cooperative agreements or other support awarded to Baltimore City undergo rigorous approval by the Baltimore City Board of Estimates—the fiscal policy authority of the City, the City Solicitor, Comptroller, and Director of Public Works. Over the past five years, Baltimore City agencies, including our Department of Public Works, Department of Planning/Office of Sustainability, Mayor's Office of Infrastructure Development among many other agencies, divisions and offices have adeptly managed substantial grants under the purview of several federal agencies including, EPA, USDA and the FEMA.

Project Title: State Environmental Justice Cooperative Agreement (SEJCA) valued at \$572,000

- Assistance Agreement Y | Federal Agency: EPA
- Description: To expand the scope and reach of DPW's YH2O program, \$200,000 was awarded to the city's DPW in FY 2021. DPW submits semi-annual fiscal and narrative reports to this funder. To date, reports have been submitted in a timely manner. DPW also meets monthly with an EPA program manager to discuss progress.
- Primary Contact: Ann Haskins Brookover

Project Title: American Rescue Plan Act

- Assistance Agreement: Y | Federal Agency: The Treasury Department
- Description: The 2021 American Rescue Plan Act (ARPA) provided \$641 million to the City of Baltimore through the State and Local Fiscal Recovery Fund in response to the COVID-19 public health emergency and its negative economic impacts. The administration has used this one-time funding to make strategic investments in Baltimore's future and equitably deliver resources and services to City residents. In pursuit of these goals, in July 2021 Mayor Scott established the Mayor's Office of Recovery Programs, responsible for administering all aspects of ARPA funding and regularly reporting to the federal government, as well as the public.
- Primary Contact: Shamiah T. Kerney, Chief Recovery Officer

### **Anne Arundel County**

Project Title: Anne Arundel County Hate Crime Prevention

- Assistance Agreement Y/N: 15PBJA-23-GG-05364-HATE | Federal Agency: Department of Justice, 16.040 - Matthew Shepard and James Byrd, Jr. Hate Crimes Education, Investigation and Prosecution Program
- Description: 4-year, 1.2 million dollar grant to develop a comprehensive approach to hate crime prevention, investigation, and prosecution, and to provide services for victims of hate bias incidents in Anne Arundel County, Maryland
- Primary Contact: Tamaro White

Project Title: Odenton MARC Station Development

- Assistance Agreement Y: B-23-CP-MD-0710 | Federal Agency: 14.251 Economic Development Initiative, Community Project Funding, and Miscellaneous Grants
- Description: Federal funding will be used to supplement county funding and potential state and private funding to construct adequate parking to meet demand at the transit-oriented development site surrounding the Odenton MARC Station.
- Primary Contact: Angela Dyer

Project Title: Ralph Bunche Community Center Restoration

- Assistance Agreement Y: B-23-CP-MD-0712 | Federal Agency: 14.251 Economic Development Initiative, Community Project Funding, and Miscellaneous Grants

- Description: \$750,000 award in federal funds will be used for renovation of an historic County-owned school house that is home to the Ralph J. Bunche Community Center, an accredited 501(c)(3) nonprofit organization established by concerned citizens of the community.

- Primary Contact: Angela Dyer

Project Title: Crownsville Nonprofit Incubator and Community Space

- Assistance Agreement Y/N: B-23-CP-MD-0711 | Federal Agency: 14.251 Economic Development Initiative, Community Project Funding, and Miscellaneous Grants
- Description: Federal funds will be used to renovate existing County-owned space in order to create a nonprofit incubator and community space. Renovations will include plumbing, restrooms, floors, and other interior improvements.
- Primary Contact: Angela Dyer

Project Title: Inclusive Ventures Small Business Program

- Assistance Agreement Y/N: SBAHQ23I0140 | Federal Agency: 59.059, Small Business Administration
- Description: \$1,650,000 in federal funds for the Inclusive Ventures Program that assists small, minority, women, and veteran entrepreneurs in Anne Arundel County with education, mentorship, and access to capital.
- Primary Contact: Phuc Nguyen

**Baltimore County**

Project Title: Energy Efficiency and Conservation Block Grant

- Assistance Agreement: Y. Award Number: DE-SE0000162 | Federal Agency: Department of Energy
- Description: Implementing strategies to reduce energy use, fossil fuel emissions, and to improve energy efficiency. The County's allocation is \$712,040. The County has proposed to fund: (1) Interior facility lighting efficiency retrofits (LED lighting), (2) Consultant services to conduct rooftop solar assessments on government owned or controlled buildings and (3) Consultation services for energy/decarbonization audits for a number of County-owned buildings that are subject to the Building Energy Performance Standards (BEPS) regulation issued by the Maryland Department of the Environment.
- Primary Contact: Karen Wu, DOE, [karen.wu@hq.doe.gov](mailto:karen.wu@hq.doe.gov)

Charging and Fueling Infrastructure Discretionary Grant

- Assistance Agreement: Y | Federal Agency: FHWA-DOT
- Description: Funding is intended to provide grants to entities to strategically deploy publicly accessible EV charging infrastructure in certain locations or along designated AFCs that will be accessible to all drivers of EVs. Eligible project costs include acquisition and installation of eligible charging infrastructure, related construction or reconstruction related to the project, network and warranty services, and/or development phase activities such as planning or feasibility analysis. The County plans to fund the installation of three dual-port Level II chargers and one Direct Current Fast Charger (DCFC) unit for the Sparrows Point New Recreational Facility.
- Primary Contact: James Peratino, DOT. [james.peratino@dot.gov](mailto:james.peratino@dot.gov)

**Howard County**

Project Title: Energy Efficiency and Conservation Block Grant

- Assistance Agreement: DE-SE0000294.0000
- Federal Agency: DOE

- Description: Howard County's EECBG award utilizes blueprints 2A, 2C, 2D, 3B, 4B, and D. Summarized, the funding will assist energy efficiency upgrades in County buildings via energy audits and electrification assessments, conducting a residential electrification campaign, educating the public on community solar, conducting stakeholder engagement on electric vehicle infrastructure topics, and convening industry partners for clean energy workforce development.

- Primary Contact: Karen Wu, [karen.wu@hq.doe.gov](mailto:karen.wu@hq.doe.gov)

Project Title: Dunloggin Stream Restoration Subaward

- Assistance Agreement: Y - Chesapeake Bay Trust Fund
- Federal Agency: EPA
- Description: Watershed Assistance Grant.
- Primary Contact: Jana Davis, PhD, Executive Director - Chesapeake Bay Trust

Project Title: Chesapeake Bay Program - Innovative Nutrient and Sediment Reduction Pass-Through

- Assistance Agreement: Y - National Fish and Wildlife Foundation (NFWF)
- Federal Agency: EPA
- Description: Planting the Trees for the Future Initiative (MD).
- Primary Contact: Holly A. Bamford, PhD, Chief Conservation Officer

Project Title: American Rescue Plan Act (ARPA)

- Assistance Agreement: Y - SLFRP2806
- Federal Agency: U.S. Department of Treasury
- Description: COVID-19 State and Local Fiscal Recovery Funds
- Primary Contact: N/A

Project Title: COVID-19 Coronavirus Relief Fund Pass-Through (Cares Act)

- Assistance Agreement: N/A | Federal Agency: U.S. Department of Treasury - Maryland Department of Budget and Management
- Description: Cares Act | Primary Contact: N/A

Project Title: Charging and Fueling Infrastructure Discretionary Grant Subaward

- Assistance Agreement: MD Clean Energy Center. | Federal Agency: DOT
- Description: Howard County's Scaggsville Public Safety Complex will receive 2 dual-port Level 2 Electric Vehicle chargers as part of Maryland Clean Energy Center's Award.
- Primary Contact: Amy Gillespie, Maryland Clean Energy Center

Project Title: Howard County Neighborhood Assessment and Flood Mitigation Opportunities

- Assistance Agreement: Award letter received, agreement in process | Federal Agency: FEMA
- Description: This project will evaluate the use of stormwater management in various locations throughout the County as it relates to flooding and water quality, specifically looking at impacts to underserved communities. The objective is to implement small neighborhood level drainage improvements that will incrementally improve the community's resilience to increased rainfall intensities and durations associated with climate change.
- Primary Contact: Lindsay DeMarzo, Howard County

**b. Reporting Requirements (10 possible points)** Reporting requirements for each project or funding agreement were met to the best ability of the project teams, and all interim and final reports were submitted on time when possible.

**c. Staff Expertise (10 possible points) Staff Expertise (10 possible points)**

The Baltimore MSA is fortunate for seasoned professionals able to contribute to this work. Primary contacts from each of the 6 counties in the MSA are listed, though additional team members may

support the grant implementation. As the lead applicant, Baltimore City lends a diverse team with broad technical, programmatic and environmental justice expertise to the implementation of this grant proposal including staff from the city's Office of Sustainability, Department of Planning, Department of Public Works, Mayor's Office and a multi-agency Sustainability & Resiliency Subcabinet, chaired by the city's Chief Administrative Officer. Biographies for representatives from each local government are in **Appendix D3: Team Biographies**.

**SECTION 7: Budget Narrative (45 possible points)**

- **Budget Detail (20 possible points)**

A complete budget narrative and budget worksheets with justifications for each line item requested under this proposal are available in **Appendix A: Budget Narrative**.

- **Expenditure of Awarded Funds (15 possible points)**

In SECTION 6a we detail Baltimore City's past roles in responsible fiscal stewardship of federal or other grant funds. Our team is committed to excellence, and diligently monitors the progress of all grants. Baltimore agencies currently supported by EPA through federal grants submit semi-annual fiscal and narrative reports, reflective of a commitment to adhering to all EPA reporting guidelines and requirements to ensure the integrity of funding objectives. Baltimore City has dedicated staff willing to engage in meetings to discuss project progress. Collaborating with prospective partners, we establish outcome metrics and conduct monthly check-ins to monitor progress. This frequent communication allows us to make real-time operational adjustments, ensuring alignment with priority outputs. Additionally, we remain agile in responding to unexpected outputs, evaluating their potential as beneficial outcomes. Guidance from our EPA grant manager informs any necessary adjustments, maintaining the highest standards of grant management and fostering a culture of continuous improvement.

- **Reasonableness of Costs (10 possible points)**

All proposed funds are deemed reasonable, allowable and applicable to the NOFO for CPRG. In the **Budget Narrative (Appendix A)**, 10 pages in total, we provide detailed explanations of all line items in the budget worksheets. Each budget category includes costs listed by CPRG Measures (1 -8). We also reference the related REDUCE strategy for specific funding requests. Where necessary, additional context for the reasonableness of costs and/or the necessity of those requested costs is conveyed. Please reference the budget narrative text for more information.

# **APPENDICES**

## **APPENDIX A1: BUDGET DETAIL**

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**TOTAL PERSONNEL - \$4,581,985 (Y1: \$835,750; Y2: \$875,375; Y3: \$915,681; Y4: \$956,703; Y5: \$998,475)**

Personnel costs refer to staff that the City of Baltimore will hire to help coordinate the implementation of Measures 1-8. These personnel expenses are critical to enhancing the regional and city capacity to facilitate the allocation of funds, oversee collaboration with REDUCE Coalition partners and support region-wide engagement, outreach and marketing to socialize climate behavior change among environment justice communities. Positions pioneering new career fields that will be needed to further drive climate pollution reduction include (1) Regional Heat Resilience Officers, (2) Maryland Climate Corps Fellows and (3) a Climate Finance Officer. These roles are emerging fields of climate expertise.

- **M1** - Sustainable Transportation Coordinator 100% FTE, @\$80,000/Year, 5% increase annually (**Y1:** \$80,000; **Y2:** \$84,000; **Y3:** \$88,200 ; **Y4:** \$92,610; **Y5:** \$97,241): The Sustainable Transportation Coordinator will facilitate the regional deployment of mode shift incentives such as free transit passes, micromobility rebates and advancing telework person hours across the region.
- **M1** - Climate & Resilience Program Manager @.10 FTE: MATCH 10% of the Climate & Resilience Program Manager's time in Baltimore City's Office Of Sustainability will be dedicated to facilitating the implementation of CPRG.
- **M1** - Grants Manager @.05% : MATCH 5% of the Climate & Resilience Planner's time in Baltimore City's Office Of Sustainability will be dedicated to facilitating the implementation of CPRG.
- **M2** - EV Adoption Coordinator @ \$75,000 annual salary with, 5% increase a year (**Y1:** \$75,00; **Y2:** \$78,750; **Y3:** \$82,688; **Y4:** 86,822 ; **Y5:** \$91,163): The EV Adoption Coordinator will support the adoption of electric vehicle use through education, outreach and marketing and facilitate the installation of 155 EV charging stations across the region with a priority for environmental justice and frontline communities. A portion of these installations will take place at community resiliency hubs across the region serving disadvantaged communities.
- **M3** - Energy Project Coordinator 100% FTE, @\$75,000/year (**Y1:** \$37,500; **Y2:** \$39,375; **Y3:** \$41,344; **Y4:** \$43,411; **Y5:** \$45,581): Half of the salary for an Energy Project Coordination Coordinator will be covered with CPRG funds to support the deployment of energy efficiency upgrades, electrification enhancements and the installation of rooftop solar for disadvantaged communities. The remaining salary will be supported by other funding resources such as federal and state grants.
- **M3** - Maryland Climate Corps Fellows (Energy Education Associates) 100% FTE, 2 @ \$15-25/hour for 40 hrs/week for 12 months (2080 hrs total) (**Y1:** \$62,400; **Y2:** \$72,800 ; **Y3:** \$83,200; **Y4:** \$93,600; **Y5:**\$104,000): Maryland's Department of Service and Civic Innovation (DSCI) connects Climate Climate Corps Fellowship opportunities with young people between the ages of 18-26 without college degrees to climate career pathways. Climate Corps Fellows recruited are presented with options to enter the environmental field, gain the necessary skills, knowledge and expertise while receiving mentorship from state climate leaders. At the completion of the 10-months of service, each fellow will have gained (1) A \$6,000 awarded for their service, (2) Valuable experience in the fields of environmental sustainability, local governance and climate mitigation of adaptation (3) Ongoing professional and personal development and (4) Mentorship support, career coaching and job seeking assistance. MD's DSCI's Climate Corps Fellowship provides a timely opportunity to foster more inclusive opportunities for prospective environmental professions to launch their careers. These Fellows will support coordination needs for the actions under Measure 3. Salaries will begin at \$15/hour in year 1, increasing by \$2.50 annually to \$25/hour in year 5 to adjust compensation for the cost of living of COLA.
- **M4** - Maryland Climate Corps Fellows (Food Waste Associates) 80% FTE, 3 @ \$15-25/hour for 40 hrs/week for 12 months (2080 hrs total) (**Y1:** \$93,600 ; **Y2:** \$109,200 ; **Y3:** \$124,800; **Y4:** \$140,400; **Y5:**\$156,000): These Fellows will support coordination needs for the actions under Measure 4 and will be recruited as part of Maryland's Department of Service and Civic Innovation (DSCI) Climate Corps Fellowship (explained above). These Fellows will serve as "Food Waste Associates" supporting



coordination needs for the actions under Measure 3. Salaries will begin at \$15/hour in year 1, increasing by \$2.50 annually to \$25/hour in year 5 to adjust compensation for the cost of living.

- **M5** - Regional Heat Resilience Officers, 100% FTE, (2) @\$85,000 Year (**Y1**: \$170,000; **Y2**: \$170,000; **Y3**: \$170,000; **Y4**: \$170,000; **Y5**: \$170,000 ): Heat resilience requires dedicated staff driving heat mitigation or cooling interventions at the community-level. These two Regional Heat Resilience Officers will lead the implementation of neighborhood-level cooling interventions and pre-post measurements of all interventions. Heat mitigation planning and implementation anchored to nature based solutions and informed by community needs and concerns, not only helps to cool communities, but can support climate pollution reduction on a community-wide scale through fewer energy need to cool individual households or facilities. The Baltimore Social Environmental Collaborative will be a collaborator to assess the impact of community cooling interventions.
- **M5** - Tree Nursery Manager 100% FTE, @\$75,000 per Year (**Y1**: \$75,000; **Y2**: \$75,000; **Y3**: \$75,000; **Y4**: \$75,000; **Y5**: \$75,000) Maryland has a goal to plant 5 million new trees under the state's Tree Solutions Now Act, by 2031. This tree planting goal warrants more local government capacity to produce the necessary tree seedlings, store young trees to be planted in areas lacking adequate tree canopy and train workforces on key nursery management skills. The Tree Nursery Manager will oversee operations to supply young trees to local governments in the Baltimore MSA.
- **M5** - Tree Nursery Staff, 100% FTE, 3 @ \$50,000/Year (**Y1**: \$150,000; **Y2**: \$150,000; **Y3**: \$150,000; **Y4**: \$150,000; **Y5**: \$150,000): Additional tree nursery staff will carry out additional coordinating tasks as needed to support the deployment of young tree, carbon sequestration and costs savings..
- **M8** - Climate Finance Officer, 100% FTE @\$80,000/Year, with 5% Increase Annually (**Y1**: \$80,000; **Y2**: \$84,000; **Y3**: \$88,200; **Y4**: \$92,610; **Y5**: \$97,241): The Climate Finance Officer will conduct analysis to assess how public, private, and/or philanthropic funding can be better leveraged to support climate pollution reduction. This will entail assessing current or potential climate investments among coalition governments, gaps in funding and seek out new opportunities to secure funds dedicated to climate mitigation or adaptation. The Climate Finance Officer will also explore new revenue sources for the Climate Pollution Reduction Fund detailed in Section 2 of the work plan proposal.

**TOTAL FRINGE BENEFITS - \$1,820,007 (Y1: \$353,544 ; Y2: \$343,575 ; Y3: \$363,751 ; Y4: \$374,208 ; Y5: \$384,929)** Each position listed under personnel will be hired by the city and serve as team members in the city's Office of Sustainability, or Department of Public Work. All personnel hired under CPRG will receive a comprehensive benefits package, with a minimum fringe benefit @ 20% of their base salary to medical, prescription drug, dental, vision, optional life, AD&D, and FSA plans. The City's Department of Human Resources also provides wellness programs, support groups, and workshops. We support fringe costs among all employees hired to work for the city under CPRG to promote equity among city workforces. The fringe percent for each full-time unionized role is 35% and 20% for climate fellows.

- **M1** - Sustainable Transportation Coordinator & Fringe EV Adoption Coordinator Fringe @35%; **M3** - Project Coordinator @35% Maryland Climate Corps Fellows @20%; **M4** - Maryland Climate Corps Fellows @20%; **M5** - Heat Resilience Officers, Tree Nursery Manager; Tree Nursery Staff (3) @35% each; **M8** - Climate Finance Officers @35% Fringe

**TOTAL TRAVEL - \$111,223 (Y1: \$22,245 ; Y2: \$22,245 ; Y3: \$22,245 ; Y4: \$22,245; Y5: \$22,245)** Travel costs requested under this proposal will provide funds to support local travel across the region, and connect CPRG-funded positions leading on emerging topics with the latest evidence-based approaches to climate pollution reduction. Emerging positions never before employed in the city will benefit from the opportunity to connect with and learn from colleagues leading similar bodies of work nationally. We limit CPRG-related travel in this proposal to avoid carbon intensive actions associated with this CPRG goals such as flying, driving combustion vehicles. We request the same level of travel-related funding in each year of the period of performance, so some of the measures have been collapsed for efficiency.

- **M1 - Local Mileage (Y1: \$655; Y2: \$655; Y3: \$655; Y4: \$655; Y5: \$655) \$2,500:** Refers to cost needed for CPRG-funded staff to navigate throughout the region, if/when they use personal vehicles to do so and are reimbursed for those costs, to support implementation of Measures 1. We estimate roughly 1000 miles/Year @\$0.655/mi for a total of \$3,275 over the periods of performance. Ground Transportation (Y1: \$2,500; Y2: \$2,500; Y3: \$2,500; Y4: \$2,500; Y5:\$2,500): These costs refer to other non-single occupant vehicle travel related costs needed to traversing throughout the region in support of implementation for M1 either via public transit such as subway or bus, ride hailing apps and/or other publicly accessible forms a ground transport such as shared bike, scooter apps. We estimate a total of \$12,500 in ground transportation costs over the period of performance.
  - **M2 - \$13,338** Workforce development program support (Y1: \$2,668; Y2: \$ 2,668; Y3: \$ 2,668; Y4: \$ 2,668; Y5: \$ 2,668): These costs will support travel and or additional training needs for mechanics trained in electric vehicle maintenance. As EV adoption expands, the number of mechanics with the technical expertise needed to support maintenance needs will increase. These funds will support travel needs for existing local government employees needed to be cross trained on EV repairs. EV mechanical training costs may also support workforce development trainings.
    - Airfare - \$900 roundtrip @ 2 round trip flights per year, Luggage Fees - \$25 per flight @ 2 flights per year; Hotel - \$200 per day @ 3 days per year, Per Diem - \$71 per day @ 3.5 days per year; Taxi - \$45 per year; Local Mileage: 500 miles/Year @\$0.655/mi:
    - Ground Transportation: Includes cost for the use of regional transit such as bus, train or other shared mobility options
  - **M3 & M4 Combined Total - \$44,489 or \$22,245\*2 (Y1: \$5,982.50 ; Y2: \$5,982.50; Y3: \$5,982.50; Y4: \$5,982.50; Y5:\$5,982.50)**
    - Local Mileage for both M3 and M4 (Y1: \$982; Y2: \$982; Y3: \$982; Y4:\$982 ; Y5: \$982): Refers to costs needed for CPRG-funded staff to navigate throughout the region, if/when they use personal vehicles to do so and are reimbursed for those costs, to support implementation of Measures 3 & 4. We estimate roughly 1,500 miles/Year for both Measure 3 & 4@\$0.655/mi for a total of \$4,912.5 over the periods of performance.
    - Ground Transportation @\$2,500/Year: These costs refer to other non-single occupant vehicle travel related costs needed to traversing throughout the region in support of implementation for M3 & 4 either via public transit such as subway or bus, ride hailing apps and/or other publicly accessible forms a ground transport such as shared bike, scooter apps. We estimate a total of \$25,000 in ground transportation costs for both measures 3 & 4 over the period of performance.
  - **M5 & M8 Combined Total \$51,720 or \$25,860 \* 2 (Y1: \$10,344; Y2: \$10,344; Y3: \$10,344; Y4: \$10,344; Y5: \$10,344):** Travel Cost for Regional Nature-based Solutions or Heat-Related Conference Attendance. These costs will support travel and or additional training, collaboration of ideation opportunities for the Regional Heat Resilience Officers who are entering an emerging field. We feel these funds are necessary given the nascency of the urban heat resilience and mitigation professions, attending local, regional or national convenings on the topic is beneficial for the region, professional learning goals for the individuals in these roles and ongoing climate literacy goals for local government staff. We collapsed the travel funding needs for both measures 5 & 8 as these fundline items are identical for each year in the period of performance.
    - Conference Registration @\$500; Airfare - \$900 Roundtrip @ 1 Roundtrip per Year for 2 People; Luggage Fees - \$25 per flight @ 2 flights per year, Hotel - \$150 per day @ 3 days per year; Per Diem - \$71 per day @ 3.5 days per year, Taxi - \$45 per year
    - Mileage for local travel (1000 miles per year at \$0.655/mi)
  - **M6 & M7 \$0** There are no travel costs requested for Measure 6 & Measure 7
- TOTAL EQUIPMENT - \$4,720,675 (Y1: \$806,875; Y2: \$514,375 ; Y3: \$2,638,175 ; Y4: \$436,875; Y5: \$324,375 )** Equipment requested using CPRG funds will support the deployment of technologies

necessary to meet CPRG reduction targets in Measures 1-4. Equipment requested for Measures 1 & 2 relate to the deployment of revenue generating services, which would serve as contributions for the proposed Climate Pollution Reduction Fund. These revenue generating approaches are described in **Section 1c: Transformative Impact, Strategy D: Climate Financing**. In some cases, these technologies will be supported and deployed by CPRG-funded positions.

- **M1 Total \$759,375 (Y1: \$150,000; Y2: \$150,000; Y3: \$150,000; Y4: \$150,000; Y5: \$150,000)**
  - Digital Kiosks @\$2,500 each, 20/year, 100 total: We propose the installation of digital kiosks at “Cool Bus Stops” in the targeted zip codes under this proposal. These kiosks will serve multiple functions, (1) provide real-time transit information such as the next bus, accessible micromobility options, and key walkable attractions, (2) serve as a source of information about regional REDUCE efforts supporting climate pollution reduction and how people can benefit from programming and (3) be a source of revenue from the sale of digital ads. We request \$50,000 for each year of the period of performance and \$250,000 in total for digital kiosks.
  - Solar Panels @\$75 per panel, 25/Year: Cool bus stops will serve as exemplary “poly solutions”, with each being solar powered, and providing options for transit system users to charge mobile devices. These funds will support the purchase of the panels needed for these designs. Solar panels, along with other creative designs will be installed in a manner that provides shade structures and protection from the elements (extreme wind, rain etc). These features will support a more accommodating user experience for transit system riders. We request \$1,875 for each year of the period of performance and \$9,375 in total for Cool Bus Stop solar panels.
  - Outdoor Cooling Units @\$5,000 each: Each Cool Bus Stop will be equipped with an outdoor cooling unit to protect transit system users from extreme heat on very hot days. The Regional Heat Resilience Officers will work closely with target communities to deploy and maintain these features. We request \$100,000 for each year of the period of performance and \$500,000 in total for outdoor cooling units with a plan to install 20 per year, and 100 over a five year period.
- **M2 - Total \$575,000 (Y1: \$ 35,000; Y2: \$ 175,000; Y3: \$ 175,000; Y4: \$ 155,000; Y5: \$ 35,000)**  
Equipment costs under Measure 2 relate to the purchase of used electric vehicles (sedans and vans) We request funds to purchase and provide free used electric vehicles families and organizations.
  - Used Electric Vehicles for 20 Low-Income Households: These families will be selected through nominations, and only those families in targeted zip codes will be eligible. A total 20 used EVs will be given away, with an estimated cost of \$20, 000 each, and a goal to begin these giveaways in Y2 and end them in Y4 of the period of performance. To provide community-based organizations such as Community Resiliency Hubs, with emission-free mobility options to support their work and serve their communities.
  - Used Electric Vans for 5 Community Resiliency Hubs or CBOs: We will also provide 5 such partners with an electric van, with one van being given away per year for 5-years and an estimated annual cost of \$30,000, totaling \$150,000 over the period of performance.
  - Electric Vehicle Rebates up to \$5,000 for 5 Community Resiliency Hubs or CBOs: An additional 5 Community Resiliency Hubs in the region will be granted up to \$5,000 for the purchase of an electric van to serve their communities.
- **M3 - \$100,000 total (Y1: \$20,000; Y2: \$20,000; Y3: \$20,000; Y4: \$20,000; Y5: \$20,000):** Training Materials For Solar Demonstration Site will be purchased to serve as an educational and training opportunity throughout the region. This site will be located at a facility owned and operated in Baltimore City, and serve as a site for hands-on learning throughout the region.
- **M4 - \$3,286,300 Total (Y1: \$600,000; Y2: \$167,500 ; Y3: \$2,291,300 ; Y4: \$110,000; Y5:\$117,500 )**  
These costs relate to items need to establish a wood reuse site similar to the nationally renowned [Camp Small Urban Wood Recycling Facility](#), which save the City of Baltimore on operational costs to manage downed trees and generate revenue from the sale to upcycled wood products. Equipment

includes one-time costs such as those proposed for Y3 - Miter Saw (\$800), jointer (\$6k) Dust collection (\$8K), hand tools (\$7), saw mill (\$5K), table saw (\$4k), storage (\$5K) firewood splitter, moisture meter (\$800). Other one-time investments in Y3 needed to support such a site include: Excavator for clearing and managing materials (\$220,000); 3000 Sq Ft Lumber Storage (\$150,000); Planer and Flatteners (\$30,000); Dehumidification and Vacuum Kiln for drying wood (90,000)

Other cost related to enhancing the existing Camp Small site with new climate pollution reduction capacity, primarily the ability to composted organic waste, including food waste, in year 3 include:

- Covered aerated static piles for Composting Systems for Baltimore City (\$850,000); Solar Panels for Composting Operation (\$400,000); Compost Screener (\$375,000)

Other costs to enhance the climate pollution reduction capacity of Camp Small, require purchasing:

- Large Stationary Mill, Mid-sized Portable Mill - \$90,000 total (Y1: \$0 ; Y2: \$60,000 ; Y3: \$25,000 ; Y4: \$2,500; Y5: \$2,500) Used for processing various wood product into value-added products.
- Biochar Equipment for 2 Wood Reutilization Sites - \$520,000 (Y1: \$500,000 ; Y2: \$5,000 ; Y3: \$5,000 ; Y4: \$5,000; Y5: \$5,000): Used to process various wood product into value-added products which serve a feedstock for composting operations, soil amendments and carbon sequestration enhancers.
- Dump Trailer - \$17,500 total (Y1: \$0; Y2: \$2,500; Y3: \$10,000; Y4: \$2,500; Y5: \$2,500): Used for storing value-added upcycled wood products.

- **M5 - M8 \$0** No equipment funds are requested for Measures 5 through 8

**TOTAL SUPPLIES - \$1,367,970 (Y1: \$326,350; Y2: \$263,530; Y3: \$288,530; Y4: \$253,530 ; Y5: \$236,030)**

All supplies procured under this proposal were informed by [EPA's Best Practice Guide for Procuring Services, Supplies, and Equipment Under EPA Assistance Agreements](#).

- **M1 - \$750,000 Total**

- Marketing Supplies total - \$250,000 (Y1: \$50,000; Y2: \$50,000; Y3: \$50,000; Y4: \$50,000; Y5: \$50,000) Relates to marketing materials that will be used to support behavior change among target communities and local government employees to advance Measure 1. Costs will include behavior nudge items, transit use/travel essentials such as water bottles, reusable foodwares and other items branded with REDUCE messaging.
- Transit Passes (Physical) (Y1: \$100,000; Y2: \$100,000; Y3: \$100,000; Y4: \$100,000; Y5: \$100,000): These funds will support the purchase and subsidization of free transit passes to encourage mode shift among residents in targeted zip codes. These will be paper passes for transit users who prefer this option over digital passes.

- **M3 - \$100,000 Total** Marketing Supplies: (Y1: \$20,000; Y2: \$20,000; Y3: \$20,000; Y4: \$20,000; Y5: \$20,000) Relates to marketing materials to support behavior change among target communities. Costs will include an assortment of home energy efficiency educational materials.

- **M4 - \$465,470 total (Y1: \$136,350; Y2: \$78,530; Y3: \$108,530; Y4: \$78,530; Y5: \$63,530)** Supplies funds under Measure 4 relate to supplies and materials that will be used to support behavior change among target communities and local government facilities for the implementation of Measure 4. Costs will include food scrap bins, mobile devices for Food Waste Associates, food scrap collection bins placed in targeted communities and home composting units to support food waste diversion behaviors. These costs include:

- A total of **\$101,920** for Food Scrap Bins for Government Buildings, procuring the majority of bins in year 1, and additional bins as needed in years 2-5 (Y1: \$78,400; Y2: \$5,880; Y3: \$5,880; Y4: \$5,880; Y5: \$5,880)
- A total of **\$1,050** for Mobile Devices, procuring the bulk in year 1 and additional devices in years 2-5 as needed (Y1: \$450; Y2: \$150; Y3: \$150; Y4: \$150; Y5: \$150); a total of **\$100,000** for the

procurement of 1000 Food Scrap Collection Bins @\$20 each: (Y1: \$20,000; Y2: \$20,000; Y3: \$20,000; Y4: \$20,000; Y5:\$20,000)

- A total of **\$225,000** for Community-Based Public Food Scrap Collection Bins @\$3,000 per site and 75 Sites Over 5 Years (Y1=10; Y2=15; Y3=25; Y4=15; Y5=10) (Y1: \$30,000; Y2: \$45,000; Y3: \$75,000; Y4: \$45,000; Y5: \$30,000)
- A total of **\$37,500** for Home Composting Units @\$50 each, 150/Year: (Y1: \$7,500; Y2: \$7,500; Y3: \$7,500; Y4: \$7,500; Y5: \$7,500)
- **M7 - \$52,500 total** (Y1: \$20,000; Y2: \$15,000; Y3: \$10,000; Y4: \$5,000 ; Y5: \$2,500) Educational Supplies - books, training manuals, exam materials for professional certifications - will be purchased, providing professional development and climate literacy resources to local government climate staff.
- **M2, M5, M6 & M8 - \$0** No supplies funds are requested for Measures 2, 5, 6 & 8

**TOTAL CONTRACTUAL - \$31,060,085** (Y1: \$4,863,717; Y2: \$5,335,717; Y3:\$6,693,217; Y4: \$6,931,717; Y5:\$7,235,717) Contracts will be executed to aid in the administration and implementation of REDUCE Strategies and CPRG Measures 1-8. Scope of works to be contracted out allow specific activities to be implemented by subject matter experts, while minimizing the administrative burdens on local government staff. All contracts will be administered in alignment with [EPA's Best Practice Guide for Procuring Services, Supplies, and Equipment Under EPA Assistance Agreements](#).

- **M1 - \$500,000 total** (Y1: \$60,000 ; Y2: \$110,000; Y3: \$110,000 ; Y4: \$110,000; Y5: \$110,000) A competitive procurement process will be administered to support the installation of Cool bus stops and enhance last-mile connectivity in target zip codes.
  - Contract to Support the Installation of Cool Bus Stops Regionally @5,000 each amount to a total of **\$450,000** (Partnership with MTA & MDOT): (Y1: \$50,000; Y2: \$100,000; Y3: \$100,000; Y4: \$100,000; Y5: \$100,000): These funds will be released through a competitive procurement process to support the installation of cool bus stops in target areas.
  - Contract to Support Last-Mile Connectivity totaling **\$50,000** (Y1: \$10,000; Y2: \$10,000; Y3: \$10,000; Y4: \$10,000; Y5: \$10,000): These funds will be used to enhance transit system used ability to travel their "last mile" to a destination in a carbon-free manner.
- **M2 - \$1,200,000** (Y1: \$240,000; Y2: \$240,000; Y3: \$240,000; Y4: \$240,000; Y5: \$240,000) A contractor(s) will be selected to manage the installation of EV chargers, maintenance and workforce development throughout the region. All installations will take place in targeted zip codes.

EV Charger Installation Costs Years 1-5					
Line Item	Year 1	Year 2	Year 3	Year 4	Year 5
Level 1 EV Charging Equipment - 50 Installed Over 5 Years @\$1500 each; 10 /Year	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000
Level 2 EV Charging Equipment 100 \$3000 each; 20/Year	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000
Level 3 EV Charging Equipment 5 @ \$50,000 each; 1/Year	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000
EV Charging Station Installations	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
EV Charging Station Maintenance	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500
EV Maintenance Workforce Development	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500
<b>Totals</b>	<b>\$240,000</b>	<b>\$240,000</b>	<b>\$240,000</b>	<b>\$240,000</b>	<b>\$240,000</b>

- **M3 - \$15,250,000 total** (Y1: \$2,550,000 ; Y2: \$2,800,000; Y3: \$3,050,000; Y4: \$3,300,000; Y5: \$3,550,000) A competitive procurement process will be administered to select the best locally-based

organization capable of successfully managing buildings and energy REDUCE activities, this will likely be a single contract. Contractual costs for Measure 3 include:

- A contract for Residential Electrification Implementation \$5,000,000 total (Y1: \$500,000; Y2: \$750,000; Y3: \$1,000,000; Y4: \$1,250,000; Y5: \$1,500,000): The scope of work will include the electrification and enabling upgrades, including heat pump HVAC, heat pump water heater, induction stoves, and electrical panel replacement services for 450 households over 5 years. Other Federal funding will be leveraged to support those goals and braid various funding sourced together. We expect the selected organization will be a trusted nonprofit entity.
- A contract for Electrification Implementation among Community Partners \$500,000 (Y1: \$100,000; Y2: \$100,000; Y3: \$100,000; Y4: \$100,000; Y5: \$100,000): The scope of work will include the electrification and enabling upgrades, including heat pump HVAC, heat pump water heater, induction stoves, and electrical panel replacement services for 50 community-based organizations over 5 Years. We expect the selected organization will be a trusted nonprofit entity.
- A contract to manage Energy Efficiency Upgrades for 10,000 households over over 5 Years \$500,000 (Y1: \$500,000; Y2: \$750,000; Y3: \$1,000,000; Y4: \$1,250,000; Y5: \$1,500,000) We expect the selected organization will be a trusted nonprofit entity. The scope of work will include the energy efficiency upgrades such as weatherization and retrofitting. Households provided energy efficiency upgrades under Measure 3 will reside in the targeted zip codes. Other Federal funding will be leveraged to support those goals and braid various funding sources together. We expect the selected organization will be a trusted nonprofit entity.
- A contract to manage the Installation of, Cool roofs and enabling upgrades for 250 households over 5 years: \$250,000 (Y1: \$60,000; Y2: \$60,000; Y3: \$60,000; Y4: \$60,000; Y5: \$60,000)
- A contract to manage the Installation of Solar Systems, Cool roofs and enabling upgrades for 10 Community Resiliency Hubs over 5 years \$45,000 (Y1: \$9,000; Y2: \$9,000; Y3: \$9,000; Y4: \$9,000; Y5: \$9,000)
- A contract to manage the installation of solar canopies at 10 parking lots across the region \$500,000 (Y1: \$100,000; Y2: \$100,000; Y3: \$100,000; Y4: \$100,000; Y5: \$100,000): In 2023, Baltimore City was awarded a technical assistance grant to assess the solar generation capacity of city owned parking lots. The complete analysis has yet to be finalized, but will inform the best location for maximized return on investment and cost effectiveness.
- **M4 - \$4,914,000 total (Y1: \$174,000; Y2: \$366,000; Y3: ; \$1,426,000 Y4: \$1,462,000; Y5: \$1,486,000)**  
A competitive procurement process will be administered to support the implementation of activities under **Measure 4 and Strategy C**. A subset of the contracting costs will be dedicated to investments in targeted zip codes, and the remaining portion of M4 funds requested will support regionally climate pollution reduction in the waste sector. These contracts include
  - A contract to manage Curbside Residential Food Scrap Collection Services in Anne Arundel, Baltimore, Carroll, Harford and Queen Anne's Counties (these funds will be separate from similar Baltimore-City-focused services requested in this application.) A total of **\$500,000** is requested for these activities. (Y1: \$100,000; Y2: \$100,000; Y3: \$100,000; Y4: \$100,000; Y5: \$100,000)
  - A contract to manage Food Scrap Collection Services: Community-Based Food Scrap Collection Locations will be established at Farmers' Markets, Libraries, Schools and Other Community-Based Sites easily accessible to area residents in targeted zip codes. A total of **\$540,000** is requested for these activities, which will begin in year one and steadily increase in years 1-5.(Y1: \$24,000; Y2: \$60,000; Y3: \$120,000; Y4: \$156,000; Y5: \$180,000)
  - A Design Build Contract: We request **\$3,000,000** (\$1,000,000 a year from years 3-5) to support the design of a Mid-Sized Compost Facility in the Baltimore region, for which a location will be determined based on analysis of available land in the Baltimore region. (Y1: \$0; Y2: \$0; Y3: \$1,000,000; Y4: \$1,000,000; Y5: \$1,000,000)

- A Consulting Contract for Sustainable Procurement Protocols, Practices and Systemic Changes: We request a total of \$250,000 to bring on a consultant capable of directing the region's climate workforce on Sustainable Procurement Protocols and Practices. (Y1: \$50,000; Y2: \$50,000; Y3: \$50,000; Y4: \$50,000; Y5: \$50,000)
- A contract to manage Curbside Residential Food Scrap Collection Services: Baltimore City \$624,000 total (Y1: \$0; Y2: \$156,000; Y3: \$156,000; Y4: \$156,000; Y5: \$156,000):
- **M5 - \$998,585 total (Y1: \$199,717; Y2: \$199,717; Y3: \$199,717; Y4: \$199,717; Y5: \$199,717)**  
Contracts related to Measure 5 will support the deployment of climate pollution reducing eco amenities, and provide added cobenefits of nature-based solutions that may mitigate the urban heat island effect, beautify communities, and generally increase community resilience. These include:
  - A contract to Implement Nature-Based Solutions, Heat Mitigation or Cooling Strategies in Selected Communities, coordinated by the regional Heat Resilience Officers **\$498,585 total (Y1: \$99,717; Y2: \$99,717; Y3: \$99,717; Y4: \$99,717; Y5: \$99,717)**
  - A contract to Implement Nature-Based Solutions Intended to Increase Permeability and Decrease Impervious Surfaces to promote community cooling **\$500,000 total (Y1: \$100,000; Y2: \$100,000; Y3: \$100,000; Y4: \$100,000; Y5: \$100,000):**
- **M6 - \$7,450,000 total (Y1: \$1,490,000; Y2: \$1,490,000; Y3: \$1,490,000; Y4: \$1,490,000; Y5: \$1,490,000)** **Strategy A - Meaningful, Authentic Engagement and Measure 6** relate to costs associated with implementing a robust, regional climate pollution reduction program that takes community input very seriously, especially for communities in areas often excluded from climate decision making processes. We have dedicated a significant amount of funding to hire the necessary engagement, behavior change and marketing expertise to make REDUCE a successful regional model for climate pollution reduction. These include:
  - A contract to manage the engagement, outreach and marketing needs for all energy-related community and regional energy efficiency, electrification and renewable energy adoption. **\$1,000,000 total (Y1: \$200,000; Y2: \$200,000; Y3: \$200,000; Y4: \$200,000; Y5: \$200,000)**
  - Outreach & Engagement Contract to leverage community-driven, community-led and community sustained participatory engagement. **\$3,750,000 total (Y1: \$750,000; Y2: \$750,000; Y3: \$750,000; Y4: \$750,000; Y5: \$750,000)**
  - A contract to facilitate Educational Workshops related to waste reduction, reuse, recycling, repurposing and other recirculating items into the local economy **\$200,000 total (Y1: \$40,000; Y2: \$40,000; Y3: \$40,000; Y4: \$40,000; Y5: \$40,000).**
  - A contract to support a Community-based Social Marketing Campaign Contract: Food Waste Reduction and Diversion Behaviors. **\$2,500,000 total (Y1: \$500,000; Y2: \$500,000; Y3: \$500,000; Y4: \$500,000; Y5: \$500,000).**
- **M7 - \$747,500 total (Y1: \$150,000; Y2: \$130,000; Y3: \$177,000; Y4: \$130,000; Y5: \$160,000)** In our efforts to enhance climate capacity across local governments, we will use CPRG funds to facilitate several climate-related trainings and professional development opportunities. These include:
  - A contract to Facilitate Climate Literacy Trainings **\$75,000 total (Y1: \$15,000; Y2: \$15,000; Y3: \$15,000; Y4: \$15,000; Y5: \$15,000)**
  - A contract to Facilitate Greenhouse Gas Inventory and Carbon Accounting Trainings providing local government staff with the knowledge and technical skills to conduct the needed GHG inventories to track progress on CPRG measures. **\$50,000 total (Y1: \$0; Y2: \$20,000; Y3: \$20,000; Y4: \$20,000; Y5: \$0)**
  - A contract for Environmental Leadership Training and Retreats for 50 Local Government Staff to help 50 climate leaders in the Baltimore MSA lead in a manner that centers climate equity and climate justice. **\$122,500 total (Y1: \$25,000; Y2: \$0; Y3: \$47,500; Y4: \$0; Y5: \$50,000)**



- A contract to Facilitate Clean Energy Transition Trainings for 250 Local Government Staff. **\$15,000 total (Y1: \$15,000; Y2: \$0; Y3: \$0; Y4: \$0; Y5: \$0)**
- A contract to Facilitate Climate Career Trainings Programs in 5-Environmental Competencies: (1) Solar Installation (2) Landscape Management Trainings (3) Composting Training (4) Weatherization and Energy Efficiency Upgrades (5) Electrification Upgrades, **\$475,000 total (Y1: \$95,000; Y2: \$95,000; Y3: \$95,000; Y4: \$95,000; Y5: \$95,000)**
- **M8 - \$0** No contractual funds are request under Measure 8
- TOTAL OTHER - \$15,190,500 (Y1: \$2,777,736; Y2: \$4,292,736; Y3: \$2,272,736; Y4:\$2,332,736 ; Y5: \$2,452,736)** Other cost include subawards to local government partners to support progress related to meeting reduction targets in Measures 1-8, participant support costs such as rebates or other costs.
- **M1 - \$8,975,000 total (Y1: \$2,035,000; Y2: \$1,735,000; Y3: \$1,735,000; Y4: \$1,735,000; Y5: \$1,735,000)** In support of Measure 1, we request funds to:
  - Deploy Participant Support Costs for Transit Passes (Digital) through partnership with MTA/MDOT's CHARMPass app. Electronic codes will be provided to residents in target zipcode to subsidize transit us, and incentivize mode shift from single occupant vehicles to transit rides. **\$2,500,000 total (Y1: \$500,000; Y2: \$500,000; Y3: \$500,000; Y4: \$500,000; Y5: \$500,000)**
  - Facilitate a Subaward to the \*Resilience Authority of Annapolis and Anne Arundel County to manage the deployment of micromobility rebates up to \$1,200 per person. **\$6,475,000 total (Y1: \$1,535,000; Y2: \$1,535,000; Y3: \$1,235,000; Y4: \$1,235,000; Y5: \$1,235,000)**
    - 2,500 E-bike Rebates up to \$1,200: **\$3,000,000 total (Y1: \$600,000; Y2: \$600,000; Y3: \$600,000; Y4: \$600,000; Y5: \$600,000)**
    - 2,500 E-Scooter Rebates Capped up to \$600: **\$1,500,000 total (Y1: \$300,000; Y2: \$300,000; Y3: \$300,000; Y4: \$300,000; Y5: \$300,000)**
    - 5000 Digital Micromobility Rebates Capped up to \$600: **\$1,800,000 total (Y1: \$600,000; Y2: \$300,000; Y3: \$300,000; Y4: \$300,000; Y5: \$300,000)**
    - Telework Support Costs for Local Government employees to reduce commuting related VMT: **\$75,000 total (Y1: \$15,000; Y2: \$15,000; Y3: \$15,000; Y4: \$15,000; Y5: \$15,000)**
    - Transit Subsidies for Local Government Employees to encourage mode shift for work-related commutes. **\$100,000 (Y1: \$20,000; Y2: \$20,000; Y3: \$20,000; Y4: \$20,000; Y5: \$20,000)**
- **M2 - \$802,500 total (Y1: \$82,500; Y2: \$97,500; Y3: \$127,500; Y4: \$187,500; Y5: \$307,500)** These cost related to program facilitate to provide residents in targeted zip codes access to EVs and providing grants to CBOs which would go toward the purchase of EVs used to serve their communities.
  - \*Participant Support Costs: EV Car-Share Participation to cover the costs of supporting memberships and or registration fees for car-share programs that provide Evs in the region at no or little cost. **\$465,000 total (Y1: \$15,000; Y2: \$30,000; Y3: \$60,500; Y4: \$120,000; Y5: \$240,000)**
  - \*Participant Support Costs: Electric Vehicle Grants up to \$7,500 for 15 Community Resiliency Hubs. **\$112,500 total (Y1: \$22,500; Y2: \$22,500; Y3: \$22,500; Y4: \$22,000; Y5: \$22,500)**
  - \*Participant Support Costs: Electric Vehicle Grants up to \$7,500 for 15 Community-Based Organizations. **\$112,500 total (Y1: \$22,500; Y2: \$22,500; Y3: \$22,500; Y4: \$22,500; Y5: \$22,500)**
  - \*Participant Support Costs: Electric Vehicle Grants up to \$7,500 for 15 Faith-Based Organizations. **\$112,500 total (Y1: \$22,500; Y2: \$22,500; Y3: \$22,500; Y4: \$22,000; Y5: \$22,500)**
- **M3 - \$495,000 total (Y1: \$99,000; Y2: \$99,000; Y3: \$99,000; Y4: \$99,000; Y5: \$99,000)** These costs relates to the installation of solar panels, EV chargers and conducting energy audits for community-service facilities or Community Resiliency Hubs.
  - Contract to Support the Installation of Solar Panels and Battery Backup Units at 10 Community Resiliency Hubs @\$30,000 each. **\$300,000 total (Y1: \$60,000; Y2: \$60,000; Y3: \$60,000; Y4: \$60,000; Y5: \$60,000)**

## APPENDIX A: BUDGET NARRATIVE

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- Contract to Support the Installation EV Chargers at 30 Community Resiliency Hubs @\$1,500 each. **\$45,000 total (Y1: \$9,000; Y2: \$9,000; Y3: \$9,000; Y4: \$9,000; Y5: \$9,000)**
- Contract to Conduct Energy Audits at 30 Community Resiliency Hubs @\$5,000 each. **\$300,000 total (Y1: \$60,000; Y2: \$60,000; Y3: \$60,000; Y4: \$60,000; Y5: \$60,000)**
- **M4 - \$2,606,180 (Y1: \$311,236; Y2: \$2,111,23; Y3: \$61,236; Y4: \$61,236; Y5: \$61,236)** These costs relate to funds requested to support regional waste reduction, with a focus on organics. Including:
  - A Subaward for Howard County Compost Facility: This funding will provide expanded service for Howard County residents and serve as a site for peer learning, tour and climate education. \$2,000,000 is request in year 2, with no funding requested in other years.
  - A Food Scrap Collection Contract: Government Buildings - These funds relates to organic waste diversion cost for municipal buildings in Baltimore City. **\$306,180 (Y1: \$61,236; Y2: \$61,236; Y3: \$61,236; Y4: \$61,236; Y5: \$61,236)**
  - A Contract for Engineering Services: This will be a geotechnical study, environmental features assessment and desktop evaluations for potential regional composting sites. **\$300,000 (Y1: \$250,000; Y2: \$50,000; Y3: \$0; Y4: \$0; Y5: \$0)**
- **M5 - \$125,000 total (Y1: \$25,000; Y2: \$25,000; Y3: \$25,000; Y4: \$25,000; Y5: \$25,000)** These Participant Support Costs to Increase Enrollment in the Weed Warriors Program will be used to enhance awareness and accessibility of local-government Weed Warriors programs.
- **M6 - \$112,500 total (Y1: \$22,500; Y2: \$22,500; Y3: \$22,500; Y4: \$22,000; Y5: \$22,500)**
  - Participant Support Costs for Climate Art Competition to install art installation made from upcycled materials **\$100,000 total**; Participant Support Costs for Collection and Reuse for Hard-to Recycle-Materials used for "Climate Art" **\$75,000 total**.
- **M7 - \$1,261,820 total (Y1: \$140,500; Y2: \$195,000; Y3: \$245,000; Y4: \$340,000; Y5: \$341,320)** These costs relate to enhancing climate competencies among local government workforces and include:
  - Jurisdiction-Level Membership for the Urban Sustainability Directors Network or the Association of Climate Change Officers (ACCO) **\$125,000, \$25,000/year**; Participant Fees to Provide Coastal Resilience Trainings for 500 Local Government Staff **\$75,000, \$15,000/year**; and aContract for Research and Evaluation with Local Research Institution and Citizen Science through a partnership with the Baltimore Social Environmental Collaborative. **\$1,061,820 total (Y1: \$100,500; Y2: \$155,000; Y3: \$205,000; Y4: \$300,000; Y5: \$301,320)**
- **M8 - \$750,000** Subaward for climate financing to the Resilience Authority of Anne Arundel County and Annapolis to evaluate, assess, and make recommendations for improved climate financing strategies across the region.

**TOTAL DIRECT - \$58,852,444 (Y1: \$10,076,748; Y2: \$11,812,521; Y3: \$13,399,335; Y4: \$11,608,014; Y5: \$11,955,827)**

**TOTAL INDIRECT - \$ 1,072,556 (Y1: \$219,728; Y2: \$196,741; Y3: \$244,167; Y4: \$205,326 ; Y5: \$206,59)**

Total Direct and Indirect Costs by Measures								
Measures	M1	M2	M3	M4	M5	M6	M7	M8
Direct	\$11,658,168	\$3,150,308	\$16,738,891	\$12,035,706	\$4,209,445	\$7,625,000	\$2,061,820	\$1,373,106
Indirect	\$630,000	\$ 315,031	\$49,695	\$77,831	\$0	\$0	\$0	\$75,000
Total	\$12,288,168	\$3,465,338	\$16,788,586	\$12,113,537	\$4,209,445	\$7,625,000	\$2,061,820	\$1,448,106

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TABLE 4: REDUCE GEOGRAPHIC TIERS					
REDUCE Tier	% Reduction	Total MTCO2 Reduced/Year	# Residents Impacted/zip code	# Households Impacted/zip code	EJ Score/Percentile
Tier A	50+	1,000,000	19,250	14,350	90th
Tier B	40	500,000	19,000	14,250	80th
Tier C	30	350,000	18,500	13,875	70th
Tier D	20	250,000	17,500	13,125	60th
Tier E	10	100,000	15,000	11,250	50th
Tier F	5	50,000	10,000	7,500+	40th

TABLE 5: SUMMARY OF BALTIMORE MSA EMISSIONS BY SECTOR (2021)	
Sector	Metric Tons of CO2e
Transportation & Mobile Sources	14,651,004
Solid Waste	719,585
Water & Wastewater	325,157
AFOLU	231,143
Commercial Energy	6,356,377
Industrial Energy	1,140,150
Residential Energy	6,737,837
Process & Fugitive Emissions	2,036,815
<b>Total</b>	<b>32,198,072</b>

TABLE 6: GHG REDUCTION PROJECTS FROM 2025 TO 2030 and 2025 to 2050		
Action	Cumulative Impacts (MTCO2e) (2025-2030)	Cumulative Impacts (MTCO2e) (2025-2050)
VMT Reduction - 25% by 2050 - Gasoline	2,089,891	27,587,670
VMT Reduction - 25% by 2050 - Diesel	713,067	11,918,398
Advanced Clean Cars II	4,129,181	70,978,020
Advanced Clean Trucks	2,137,294	33,694,930
Clean Power Standard	0	36,885,802
Residential Energy Codes and Standards	498,731	7,837,219
Commercial Energy Codes and Standards	401,970	6,316,667
Residential Building Energy Performance Standards	2,090,620	37,472,999
Commercial Building Energy Performance Standards	1,512,515	27,906,084
Waste diversion	749,799	5,034,361
<b>Total</b>	<b>14,323,068</b>	<b>265,632,150</b>

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TABLE 7: TRADE-OFF ANALYSIS FOUNDATIONAL PRINCIPLES	
Term	Definition
<b>Precautionary Principle</b>	A concept that prioritizes preventive actions, public health and human safety by preventing exposure to toxins or contaminants or other actions which could cause adverse health outcomes, and places the burden of proof on the proponents of a potentially harmful action
<b>Wicked Problems</b>	Complex problems that have no perfect, clear solutions which are widely agreed upon. Solutions may have unintended consequences.
<b>Environmental externalities</b>	The cost, environmental and public health burdens, often unmeasured and unquantified, left to society to remediate, mitigate, resolve or otherwise suffer the consequences related to economic activity.
<b>Risks communication</b>	Real-time exchange of information, advice and opinions between experts or officials and people who face a threat (from a hazard) to their survival, health or economic or social wellbeing.
<b>Trade-offs</b>	Progress in one area of sustainability or environmental protect, resulting in a perceived loss for another area, sector, community or stakeholder

TABLE 8: PERFORMANCE MEASURES AND METRICS		
Activity	Measures	Metrics
Increase Telework Days/Hours	Number of people allowed to telework	Person-Hours of telecommuting
Increase Maryland Commuter Choice Participation	Number of new registrants with Maryland Commuter Choice	Registrants per month/year
Deploy Free Transit Passes	Number of passes provided	Passes use per month/year
Deploy 'Cool Bus Stops'	Number of cool bus stop used	Pre/Post temperatures
Build Infrastructure to Advance Complete Streets	Miles of 'Complete Streets' Upgraded	Miles in each county
Provide Micromobility Incentives/Rebates	Number of rebates provided	Average cost per rebate
Connect Households with EV Adoption Incentives	Number of households engaged	Households engaged per year
Train EV Maintenance Workforce	Number of EV technicians trained	Individuals Trained
Install Community-Based EV Charging Infrastructure	Number of EV chargers installed	Charging sessions per zip code
Provide EV Charging Rebates	Number of rebates processed	Individual Rebates
Establish EV Car Sharing Programs	Number of People the program is accessible to	Programs in LIDAC areas
Provide EV Grants for the Purchase of Used EVs*	Number of grants awarded	Average number of people served per rebate
Expand Energy Conservation Education	Number of people engaged	People engaged per year
Cool Roof Installations*	Number of households with cool roofs installed	Household/year with cool roofs
Community Resiliency Hubs Support*	Number of Hubs established	Hubs per zip code
Energy Efficiency Upgrades	Number of households supported	Households per year

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TABLE 8: PERFORMANCE MEASURES AND METRICS		
Household Electrification Upgrades	Number of households fully electrified	Households electrified per zip code
Rooftop Solar for LMI Households	Number of roof top units installed	Households per zip code with solar
Community-Based Waste Reduction Workshops	Number of workshops	People who attended/engaged, community trainers supported
Provide Household Food Waste Reduction Packages	Number of packages distributed	Households engaged per year
Establish/Increase Participation in Food Scrap Drop-Off Locations (100,000 People Engaged)	Number of food scrap drop-off locations	Food scrap diversion volume per site
Distribute Home Composting Bins and Composting training	Number of bin distributed	Number of residents trained, % increase in local composting capacity
Host Fix-it and Repair Clinics (2,500 engaged)	Number of events hosted	Events Hosted, tonnage of material repaired
Increase Composting Infrastructure	Additional composting capacity (Tons)	% of households served regionally, tonnage of food waste diverted, % increase in local composting capacity
Deploy Tree Plantings and Maintenance	Number of trees planted	Trees per sq. mi. in EJ areas
Remove Impervious Surfaces	Mile of impervious removed	Sq. Ft. per zip code
Scale Weed Warriors Programming	Number of new Weed Warriors	% increase in trainees
Green Space Enhancements	Number of green spaces enhances	CO2 sequestration potential
Vegetated Cooling Hubs	Number of cooling hubs installed	Cooling Hubs
Community Cooling Implementation	Number of community cooling interventions	Pre/post ambient air test

TABLE 9: BALTIMORE-COLUMBIA-TOWSON METROPOLITAN STATISTICAL AREA REGIONAL GREENHOUSE GAS INVENTORY					
Sector/Activity	Fuel or Source	2021 Usage/Activity	Units	2021 Emissions (MT CO2e)	Percent of Total
Residential Energy	Electricity	13,131,506,026	kWh	4,026,759	12.51%
	Wood	1,926,115	MMBtu	18,764	0.06%
	Distillate Fuel Oil No. 2	6,623,955	MMBtu	493,177	1.53%
	Propane	3,194,532	MMBtu	198,249	0.62%
	Kerosene	93,957	MMBtu	7,113	0.02%
	Natural Gas	37,488,768	MMBtu	1,993,776	6.19%
	<b>Residential Energy Total</b>			<b>6,737,838</b>	<b>20.93%</b>
Commercial Energy	Electricity	13,333,284,169	kWh	4,088,634	12.70%
	Distillate Fuel Oil No. 2	3,549,084	MMBtu	264,242	0.82%

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TABLE 9: BALTIMORE-COLUMBIA-TOWSON METROPOLITAN STATISTICAL AREA REGIONAL GREENHOUSE GAS INVENTORY					
Sector/Activity	Fuel or Source	2021 Usage/Activity	Units	2021 Emissions (MT CO <sub>2</sub> e)	Percent of Total
	Propane	5,978,384	MMBtu	371,012	1.15%
	Natural Gas	30,533,424	MMBtu	1,623,868	5.04%
	Kerosene	48,618	MMBtu	3,681	0.01%
	Other Commercial Fuels			4,940	0.02%
	<b>Commercial Energy Total</b>			<b>6,356,377</b>	<b>19.74%</b>
Industrial Energy	Electricity	1,862,600,409	kWh	571,164	1.77%
	Natural Gas	26,745,309	MMBtu	469,167	1.46%
	LPG	16,587	MMBtu	1,023	0.00%
	Distillate Fuel Oil No. 2	296,934	Gallons	17,772	0.06%
	Other Industrial Fuels			81,025	0.25%
	<b>Industrial Energy Total</b>			<b>1,140,151</b>	<b>3.54%</b>
On Road Transportation	Gasoline	24,002,996,939	VMT	10,455,598	32.47%
	Diesel	2,197,349,539	VMT	3,123,678	9.70%
	CNG	23,351,041	VMT	2,364	0.01%
	Ethanol	42,270,949	VMT	3,649	0.01%
	Electricity	164,673,988	VMT	81,049	0.25%
Rail	Diesel	651,438	MMBTU	48,603	0.15%
Waterborne Transportation	Gasoline	538,605	MMBTU	38,781	0.12%
	Diesel	141,989	MMBTU	10,508	0.03%
Off Road Transportation & Mobile Sources	Gasoline	4,601,077	MMBTU	330,478	1.03%
	Diesel	6,125,066	MMBTU	453,254	1.41%
	CNG	164,348	MMBTU	10,364	0.03%
	LPG	1,504,860	MMBTU	92,677	0.29%
	<b>Transportation &amp; Mobile Sources Total</b>			<b>14,651,004</b>	<b>45.50%</b>
Solid Waste	Waste Generation	1,172,453	Tons	484,613	1.51%
	Landfill Gas Flaring	446,259	MMBTU	5,494	0.02%
	Solid Waste Incineration	6,619,110	MMBTU	229,478	0.71%
	Closed Landfills			99,087	0.31%
	<b>Solid Waste Total (does not include Closed Landfills)</b>			<b>719,585</b>	<b>2.23%</b>
Water and Wastewater	Wastewater Treatment			325,157	1.01%
	<b>Water and Wastewater Total</b>			<b>325,157</b>	<b>1.01%</b>
Process & Fugitive Emissions	Fugitive Emissions from Natural Gas Distribution	85,056,325	MMBTU	157,051	0.49%

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TABLE 9: BALTIMORE-COLUMBIA-TOWSON METROPOLITAN STATISTICAL AREA REGIONAL GREENHOUSE GAS INVENTORY					
Sector/Activity	Fuel or Source	2021 Usage/Activity	Units	2021 Emissions (MT CO2e)	Percent of Total
	Oil and Gas Production and Processing			3,290	0.01%
	Industrial Process & Product Use			1,876,474	5.83%
	Process & Fugitive Emissions Total			2,036,816	6.33%
Agriculture, Forestry, and other Land Uses (AFOLU)	Livestock			149,135	0.46%
	Crops			82,009	0.25%
	Land/Forestry			-1,452,350	-4.51%
	AFOLU Total (does not include Land/Forestry)			231,144	0.72%
Total 2021 Regional Emissions				32,198,072	

TABLE 10: BAU Emissions, Net Reductions per Action, & Remaining Emissions after Implementation (MTCO <sub>2</sub> e)			
Projection Timeline	2025	2030	2050
Business As Usual Emissions	28,128,384	25,503,512	23,719,593
Action	Net Reductions		
VMT Reduction - 25% by 2050 - Gasoline	105,691	579,093	1,745,018
VMT Reduction - 25% by 2050 - Diesel	33,955	203,733	882,845
Advanced Clean Cars II	199,881	1,170,684	4,662,100
Advanced Clean Trucks	93,525	635,066	2,354,686
Clean Power Standard	0	0	3,228,167
Residential Energy Codes and Standards	23,749	142,494	474,983
Commercial Energy Codes and Standards	19,141	114,849	382,828
Residential Building Energy Performance Standards	92,472	618,272	2,308,824
Commercial Building Energy Performance Standards	65,683	450,911	1,725,072
Waste diversion	35,705	214,229	214,228
Remaining Emissions after Implementation	27,458,582	21,374,181	5,740,842
Percent Change (%) from 2021 Baseline	-14.72%	-33.62%	-82.17%

TABLE 11: GHG REDUCTION PROJECTIONS (MT CO <sub>2</sub> E) AND PERCENT CHANGE FROM BASELINE				
	2021 Baseline	2025	2030	2050
Industrial Energy	1,140,151	805,315 (-29.37%)	631,097 (-44.65%)	469,160



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				(-58.85%)
Residential Energy	6,737,838	4,886,770 (-27.47%)	3,391,856 (-49.66%)	333,476 (-95.05%)
Commercial Energy	6,356,375	4,594,802 (-27.71%)	3,232,077 (-49.15%)	477,562 (-92.49%)
Transportation & Mobile Sources	14,651,004	13,854,053 (-5.44%)	10,953,762 (-25.24%)	1,205,312 (-91.77%)
Water & Wastewater	325,157	336,154 (3.38%)	343,262 (5.57%)	367,597 (13.05%)
AFOLU	231,144	231,144 (0%)	231,144 (0.00%)	231,144 (0.00%)
Process & Fugitive Emissions	2,036,816	2042127 (0.26%)	2,045,560 (0.43%)	2,057,314 (1.01%)
Solid Waste	719,585	708217 (-1.58%)	545,423 (-24.20%)	599,277 (-16.72%)

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TABLE 12: ECOLOGIC AMENITIES FOR COMMUNITIES				
Number	Action Item	Quantity	Description	M1-6
M1 - F	Increase Telework Days/Hours	5,200,000	Person-Hours	M1
M1 - E	Increase Maryland Commuter Choice Participation	500,000	New Participants	M1
M1 - D	Deploy Free Transit Passes	2,500,000	Individual Passes	M1
M1 - C	Deploy 'Cool Bus Stops'	50	Bus Stops Cooled	M1
<b>M1 - B</b>	<b>Build Infrastructure to Advance Complete Streets</b>	<b>1,500</b>	<b>Miles of Streets</b>	<b>M1</b>
<b>M1 - A</b>	<b>Provide Micro Mobility Incentives/Rebates</b>	<b>10,000</b>	<b>Individual Rebates*</b>	<b>M1</b>
M2 - F	Connect Households with EV Adoption Incentives	10,000	Households	M2
M2 - E	Train EV Maintenance Workforce	100	Individuals Trained	M2
M2 - D	Install Community-Based EV Charging Infrastructure	155	Levels 1-3 Charging Ports	M2
M2 - C	Provide EV Charging Rebates	1,000	Individual Rebates	M2
<b>M2 - B</b>	<b>Establish EV Car Sharing Programs</b>	<b>50</b>	<b>Programs in LIDAC</b>	<b>M2</b>
<b>M2 - A</b>	<b>Provide EV Rebates for the Purchase of Used EVs</b>	<b>1,000</b>	<b>Rebates Provided</b>	<b>M2</b>
M3 - F	Expand Energy Conservation Education	10,000	Households	M3
M3 - E	Cool Roof Installations*	1,000	Household	M3
M3 - D	Community Resiliency Hubs Support*	50	Hubs Established	M3
M3 - C	Energy Efficiency Upgrades	10,000	Households	M3
<b>M3 - B</b>	<b>Household Electrification Upgrades</b>	<b>10,000</b>	<b>Households</b>	<b>M3</b>
<b>M3 - A</b>	<b>Rooftop Solar for LMI Households</b>	<b>10,000</b>	<b>Households</b>	<b>M3</b>
M4 - F	Community-Based Waste Reduction Workshops	25	Workshops (2,500 people engaged)	M4
M4 - E	Provide Household Food Waste Reduction Package	2,500	Packets Provided to Households	M4
M4 - D	Receive Backyard Composting Bin + Composting Training	750	Households	M4
M4 - C	Food Scrap Drop Off Locations	75	Drop-Off Locations	M4
<b>M4 - B</b>	<b>Host Fix-it and Repair Clinics</b>	<b>25</b>	<b>Events Hosted</b>	<b>M4</b>
<b>M4 - A</b>	<b>Host an In-vessel composting unit</b>	<b>5</b>	<b>Increased Capacity</b>	<b>M4</b>
M5 - F	Deploy Tree Plantings and Maintenance	1,000,000	Trees Planted	M5
M5 - E	Remove Impervious Surfaces	1,000,000	Sq. Ft.	M5
M5 - D	Scale Weed Warriors Programming	10,000	People Trained	M5
M5 - C	Green Space Enhancements	100	Projects Supported	M5
<b>M5 - B</b>	<b>Vegetated Cooling Hubs</b>	<b>100</b>	<b>Hubs Built</b>	<b>M5</b>
<b>M5 - A</b>	<b>Community Cooling Implementation</b>	<b>15</b>	<b>Plans Implemented</b>	<b>M5</b>
M6 - F	Embed REDUCE Ambassadors in Communities	50	Ambassadors	M6
M6 - E	REDUCE Ambassadors Engagement	100	Ambassadors	M6
M6 - D	REDUCE Ambassadors Engagement	200	Ambassadors	M6

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M6 - C	REDUCE Ambassadors Engagement	300	Ambassadors	M6
M6 - B	REDUCE Ambassadors Engagement	400	Ambassadors	M6
M6 - A	REDUCE Ambassadors Engagement	500	Ambassadors	M6

### Description of Upgrades to Community Facilities and/or Community Resiliency Hubs

The City of Baltimore will use Measure 3 funds to implement CPRG Community Demonstration Projects. Two demonstration projects will be employed to both actively reduce emissions while also serving as community touchpoints for education and acquisition guidance on available decarbonization technologies.

**Location 1:** 1137 N. Gilmor St, Baltimore, MD

**Description:** This 3,600 sq. ft. location is set to become a training center and weatherization office for the city's Department of Housing and Community Development. As such, this location provides community assistance around energy bills and usage including insulation, air sealing, water heater efficiency, lighting efficiency, water efficiency, HVAC tune-ups, appliance replacement with EnergyStar appliances, and safety checks. This location's heating system is currently natural gas and it's estimated to use approximately 1,700 therms per year or 170,000 kBtu. Based on the Energy Information Administration Carbon Dioxide Emissions Coefficients table<sup>1</sup>, this equates to 19,830 lbs. of CO<sub>2</sub>. Electrifying this site with a \$30,000 mini split system both serves the decarbonization of the building by supplanting the combustion of natural gas as well as serving the community to engage directly with the technology as they make their own energy decisions.

Air sealing measures (\$20,000) have been completed across the city in other community locales. Table 1-B below illustrates Baltimore City's experience in air-sealing measures in commercial buildings.

TABLE 1-B Air Sealing Estimates		
Condition of envelope	Infiltration reduction potential	Estimated simple payback
Very leaky	35%	< 5 years
Moderately leaky	20-30%	6-9 years
Average	10-15%	> 10 years
Tight (meets green standards)	1-8%	Not cost effective

These estimates mostly apply to commercial buildings. Residential buildings exhibit a 20-50% heating and cooling load attributable to leakage. Therefore, the 34,000 kWh annual electricity use can be conservatively reduced to 27,200 kWh annually or potentially to 17,000 kWh. A 20% reduction in electricity would avoid 4,793 lbs CO<sub>2</sub>, 2.4 lbs of SO<sub>2</sub>, and 2.1 lbs of NO<sub>x</sub>. A 50% reduction will avoid

<sup>1</sup> [https://www.eia.gov/environment/emissions/co2\\_vol\\_mass.php](https://www.eia.gov/environment/emissions/co2_vol_mass.php)

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11,983 lbs CO<sub>2</sub>, 6 lbs of SO<sub>2</sub>, and 5.25 lbs NO<sub>x</sub> according to RFCE emissions<sup>2</sup>. This number is compounded for every resident who is informed and guided through measures for their own home.

Furthermore, a 7kW/\$21,000 rooftop solar installation tilted at 25 degrees has the capacity to reduce the energy needed by an additional 9,900 kWh<sup>3</sup>, avoiding 6344 lbs CO<sub>2</sub>, 3.2 lbs SO<sub>2</sub>, and 2.8 lbs of NO<sub>x</sub>. Electricity use can be zeroed out with additional renewable energy purchases. Metrics are compounded for every residential customer informed and guided through a solar installation.

**Location 2:** Harford Senior Center 4920 Harford Rd.

**Description:** This second demonstration project serves the older adult population with fitness, wellness, dining, and learning classes. Harford Senior Center, an 8,500 SF building, averages 3,600 therms of natural gas use per year or 360,100kBtu. Installing a mini split system at this location would cost approximately \$60,000 and avoid 19,000 lbs of CO<sub>2</sub> from methane combustion<sup>#</sup>.

As indicated in Table 1-B, a conservative estimate of 20% is attributable to heating and cooling leakage load. Employing air sealing services (\$20,000) is expected to reduce energy usage by 10,800 kWh. In the RFCE region<sup>4</sup>, this equates to a GHG reduction of 7600 lbs CO<sub>2</sub>, 3.82 lbs SO<sub>2</sub>, and 3.36 lbs NO<sub>x</sub> annually. As a demonstration project, this figure is multiplied for every resident who undertakes this measure in their own home.

A roof replacement (estimated to be \$459,000) and a subsequent 15kW rooftop solar installation (\$45,000) would produce 21,212 kWh<sup>5</sup> annually and avoid 14,943 lbs CO<sub>2</sub>, 7.5 lbs SO<sub>2</sub>, and 6.6 lbs NO<sub>x</sub>. Remaining electricity usage can be offset with renewable energy purchase agreements. Again, these demonstration projects directly serve the citizens of Baltimore and provide an opportunity to directly experience their applications while also receiving education on acquisitions, financing, and rebate opportunities.

These estimates are provided for illustrative purposes, and do not reflect the exact amount of funding request in the CPRG proposal to support these projects. We anticipate a combination of funding mechanisms will be used to support these projects with up to \$30,000 in CPRG funding used for each of these facilities.

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<sup>2</sup> <https://www.epa.gov/egrid/power-profiler#/RFCE>

<sup>3</sup> <https://pvwatts.nrel.gov/pvwatts.php>

<sup>4</sup> <https://www.epa.gov/egrid/power-profiler#/RFCE>

<sup>5</sup> <https://pvwatts.nrel.gov/pvwatts.php>