Planning for Climate and Energy Equity in Maryland

Project support provided by

EXECUTIVE SUMMARY

Why Should Maryland's Climate and Energy Policies Address Social Equity?

Many opportunities exist to reduce carbon emissions by the mandated 40 percent before 2030. These same opportunities could address the disproportionate impacts of climate change on Maryland's most vulnerable communities

In 2009, the Maryland Legislature passed the Greenhouse Gas Reduction Act (GGRA), requiring the state to develop and implement a plan that would reduce greenhouse gas emissions 25 percent by 2020. The Maryland Climate Change Commission (i.e., the Commission) was established to advise the Governor and General Assembly on this GGRA Plan and on other strategies to mitigate the causes of, prepare for and adapt to the consequences of climate change. The Commission's key goals include "addressing any disproportionate impacts of climate change on low–income and vulnerable communities."[1]

This charge provides an opportunity to examine Maryland's climate change policies and programs through a lens of climate and energy equity. The recommendations below explore climate and energy equity in the existing GGRA Plan, noting priorities that should be researched and refined for further consideration in the Commission's 2016 work plan and report to the Governor. In addition, a number of long-term recommendations are offered to reduce greenhouse gas emissions and enhance climate adaptation planning via the development of a new 2018 GGRA Plan, which aims to reduce carbon emissions 40 percent by 2030.

Substantial social inequities exist and will persist in Maryland without action

Maryland's economy is growing and the state is expected to gain 582,000 jobs over the next 20 years.[2] Unfortunately this growth does little to ameliorate past and future inequalities in the state. The proportion of people of color in Maryland has nearly doubled from 26 to 45 percent between 1980 and 2010 and this demographic experiences disproportionate effects of environmental and social inequities.

- Maryland ranks first in the nation in vacant home rates, with highest rates in Baltimore city, the Eastern Shore and western Maryland.[3] High vacancy rates proliferate in low-income

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[1] Maryland House Bill 514. Maryland Commission on Climate Change. Available at: http://mgaleg.maryland.gov/2015RS/chapters_noln/Ch_429_hb0514E.pdf.
[2] National Center for Smart Growth Research and Education. 2014. PRESTO Baseline Report. Available at: http://smartgrowth.umd.edu/PReSTo.html#PRESTO%20Reports
[3] Maryland Department of Planning. 2011. Jurisdiction Highlights of 2010 General Demographic Characteristics for Maryland. Available at: http://planning.maryland.gov/msdc/census/Cen2010/SF1/SumyProf/chart/Chart%207%20-%20Vacancy%20Rate.pdf

neighborhoods and create challenges with crime, access to amenities, pests, health and high energy burdens. Further, people of color and low-income households are more likely to rent and often do not have access to the same resources, clean energy or otherwise, as homeowners.[4]

- People of color and low-income communities in Maryland are more likely to live in neighborhoods exposed to toxic chemicals and experience more deaths from asthma, as well as higher rates of cancer from exposure to toxic air pollution. Additionally they are less likely to have the resources needed to visit a doctor.

- Investment in communities that are predominantly home to people of color or low-income households appear to be disproportionately low, as indicated by fewer resources allocated to clean water projects, for example.

- People of color in Maryland are less likely to have the technical skills to meet future workforce needs in technology and clean energy development. Current unemployment rates are 38 percent higher for people of color than white people. However, people of color with a Bachelor's or higher degree earn wages on par with whites.[5]

- Compared with other counties in the state, communities in Baltimore City and Garrett, Allegany, Kent and Somerset counties have the least capacity or resilience to respond to environmental hazards and disasters from climate change, according to the Social Vulnerability Index.[6]

Social inequities leave communities vulnerable to climate change impacts and the policies used to address climate change

Social inequities reduce the capacity of vulnerable communities to prepare for and respond to climate change and take advantage of the substantial benefits provided from emission reduction strategies. Low-income households, people of color and medically sensitive populations are particularly vulnerable. Climate changes such as severe weather and extreme heat can place vulnerable communities in harm's way, exposing people to mold and toxic chemicals from flooding, exacerbating asthma due to higher ground-level ozone levels and leaving few safe havens during blackouts and severe storms.

Without focused resources to reduce existing and future vulnerabilities, social equity gaps may escalate, neighborhoods may deteriorate and increased government resources may be necessary to help those in need. Proactive climate and energy equity policies can build up communities, prepare them for future changes and bolster local and regional economies.

However, when climate planning efforts give little regard to climate and energy equity, state policies can inadvertently threaten vulnerable communities and increase economic and environmental disparities.

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[4] PolicyLink/PERE. National Equity Atlas. 2015. Available at: www.nationalequityatlas.org.
[5] PolicyLink/PERE. National Equity Atlas. 2015. Available at: www.nationalequityatlas.org.
[6] Hazards and Vulnerability Research Institute at the University of South Carolina. 2010. Social Vulnerability Index for the United States, 2006-2010. Available at: http://webra.cas.sc.edu/hvri/products/sovi.aspx

For instance:

- Current policies to support electric vehicles and solar power leave few options for low-income communities to take advantage of these clean energy programs given the high upfront costs.

- Energy efficiency and renewable energy assistance and grant programs provide few options for renters or low-income households in older buildings without ensuring the buildings are up to code and are in good enough condition to allow for these upgrades.

- Pollution trading programs meant to achieve statewide reductions in carbon pollution and water pollution can create emissions hotspots in communities where environmental burdens are already high.

A comprehensive set of policies is needed to address climate and energy inequities

Climate change may be the greatest opportunity to address social equity. Weaving climate and energy equity through policy change will create resilient and healthy communities. The state and stakeholders should understand that climate policies can increase social disparities and they should pursue actions to reduce these disparities. Toward this end, the state could first target resources toward the most vulnerable residents, from a social and climate equity perspective. Resources dedicated to greenhouse gas reductions, clean energy transitions and climate adaptation could be distributed in a way that places everyone on equal footing and balances vulnerabilities across the state.

Gaps and Opportunities in the GGRA Plan

Programs in the existing 2013 GGRA Plan were evaluated to determine how well they benefit and reduce disproportionate impacts in disadvantaged communities. This evaluation informed a number of program improvement recommendations, including modifications of existing programs and initiation of new programs modeled after the federal government and local governments in Maryland and beyond. The evaluation was discussed at a day-long stakeholder focus group held in Baltimore on November 30, 2015 of regional experts in health, environmental justice, social, climate and energy equity.[7] Many of the case studies and recommendations arose from this discussion.

Develop a climate and energy equity framework and planning process

Climate and energy equity means that everyone shares the burdens and benefits of climate change equally. Unfortunately, vulnerable communities are at heightened risk for the consequences of climate change, many of which are discussed throughout the report, but include rising health risks,

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[7] Participants represented the Abell Foundation, Baltimore Neighborhood Indicators Project, Clean Water Action, Choose Clean Water Coalition, Community Power Network, Environmental Integrity Project, Fuel Fund of Maryland, Georgetown Climate Center, Maryland Environmental Health Network, a member of the Maryland House of Delegates, University of Maryland Environmental Finance Center, University of Maryland Environmental Law Clinic, University of Maryland's Community Engagement, Environmental Justice and Health Lab, United Workers, USDA Forest Service and WeACT for Environmental Justice.

disproportionate economic burdens and increased exposure to pollutants. The strategies used to mitigate and prepare for climate change make all the difference in how these communities cope. A new framework for evaluating existing and proposed programs and policies could guide strategies to improve quality of life and increase community resilience to future and existing climate impacts.

We recommend an *iterative and adaptive climate and energy equity screening process*. This process is based on a foundation of meaningful public and community engagement that develops goals and indicators, identifies vulnerabilities, screens existing or proposed policies and programs, develops and adopts changes and tracks progress toward equity goals. Priorities include building long-term community trust and capacity; providing benefits to every household; and providing for institutional accountability.

Specifically, future versions of the GGRA Plan and related climate change and energy programs and policies could:

1. *Develop goals and indicators that reflect the vulnerabilities inherent in disadvantaged communities and overlap with climate change impacts.*

2. *Define and map vulnerable communities by mapping areas that: 1) experience existing social equity concerns; 2) are highly vulnerable to climate impacts and energy decisions; and 3) currently receive few investments (e.g., distributional equity). Examples include CalEnviroScreen 2.0 and the National Smart Growth Research and Education Center's PRESTO tool.* [8]

3. *Screen for existing programs and policies that will serve vulnerable communities and promote climate and energy equity goals. Do so by assessing conflicts with other policies that could create additional disparities, identifying all potential positive and negative impacts for each of the identified communities and assessing institutional accountability.*

4. *Prioritize and target current programs, policies and strategies to reduce inequities in opportunity and burden. Identify and prioritize new programs, policies and strategies that have the potential to create opportunities and reduce inequities.*

5. *Develop and adopt recommendations, track progress and adapt as needed to ensure that the program changes are fair and inclusive, that resources are distributed in a fair manner and that policies effectively reduce existing and future disparities. This step includes monitoring distribution of investments and tracking changes in climate and energy inequities.*

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[8] National Center for Smart Growth Research and Education. 2014. PRESTO Baseline Report. Available at: http://smartgrowth.umd.edu/PReSTo.html#PRESTO%20Reports

Require a cumulative impacts analysis for greenhouse gas reduction programs and policies

Support and implement the proposed Cumulative Impacts Bill of 2014 and require a formal evaluation of potential changes in all air pollutants.

- Consider utilizing a range of data including indoor air data, outdoor and personal monitoring data.
- Share air quality data in tandem with social vulnerability data during community outreach and engagement activities.
- Fill gaps in the locations of state air quality monitoring station and frequency of sampling.
- Provide communities with resources and opportunities to collect local air quality data for use in policy development and regulatory decisions.

Support meaningful engagement and outreach to empower communities

Encourage and support collaborative and participatory processes in the development and implementation of new or revised policies, programs and projects.

- Programmatically assess the distribution and type of outreach conducted under each climate change program across all state agencies.
- Pilot the use of EPA's Collaborative Problem Solving Model and work by the Maryland Department of Health and Mental Hygiene to use Health Impact Assessments to understand climate change impacts and preparedness options.

Address disparities in access to greenhouse gas reduction and climate adaptation benefits

Provide increased access to energy efficiency and renewable energy benefits.

- Integrate and align federal and regional carbon reduction programs with state programs to address environmental justice through the 2016 Regional Greenhouse Gas Initiative (RGGI) update and the State Implementation Plan development for the U.S. EPA's Clean Power Plan.
- Enforce building codes and assess barriers to energy efficiency upgrades and renewable energy systems in the Maryland Building Performance Standards and related codes.
- Support programs to assess and improve housing stock quality to improve access to renewable energy and energy efficiency programs. This includes the reclamation of vacant buildings.

- Promote and support initiatives to give low and moderate income households access to solar, such as those developed by Civic Works and the Fuel Fund of Maryland.

- Target investments to help finance low and moderate income access to renewable energy, such as those identified by the Maryland Clean Energy Center's Green Bank study.

- Eliminate policies that prevent EmPOWER funds from supporting fuel switching.

- Promote policies that expand solar access for renters such as Community Choice Aggregation or Virtual Net Metering.

- Promote policies to address 'split incentives' between landlords and tenants and improve housing stock quality for renters and low-income households.

- Promote assessment and improved coordination of demand reduction initiatives.

Promote increased access to job creation benefits.

- Promote policies and programs that target workforce development efforts such as Civic Works, C.H.O.I.C.E Works and Power 52.

- Promote policies and programs that target support for energy efficiency and renewable energy businesses such as those highlighted in the proposed 25 percent Renewable Portfolio Standard legislation.

- Promote education programs that give disadvantaged communities access to advanced training in technology and clean energy such as the P-TECH program sponsored by IBM.

Promote increased access to ecosystem market benefits.

- Support and promote policies and programs, such as land trusts and co-ops that allow low-income communities and small businesses to participate in ecosystem markets.

Promote increased access to "Buy Local" benefits.

- Support acceptance of Supplemental Nutrition Assistance Program (SNAP) benefits at farmer's markets.

- Increase outreach to targeted communities through regional food hubs and provide support for Community Supported Agriculture.

Implement and enhance Maryland's Zero Waste Action Plan to address sustainable materials management.

- Develop and implement protocols to assess cumulative impacts of waste-to-energy facilities.
- Meaningfully engage potentially impacted communities in decision-making for permit applications for new waste-to-energy-facilities.

Address disparities in burdens created by greenhouse gas reduction and climate adaptation programs and policies

Reduce energy burdens (and impacts of rate increases).

- Implement a comprehensive Affordable Energy Program.

Identify and address disparate impacts of fuel switching and allowable renewable energy sources under the Renewable Portfolio Standard.

- Assess community health impacts of hydraulic fracturing, black liquor, poultry litter, wood to energy and incineration of waste using Health Impact Assessments.
- Explore removing black liquor, waste-to-energy incinerators and poultry litter from the list of renewable energy sources under the Renewable Portfolio Standards in favor of solar and wind power.

Identify and address disparate impacts of ecosystem and carbon markets (i.e. 'hot spots') in Maryland's nutrient trading programs and RGGI.

Improve support for vulnerable communities through Maryland's greenhouse gas reduction and climate adaptation programs and policies

Establish comprehensive policies to reduce the negative impacts of black carbon from diesel emissions.

- Include black carbon and particulates in the calculation of the state's emissions and develop a comprehensive program to reduce black carbon and particulate emissions.
- Adopt a lead-by-example approach to retire any remaining diesel legacy fleets and require clean diesel technology or low emissions engines to be used during state-funded projects. Focus support on the upgrade and retrofit of the oldest diesel vehicles and systems located next to residential areas in vulnerable communities.
- Implement a net zero port and freight policy to accelerate reductions in diesel emissions near disadvantaged communities.

Promote transportation investments that increase access to opportunity centers.

- Promote and support inclusionary zoning policies.
- Support new opportunity centers through comprehensive vacant building plans and access to quality recreation centers and schools.

Promote policies and programs that improve resilience in vulnerable communities.

- Support Resilience Hubs modeled after proposals in Baltimore City.

- Promote expanded tree canopies that protect low-income and medically sensitive communities.
- Support targeted watershed management investments to reduce flooding, improve water quality and support health equity.

Adapt state hazard mitigation policies and procedures to accommodate climate vulnerabilities of low-income communities.

- Update the State Hazard Mitigation Plan to quantitatively assess climate change vulnerability and risk, as was done in Baltimore's DP3 Hazard Mitigation Plan. Include an assessment of social vulnerability as an additional layer.
- Provide support from state and federal pre- and post-hazard mitigation funding to increase resilience of buildings and communities most vulnerable to climate change.

TABLE OF CONTENTS

Acronyms and Abbreviations

APU   Auxiliary Power Unit
CSA   Community Supported Agriculture
DBED   Department of Business and Economic Development
DGS   Department of General Services
DHCD   Department of Housing and Community Development
DNR   Maryland Department of Natural Resources
EPA   United States Environmental Protection Agency
GHG   Greenhouse Gases
GGRA   Greenhouse Gas Reduction Act
GPI   Genuine Progress Indicator
MBPS   Maryland Building Performance Standards
MDA   Maryland Department of Agriculture
MDE   Maryland Department of the Environment
MDP   Maryland Department of Planning
MEA   Maryland Energy Administration
MIA   Maryland Insurance Agency
MSDE   Maryland State Department of Education
PSC   Public Service Commission
PEPCO   Potomac Electric Power Company
RGGI   Regional Greenhouse Gas Initiative
RPS   Renewable Portfolio Standard
SNAP   Supplemental Nutrition Assistance Program

CHAPTER 1: INTRODUCTION

Maryland Needs a Climate and Energy Equity Framework

Maryland's economy is growing and the state expects to gain 582,000 jobs over the next 20 years.[9] This gain does not come without challenges. Additional jobs will bring more people, resulting in greater energy use, congested roads and a potential increase in the gap between low-income communities and those with greater resources. Already many low-income households and people of color are burdened with higher than average exposure to pollution and limited access to environmental restoration programs. These communities often experience poor health and living conditions, higher exposure to crime and little opportunity to prepare for future jobs.

Existing social inequities limit the capacity of vulnerable communities to prepare for and respond to climate change opportunities and impacts. Low-income households, people of color and medically sensitive populations are particularly vulnerable to climate change. Climate changes such as severe weather and extreme heat can place vulnerable communities in harm's way, exposing people to mold and toxic chemicals from flooding, exacerbating asthma due to higher ground-level ozone levels and leaving few safe havens during blackouts and severe storms.

State policies can also increase the economic and environmental disparities in vulnerable communities. As an example of this, low-income communities have few opportunities to take advantage of programs supporting electric vehicles and solar power, given the high upfront costs of purchasing these technologies. Energy efficiency, renewable energy assistance and grant programs do not ensure that older buildings are up to code and in good enough condition to allow for these upgrades and limit participation by renters and low-income households. Pollution trading programs meant to achieve statewide reductions can create emissions hotspots in communities where environmental burdens are already high.

For these reasons, state climate mitigation and adaptation policies must be examined. The state and stakeholders should take note of how climate policies can increase social disparities and pursue actions to reduce such gaps. The state could first target resources towards those who are most vulnerable from a social and climate equity perspective. Resources dedicated to greenhouse gas reductions, clean energy transitions and climate adaptation could be distributed to place everyone on equal footing and balance vulnerabilities across the state.

In 2009, the Maryland Legislature passed the Greenhouse Gas Reduction Act (GGRA), requiring the state to develop and implement a plan to reduce greenhouse gas emissions 25 percent by 2020. The first plan,

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[9] National Center for Smart Growth Research and Education. 2014. PRESTO Baseline Report. Available at: http://smartgrowth.umd.edu/PReSTo.html#PRESTO%20Reports

finalized in 2013, includes 150 programs to reduce greenhouse gas emissions as well as a multi-sector approach to implement climate change adaptation policies. The Maryland Climate Change Commission (i.e., the Commission) is one of the primary advisory bodies for the GGRA Plan. The Commission was established to advise the Governor and General Assembly on strategies to mitigate the causes of, prepare for and adapt to the consequences of climate change. The Commission's establishing authority states that one goal is "addressing any disproportionate impacts of climate change on low-income and vulnerable communities."[10]

This report evaluates the existing 2013 GGRA Plan through an environmental justice lens, using the charge to the Commission as a guide for recommendations aimed at increasing equitable outcomes from Maryland's future climate planning efforts. In the short term, these recommendations can inform updates to the GGRA Plan and offer the Commission a set of priorities to research and refine for further consideration in the Commission's 2016 work plan and report to the Governor. In addition, a number of long-term recommendations are offered to reduce greenhouse gas emissions and enhance climate adaptation planning via the development of a new 2018 GGRA Plan, which aims to reduce carbon emissions 40 percent by 2030.

This report offers a series of nationally recognized tools that can be used when updating policies and implementing programs. This chapter provides background on social and environmental vulnerabilities in Maryland, an overview of the current state of environmental justice policies in the state and the link to climate change planning. Chapter 2 includes an evaluation of programs in the 2013 GGRA Plan, looking at the degree to which they currently support disadvantaged communities. Chapter 3 outlines a framework to embed equity in decision-making and includes vision development, a proposed process and a set of objectives and criteria for evaluating programs. Chapter 4 recommends next steps and high priority actions.

Growing Environmental and Health Disparities

Communities of color and low-income communities in the United States are often disproportionately burdened by environmental and public health risks and enjoy fewer benefits from environmental programs and natural resources.[11] The accumulation of environmental, social and economic problems in communities and the lack of health-promoting infrastructure has detrimental effects on public health and quality of life.[12] Environmental disparities in the United States are largely the result of past and present unfairness in the design and implementation of environmental laws, regulations, policies and programs at the national, state and local levels.[13] Climate change is also a significant environmental justice concern. As noted in the national Clean Power Plan recently released by the U.S. Environmental Protection Agency

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[10] Maryland House Bill 514. Maryland Commission on Climate Change. Available at: http://mgaleg.maryland.gov/2015RS/chapters_noln/Ch_429_hb0514E.pdf.
[11] U.S. Environmental Protection Agency, 2011. Plan EJ 2014. Available at: http://www3.epa.gov/environmentaljustice/resources/policy/plan-ej-2014/plan-ej-2011-09.pdf.
[12] Wilson, S.M. 2010. Environmental Justice Movement: A Review of History, Research and Public Health Issues. U.S.C. Journal of Public Management & Social Policy 19:36.
[13] Kuehn, R.R. 2000. A Taxonomy of Environmental Justice. Environ. Law Reporter. 30:10681-10699.

(EPA), "[l]ow-income communities and communities of color already overburdened by pollution are disproportionately affected by climate change and are less able to be resilient than others to adapt to or recover from climate change impacts."[14]

Maryland's growing social equity gap

In a 2013 report published by the Institute for Policy Studies, *Closing the Inequality Divide: A Strategy for Fostering Genuine Progress in Maryland,* the authors note the following findings about growing inequality in Maryland:

- Inequality in Maryland is increasing over time. The costs of inequality [such as poor health, crime, exposure to pollution] have steadily risen since 1968 and are presently at their highest levels.

- Inequality in Maryland manifests itself in a wide income gap between wealthy and poor households. The wealthiest 3 percent of Marylanders earn 36 percent of the state's income while the poorest 24 percent of Marylanders earn just 9 percent. There is also a wide income gap between white and black households and between white and Latino households.

- Inequality in Maryland also takes the form of unequal access to the good things in life — time spent with family and friends, quality education, reliable public services, modern household appliances and opportunities for civic engagement.

- Low-income households and communities of color in Maryland also bear the brunt of environmental degradation, crime, family stress, unemployment, poor health and unsafe living conditions.

People of color and low-income communities in Maryland are more likely than others to experience environmental risks and poor health outcomes. African Americans in Maryland are more likely than other ethnic groups to die from heart disease, cancer and stroke. African Americans in the state are also 1.1 times more likely to suffer from asthma and 2.3 times more likely to die from asthma, compared to whites.[15] Exposure to chemicals from on-road and non-major stationary sources (area sources) of airborne toxins has been implicated in high cancer rates among African-American communities in Maryland.[16] People of color and low-income people in Maryland are also more likely to live in close proximity to facilities with toxic chemical releases and are also more likely to be medically underserved compared with other populations. Thus, health impacts from these chemical exposures are less likely to

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[14] U.S. Environmental Protection Agency. 2015. Carbon Pollution Emissions Guidelines for Existing Stationary Sources: Electric Utility Generating Units. Available at: http://www2.epa.gov/sites/production/files/2015-08/documents/cpp-final-rule.pdf.

[15] Maryland Department of Health and Mental Hygiene. 2012. Maryland Chartbook of Minority Health Disparities Data, Third Edition.

[16] Ben Apelberg, et. al. 2005. Socioeconomic and racial disparities in cancer risk from air toxics in Maryland. Envtl. Health Perspectives. 113: 693-695.

be detected and treated early.[17] Lastly, investment in disadvantaged communities is lacking. For instance, funds administered by the State to protect wetlands and to support clean water have dedicated little resources to low-income communities and those with predominantly people of color.[18] For these reasons, many community organizations across the country and the state of Maryland advocate for policies that will address cumulative impacts of all environmental burdens to reduce these disparities.[19]

Rising Vulnerabilities

While Maryland has become a more diverse state, the vulnerabilities associated with socioeconomic and cultural gaps have grown or not been adequately addressed. People of color and low-income communities are highly vulnerable to climate change policies that increase these gaps, leaving communities with fewer resources to respond to climate change or take advantage of economic growth opportunities arising from the Maryland's climate and energy policies. September 2015 data from PolicyLink and the Program for Regional Equity of the University of Southern California (PERE)[20] show that people of color in Maryland are more vulnerable than whites to climate change policies and impacts due to disparities in home ownership, car ownership and workforce preparation.

- People of color are more likely to be vulnerable to landlord policies, with just 54 percent owning homes in Maryland as compared with 77 percent of whites.[21] This increases the disproportionate share of income used for energy, as renters often have little control of household energy systems or access to low-energy upgrades.

- People of color are less likely to be in school or employed between the ages of 16 and 24, an average of 16 percent for people of color (19 percent for African Americans) compared with 9.6 percent for whites. People of color are also less likely to have the necessary education and training to meet future workforce technology requirements. An average of 15 percent of African Americans and Latinos have the necessary educational training for projected technology and energy jobs of the future, compared with 52 to 74 percent of whites and Asians. This creates a substantial challenge for people of color to meet the needs for clean energy skilled labor and white-collar workforces, increasing economic disparities.

- People of color are less likely than white people to own a car. On average, 15 percent of people of color do not own a car, compared with 5 percent of white people. In Baltimore, the discrepancy is even greater, with 16.5 percent of white residents without a car and 37.5 percent of people of color without access to a car. This provides an opportunity to consider how effective equitable

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[17] Wilson, S. et al. 2014. Being overburdened and medically underserved: assessment of this double disparity for populations in the State of Maryland, Envtl. Health 13:26.
[18] Dernoga, M.A. et al.. 2015. Environmental justice disparities in Maryland's watershed restoration programs, Envtl. Science & policy 67:45.
[19] S.B. 706, 431rst Sess. (Md. 2014); S.B. 693, 432nd Sess. (Md. 2015).
[20] PolicyLink/PERE. National Equity Atlas. 2015. Available at: www.nationalequityatlas.org.
[21] PolicyLink/PERE. National Equity Atlas. 2015. Available at: www.nationalequityatlas.org.

development, smart growth and public transportation policies and investments can be distributed to benefit those in need who are already contributing to lower emissions than car owners.

Figure 1. Percent of Marylanders who do not own an automobile.

IPUMS
PolicyLink/PERE National Equity Atlas, www.nationalequityatlas.org
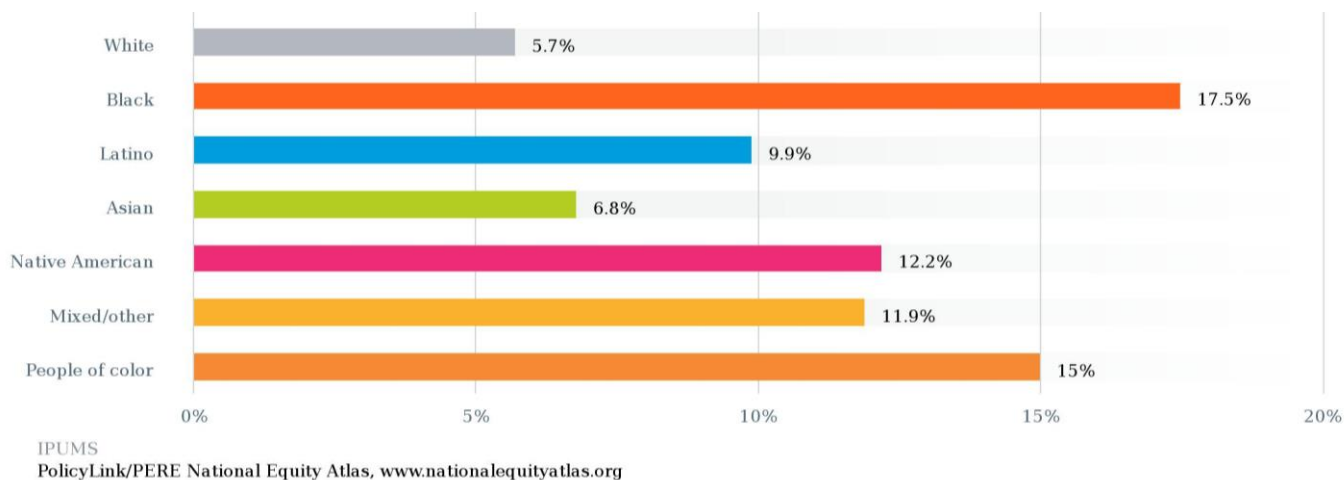
Status of Environmental Justice Policies in Maryland

Maryland kicked off efforts to address environmental justice with the Maryland Advisory Council on Environmental Justice (MACEJ) in 1997. The MACEJ advised the Governor on strategies to address environmental justice in state policy and in 1999 published a report noting disparities in exposure to air pollution and contaminated sites and failures to enforce environmental regulations in low-income communities.[22] The report described concerns about racial bias in state decision-making and "the limited capacity or ability of low-income groups to affect decision-making processes."[23] MACEJ made a series of recommendations to begin to address these issues, including establishing an Office of Environmental Justice within the Maryland Department of the Environment (MDE).[24]

However, to date – more than 15 years later – Maryland has not implemented most of the MACEJ recommendations. The State did establish the Commission on Environmental Justice and Sustainable Communities (CEJSC) in 2001, as recommended.[25] But the CEJSC's recommendations have also fallen short of implementation. For example, an indicator tool to identify environmental justice communities

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[22] Maryland Advisory Council on Environmental Justice. 1999. Environmental Justice in the State of Maryland. Available at: http://www.mde.state.md.us/assets/document/environmental_justice/ejreport99/intro.pdf.
[23] Maryland Advisory Council on Environmental Justice. 1999. Environmental Justice in the State of Maryland. Available at: http://www.mde.state.md.us/assets/document/environmental_justice/ejreport99/intro.pdf.
[24] Maryland Advisory Council on Environmental Justice. 1999. Environmental Justice in the State of Maryland. Available at: http://www.mde.state.md.us/assets/document/environmental_justice/ejreport99/intro.pdf.
[25] Maryland Annotated Code. Environment § 1-701. 2010. Commission on Environmental Justice and Sustainable Communities.

and the Environmental Benefits District program was never fully put in place.[26,27] Further, a series of recent interviews by the University of Maryland's Environmental Law Clinic finds that environmental justice organizations are concerned with contaminated fish and subsistence fishing, lack of access to green space, lack of cleanup at contaminated sites, disproportionate impacts from nutrient trading and hydraulic fracturing, trash pollution and landfill siting, disproportionate enforcement of laws and unsafe housing.[28] Many of these same issues were again identified during the review of the 2013 GGRA Plan in Chapter 2.

Equity-Positive Policies Support Economic Growth

Social equity means fair access to livelihood, education and resources, full participation in the political and cultural life of a community and self-determination in meeting fundamental needs. Equity-positive policies promote programs and investments that reduce disparities and result in more equitable outcomes. Conversely, equity-negative policies create a larger wedge between wealthier people and those with fewer resources. According to an analysis by PolicyLink and PERE, eliminating discrimination in pay and hiring, boosting educational attainment and ensuring strong and rising wages for low-wage workers could benefit Maryland by raising the state gross domestic product by $50 billion, raising incomes for people of color by nearly 50 percent and – in urban areas such as Baltimore – potentially increasing income by as much as 90 percent.[29]

Figure 2. Actual and potential state gross domestic product if social equity were accounted for. Based on 2012 data. Values are in billions.
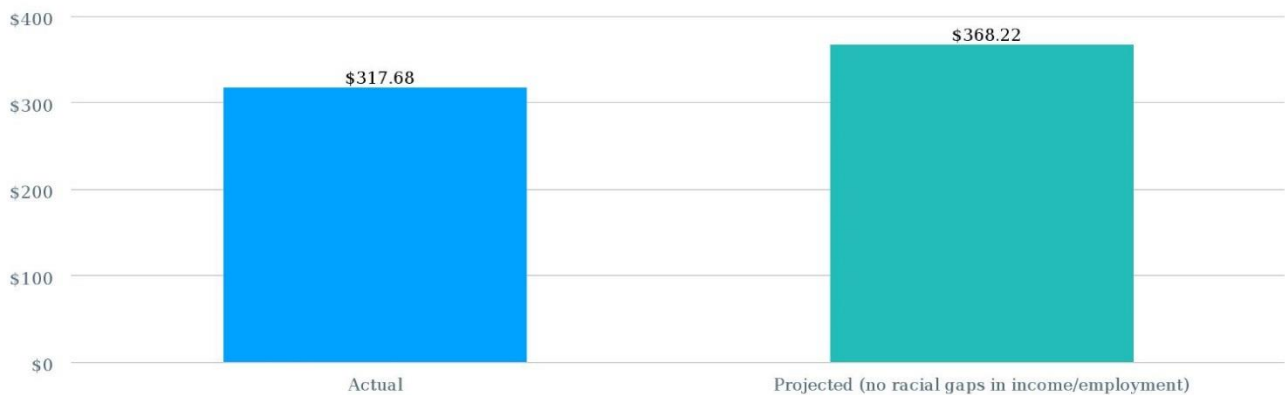
Bureau of Economic Analysis; IPUMS
PolicyLink/PERE National Equity Atlas, www.nationalequityatlas.org

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[26] Rehr, R. et al. 2013. The Maryland Commission on Environmental Justice and Sustainable Communities: A Review. J Health Care Poor Underserved. 24: 129-139.

[27] Rehr, R. et al. 2013. The Maryland Commission on Environmental Justice and Sustainable Communities: A Review. J Health Care Poor Underserved. 24: 129-139.

[28] Barett, J.L., M. Peters, H. Jacobs, J. Rubinstein. 2015. Environmental Justice in Maryland. University of Maryland Environmental Law Clinic.

[29] PolicyLink/PERE. National Equity Atlas. 2015. Available at: www.nationalequityatlas.org.

While moving Maryland closer to equitable climate change policies will not necessarily result in such drastic benefits, clear benefits to the state could be seen by addressing equity. In 2009, Maryland put in place a bold new economic indicator, the Genuine Progress Indicator (GPI), to begin to assess more precisely what has gone right and wrong in the state's economy. The GPI provides a more holistic view of the state economy than the standard state economic measure, the Gross State Product (GSP). While this indicator has become part of some of the state's programs, it has not yet received program-wide implementation.

A 2013 report by the Institute for Policy Studies used the GPI to compare the current Maryland income inequality situation with the income picture in 1968. The report concludes that inequality has imposed an economic drag on Maryland as a whole and, if left uncorrected, promises a continuing downward spiral for Maryland's poorest residents.

Healthy Communities are Resilient Communities

Healthy communities are key to addressing climate and energy equity. Both the direct impacts of carbon pollution such as exposure to pollutants and changes in the climate resulting from carbon pollution can adversely affect public health. Many disadvantaged communities are already exposed to elevated levels of air and water pollutants. Climate change is expected to exacerbate these burdens. Rising temperatures can increase ground level ozone, asthma triggers, energy use and heat waves. Extreme weather such as intense rain and storms can reduce access to health care and critical facilities, contaminate drinking water and expose people to mold in their homes and other diseases and contaminants during floods.

Marylanders are concerned about these impacts. A 2013 survey of Marylanders on "Public Health, Energy and Climate Change"[30] found that:

- Water contamination and public health are viewed as the top two threats from climate change; air pollution is the top personal health risk.

- More than half of Marylanders believe that health threats due to respiratory problems, injuries from storms or other extreme weather events and heat stroke will become more common because of climate change.

- Renewable energy sources are seen as healthier; more than half of Marylanders view coal, oil and nuclear power as damaging to people's health.

- Marylanders with an existing medical condition were 2-3 times more likely to say they were very vulnerable to climate change compared with those with no medical conditions.

A focus on building healthy communities is a thread woven throughout the recommendations below. Strategies to reduce carbon pollution, support social cohesion and increase access to public transit and

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[30] Akerlof, K., Maibach, E. W., & Mitchell, C. S. 2013. Public health, energy and climate change: A survey of Maryland residents, summer 2013. Fairfax, VA: Center for Climate Change Communication, George Mason University; Baltimore, MD: Maryland Department of Health and Mental Hygiene.

affordable, energy-efficient housing will improve health outcomes and climate change adaptation in the most vulnerable communities. Defining and measuring desired health outcomes will be key to tracking the successful implementation of climate mitigation and adaptation programs. Climate planning efforts could vastly improve health outcomes in the state if appropriately developed and broadly distributed. Improved living conditions in homes and communities could decrease energy and housing cost burdens; access to cleaner air and water could improve health status; and improvements in community cohesion would contribute to more healthy and resilient communities.

Federal and Local Government Policies Shape Implementation

Federal policy and local government authorities play a large role in shaping resource allocation, innovation and climate planning efforts when considering program or policy enhancements in light of climate and energy equity. In many cases, federal funds and policies are administered by state agencies through what is known as delegated authority. However, within federal policies such as the Clean Air Act and Clean Water Act, states have a great deal of flexibility in implementation and more importantly awarding recipients of these benefits. Moreover, environmental justice criteria are not required for most policies. An exception to this is the recently released national Clean Power Plan, which seeks to reduce carbon pollution from power plants and requires states to target carbon reduction efforts in environmental justice, low-income and tribal communities as they develop their State Implementation Plans.

Flexibility also surrounds the implementation of state programs and policies at the local level. In Maryland, local governments are largely responsible for land use decisions. This includes a range of decisions that could affect how state programs and policies are implemented and utilized, such as facility siting and location of structures in or near floodplains, stormwater management, ordinances regulating renewable energy development and infrastructure planning and upgrades. Maryland agencies have delegated authority over setting baseline conditions around pollution emissions and considerably more opportunities if projects are funded by the state. However, in many cases, local governments are the drivers of innovative climate mitigation and adaptation strategies. Examples of local government innovation and leadership are described in the next chapter.

Climate and Energy Equity Policy Framework

Efforts to promote social, climate and energy equity should use a framework that addresses both carbon emission reductions and climate preparedness. Climate and energy equity means that everyone shares the burdens and benefits of climate change investments equally and that additional disparities are not created for vulnerable communities. Climate change strategies used to mitigate and adapt to impacts can place vulnerable communities at further risk. For example, disadvantaged communities, many who already live in or near floodplains may not have the resources to escape the consequences of rising tides. Increased coastal flooding places further burdens on residents as they face damaged homes, vehicles and other property.

To address these growing inequities, this report evaluates the 2013 GGRA Plan from an environmental justice and equity perspective. Specific recommendations are made to improve quality of life and increase community resilience in the face of existing and future climate impacts. The report can be used by advisory groups such as the Commission, state and local agencies and organizations committed to addressing environmental injustice, economic equity and climate change in the state. This report can also be used as a tool to guide, strengthen and help advance climate and energy equity by:

- Developing a common understanding of climate and energy equity issues, such as anti-idling policies that reduce diesel particulate, carbon emissions and respiratory health disparities.

- Identifying effective strategies and best practices implemented in other parts of the country.

- Outlining principles and practices to assess the state of Maryland's efforts to address equity in the GGRA Plan update and related climate change programs and policies.

- Encouraging a broader climate and energy equity approach to include diverse stakeholders and extend positive policy impacts.

We evaluated programs in the existing 2013 GGRA Plan to determine how effectively they benefit or reduce disproportionate impacts in disadvantaged communities. This evaluation was strengthened by a day-long stakeholder focus group held in Baltimore on November 30, 2015 of regional experts in health, environmental justice, social, climate and energy equity.[31] This assessment uncovered a number of potential program improvements, including modification of existing programs and initiation of new programs based on models from the federal government and local governments in Maryland and beyond.

A detailed assessment of each program is provided in Appendix A, and these programs are cross-referenced throughout this section with policy identification codes used in Appendix A. The policy codes are presented so that the recommendations can be aligned with the existing 2013 GGRA Plan. Below, this report highlights programs and modifications that could have the largest impacts on improving quality of life in disadvantaged communities in Maryland. We also provide key examples and case studies illustrating these recommendations in action.

Crosscutting Plan Activities

Several climate and energy equity recommendations for the 2013 GGRA Plan could be applied to all climate programs and policies and could address environmental justice at a programmatic level. These include: 1) prioritizing resource allocation to promote climate and energy equity; 2) providing opportunities for diverse and satisfying jobs; 3) supporting meaningful outreach and engagement to empower communities; and 4) enhancing and supporting a right to clean air and water through Maryland's multi-pollutant framework. Specific recommendations for each of these three activities are provided below.

Develop and implement comprehensive prioritization efforts

The approach taken in the 2013 GGRA Plan is one of efficiency, quantifying the benefits of existing programs and their contributions toward carbon emission reduction targets. The 2013 GGRA Plan makes several references to potential programs that would enhance reductions. However, it is unclear if and when these programs will be put into place. This report recommends a closer look at opportunities for reducing emissions via the GGRA plan update and via the development of related climate and energy

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[31] Participants represented the Abell Foundation, Baltimore Neighborhood Indicators Project, Clean Water Action, Choose Clean Water Coalition, Community Power Network, Environmental Integrity Project, Fuel Fund of Maryland, Georgetown Climate Center, Maryland Environmental Health Network, a member of the Maryland House of Delegates, University of Maryland Environmental Finance Center, University of Maryland Environmental Law Clinic, University of Maryland's Community Engagement, Environmental Justice and Health Lab, United Workers, USDA Forest Service and We ACT for Environmental Justice.

policies. The existing and proposed programs highlighted in the sections below are prime targets for addressing climate and energy equity.

One strategy for managing a large comprehensive effort is to develop spatial mapping tools using Geographic Information Systems (GIS) and data platforms that can help prioritize programs and resources. This was done by the state of California via development of the CalEnviroscreen mapping tool, which helps prioritize how the state's greenhouse gas reduction resources are allocated to disadvantaged communities. The MDE's Cumulative Impacts Working Group is developing a mapping tool that could be used in a similar way. Key elements of California's approach could be applied in Maryland, including:

- An extensive community engagement process that tailors the types and weight of environmental, social and health indicators, based on community feedback. All data would be available for download by the public.

- Indicators supported by peer-reviewed scientific studies that provide separate and combined scores for social vulnerabilities and environmental burdens.

- Use of census tract level data to evaluate disparities at a fine scale.

- Introduction of policies that require the mapping tool to guide state investments and program resources.

Additional recommendations for comprehensive climate planning efforts are described in Chapter 3.

Key factors that could further characterize community vulnerability were absent from California's approach, including:

- Indicators based on climate emissions and potential climate impacts at the local scale.

- Status and distribution of state investments.

- Fluid indicators that adapt as environmental and social disparities respond to program investments.

Comprehensive climate planning: California's Global Warming Solutions Act

Soon after its formation, the California Environmental Justice Advisory Committee recommended the development of cumulative impact assessments. The resulting framework created by the California EPA includes (1) exposures, public health and environmental effects; (2) all sources of emissions and discharges of pollution in a geographic area; (3) all routes of exposure; (4) routine and accidental releases; (5) sensitive populations; and (6) socioeconomic factors. To date the framework has been used to develop comprehensive equity tools, including:

- A state-of-the-art environmental justice screening tool, CalEnviroscreen 2.0, which identifies communities with extensive environmental, social and health burdens.
- SB 535, one of the first state-level climate equity policies, which requires that 25 percent of proceeds from California's carbon trading program go to projects that benefit disadvantaged communities most vulnerable to climate change. A minimum of 10 percent of the funds must be used for projects in disadvantaged communities.
- Global Warming Solutions Act (AB 32), which sets significant emission reduction goals and stresses the importance of achieving those goals in a manner that maximizes economic and environmental co-benefits. More specifically, California's legislation requires that any trading program avoid adverse impacts on disadvantaged communities and complement the state's efforts to attain the Clean Air Act's National Ambient Air Quality Standards goals.

Provide opportunities for diverse and satisfying careers (N.4)

Creating a fair and inclusive community in which everyone can participate and prosper pays significant dividends. Equity is not only a matter of social justice; it is an economic necessity.[32] In fact, companies with the most racial and ethnic diversity are 35 percent more likely to have financial returns above their respective national industry medians. Conversely, companies in the bottom quartile for gender, ethnicity and race lag financially.[33] The 2013 GGRA Plan is expected to lead the creation of more than 37,000 jobs by 2020, most of these in the energy and transportation sectors. The more recently proposed 2015 Maryland Clean Energy Advancement Act would further require 25 percent of Maryland's energy to come from renewable sources such as solar or wind power by 2020and 40 percent by 2025, a boost from the mandated 10 percent.[34] If passed, this legislation would provide an opportunity to focus job creation and workforce development on vulnerable communities.

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[32] PolicyLink. 2011. America's tomorrow: Equity is the superior growth model. Available at:
http://wwwpolicylink.org/sites/default/files/SUMMIT_FRAMING_WEB_20120110.pdf.
[33] Hunt, V, Layton, D and Prince, S. 2015. Why diversity matters. Available at: http://wwwmckinseycom/insights/organization/why_diversity_matters#.
[34] Maryland HB 377. Renewable Energy Portfolio Standard –Revisions (Maryland Clean Energy Advancement Act of 2015) Available at:
http://mgaleg.maryland.gov/2015RS/bills/hb/hb0377f.pdf

According to the 2013 GGRA Plan, these newly created jobs could include designing and building green buildings; retrofitting older buildings with energy-efficient appliances and technologies; expanding and maintaining public transit systems; designing, building and operating windmills; introducing biomass generators and solar collectors; and research and development across an array of new practices and technologies. New clean energy jobs will also require a multi-billion dollar investment in technology to move toward a low-carbon future. These jobs would include both skilled and unskilled labor. Specifically, this report recommends exploring opportunities to support a viable transition for workers in the fossil fuel industry and provide training opportunities across all education levels during the 2018 GGRA Plan update.

> ## Maryland's P-TECH pilot
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> In November 2015, Maryland announced plans to launch four Pathways in Technology Early College High Schools (P-TECH). The P-TECH program, created by IBM, provides students with a high school diploma plus a two-year secondary degree in a STEM field at no cost to the student. Students also have access to skills-based paid internships and mentors. Inherently embedded in the program is a focus on "all students, including young people from low-income families, first-generation college students, English language learners, students with disabilities and students of color." The key to success is meaningful engagement to identify and engage students in need of this opportunity. P-TECH schools in Maryland could focus on building community resilience to climate change and attracting employers in science and engineering. This pilot could become a model for transitioning to a clean energy workforce and attracting clean energy businesses.
>
> www.ptech.org

Support a viable transition for workers in the fossil fuel industry

The State could consider developing a plan to help Maryland's workforce, especially lower-income workers, transition to sustainable energy production as jobs focused on coal extraction, coal-fired power plant operations and petrochemical manufacturing are replaced with renewable electricity from wind, solar and biomass. This shift will create new jobs in energy management as well as manufacturing of renewable energy-based and low-carbon products and services. The state could support and promote policies that encourage equitable training, hiring and contracting policies targeted at these displaced employees, with the goal of providing real and meaningful opportunities for blue- and white-collar jobs. Workforce development funds and job training programs could be integrated with public funding of renewable energy and energy efficiency projects in low-income communities. Support could also come from local hiring agreements and preference to woman-owned and disadvantaged small businesses, incentives to support local vendors and investments in neighborhood-based companies and organizations.[35]

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[35]We ACT for Environmental Justice. 2015. Northern Manhattan Climate Action Plan. Available at: http://weact.nyc/climate/nmca-201508.pdf.

Provide training opportunities across all education levels

Given the billions of dollars planned for technology investments to support carbon reductions under the 2013 GGRA Plan, the state could embed training opportunities from kindergarten to college to prepare students for future workforce needs. Training programs for in-demand skills could be available through local employers, community colleges and other state and local vocational resources. High schools and employers could offer cooperative education programs to provide on-the-job experience for students. Though not mentioned in the GGRA Plan, the University System of Maryland, MDE and the P-20 Leadership Council of Maryland could spearhead efforts to ensure that schools at all levels in disadvantaged communities receive the educational resources necessary to design curricula to meet the needs of future workforces. These efforts could include clauses to ensure that business incubator programs and technology training are available in these communities, rather than in faraway locations that are difficult to access for people without cars.

Bring jobs closer to home

Marylanders have the longest daily commutes in the U.S., regardless of demographics. On average, Marylanders take 32 minutes to travel each way to work, with African Americans and Native Americans traveling slightly longer (35 and 36 minutes, respectively). However, public transit commutes take 55 minutes on average.[36] Long commutes indicate a need for better alignment between community priorities and job availability. Long commutes reduce quality time spent with families; contribute to higher child care costs, transportation costs and employee turnover; and increase air pollution.

Job creation initiatives should address these commute times, ideally during long-term discussions focused on revitalization and regional transit planning. Vacant and abandoned buildings can be repurposed for new growth to attract businesses, for example. Established businesses can repurpose vacant and abandoned buildings as an opportunity to invest in communities. The Community Hub for Opportunities in Construction Employment (C.H.O.I.C.E) Works model could be utilized in revitalization and smart growth efforts to support local employment goals.

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[36] PolicyLink/PERE. National Equity Atlas. 2015. Available at: www.nationalequityatlas.org.

Community hub for opportunities in construction employment

The North America's Building Trades Unions' C.H.O.I.C.E Works program provides career training and employment in the form of pre-apprenticeship and apprenticeship programs in communities where construction is occurring. C.H.O.I.C.E. Works provides training for urban youth, minorities, women and veterans in the Baltimore/Washington D.C. metro area. By keeping jobs in the community, commute times are reduced, quality of life improves and community members can move towards a higher income as they receive training. One goal of the program is to move employees up the career ladder.

The program uses Community Workforce Agreements (CWAs), also known as Project Labor Agreements, to establish requirements for worker training, wages and benefits, local/targeted hiring of workers and contractor standards for construction projects. CWAs often require contractors to hire a certain percentage of the workforce locally or from specific communities, and include target numbers of apprentices from registered apprenticeships. For instance, the South Capitol Street Bridge agreement in D.C. provided jobs and training opportunities for disadvantaged residents and dedicated funds for small and minority owned businesses. CWAs can also be used during green building projects and large scale energy-efficiency retrofits as has been done in Portland, Washington state and Los Angeles.

Support meaningful outreach and engagement to empower communities

Community outreach often involves one-way communication, wherein an agency representative presents a set of potential decisions to the public. Policies resulting from this approach often neglect the needs of certain groups, particularly disadvantaged communities and implementation may lead to community distrust, barriers to implementation or enforcement and, in the worst case, litigation. When asked to improve community engagement, agencies often extend the period for feedback and sometimes involve the community in the decision-making process. But true engagement empowers communities to play a significant role in informing the final decision. Partnering with communities using a participatory decision-making framework can often achieve such desired results.

For instance, the most recent (mid-2015) outreach conducted by MDE regarding the 2018 GGRA update consisted of presentations to the public and time for public testimony. In both cases, the presenter spoke to someone, primarily using talking points, rather than engaging in true discussion. While it was laudable that MDE reached out to each region of the state, the time and investment in this type of engagement activity will likely not produce the desired long-term outcomes.

However, several model approaches, particularly those used by public health practitioners, include substantial dialogue and would prove beneficial during climate planning and implementation efforts. These include:

- **EPA's Collaborative Problem Solving Model,** which aims to overcome often deeply rooted environmental and social issues to create a collective vision involving proactive, strategic and visionary community-based processes that bring together multiple parties from various stakeholder groups using a solutions-oriented framework.[37] The model includes seven steps: issue identification and goal development; capacity building; consensus building; multi-stakeholder partnerships; constructive engagement; sound management; and evaluation and scaling up.

- **Health Impact Assessments** (HIAs) are qualitative assessments of the potential impact of a policy or project on the health of surrounding communities. Maryland's Department of Health and Mental Hygiene (DHMH) plans to use HIAs as a key strategy to address climate change impacts in partnership with the National Center for Healthy Homes, local health departments and other state agencies such as MDE, Maryland Department of Planning (MDP) and Maryland Department of Natural Resources (DNR).[38] The key steps of an HIA include an initial process that allows community members to identify high priority health hazards and health impacts; an assessment of impacts; development of recommendations; and a process for decision makers and community members to implement and track recommendations. HIAs could be a key step to meaningfully

The ReGenesis project: Collaborative problem solving to empower communities

The Arkwright and Forest Park neighborhoods of Spartanburg, South Carolina, struggled for decades with disinvestment while other parts of the city were revitalized. The community endured freight trains blocking the only entrance road, as well as pollution from a chemical manufacturing plant and two hazardous waste sites. Community members used an initial $20,000 grant from the U.S. EPA to establish ReGenesis, an environmental justice partnership with the city and county governments to promote equitable development. Through the partnership, ReGenesis identified community priorities, leveraging $270 million in revitalization and neighborhood investment. The partnership produced 500 affordable housing units, the ReGenesis Community Health Center, a green recreational facility and community benefits agreements and investments from the adjacent chemical manufacturing plant. ReGenesis went on to serve as a model for EPA's Environmental Justice Collaborative Problem Solving Model.

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[37] U.S. EPA. 2008. EPA's Environmental Justice Collaborative Problem-Solving Model. Available at: http://www3.epa.gov/environmentaljustice/resources/publications/grants/cps-manual-12-27-06.pdf
[38] Maryland Department of Health and Mental Hygiene. Maryland Public Health Strategy for Climate Change. Available at: http://phpa.dhmh.maryland.gov/OEHFP/EH/SitePages/PHStrategyCC.aspx#4

engaging communities and understanding the cumulative impacts of climate mitigation and adaptation policies, programs and projects.

Enhance and support the right to clean air and water through Maryland's multi-pollutant framework

Every citizen deserves access to clean, healthy air and water. The need to address the cumulative impacts of multiple pollutants has long been a primary concern among environmental justice advocates.

MDE's Cumulative Impacts Workgroup was formed in 2014 to develop a framework for addressing cumulative impacts in the permitting process. In the 2014 legislative session, a Cumulative Impacts Bill (SB 706/HB1210) was proposed to require applicants for new pollutant sources, or major modifications to pollutant sources, to conduct a cumulative impacts analysis. The bill was not passed, but the analysis would have required an assessment of the potential impacts of the permitted facility on human health and the environment and would have included past and present pollution burdens.[39] The workgroup is currently developing recommendations for MDE to address the issue of co-pollutants and the resulting public health burden borne by communities of color and low-income communities across Maryland. The efforts of the Cumulative Impacts Workgroup present an opportunity to overlay the 2013 GGRA Plan goals with MDE's efforts to reduce environmental impacts that disproportionately affect environmental justice communities in Maryland.

The existing multi-pollutant approach in the 2013 GGRA Plan provides a basis for the recommendations above and would improve health outcomes, particularly in disadvantaged communities near fossil fuel facilities and along transportation corridors. The societal benefits of the multi-pollutant framework include reduced incidences of premature mortality from respiratory ailments, including asthma attacks and chronic obstructive pulmonary disease, heart attacks, hospital room visits and lost work and school days. These improved health outcomes have substantial costs savings – between $168 million and $568 million annually due to avoided mortality for fine particulate matter and $25 million to $35 million each year due to ground level ozone reductions.[40] However, the societal benefits of a multi-pollutant approach are likely much higher. Lower pollutant levels allow people to spend more time outdoors, decreasing stress and improving physical fitness.[41] Access to clean water improves local economies and benefits subsistence, small-scale and larger commercial fishing operations.

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[39] Amendment failed but would have modified Annotated Code of Maryland, Environment Section 1-604 and added 1-901 through 1-903 to be under the new subtitle "Subtitle 9.1 Cumulative Impact Assessments." Available at:http://mgaleg.maryland.gov/2014RS/bills/sb/sb0706t.pdf
[40] Maryland Department of the Environment. 2013. Maryland's Greenhouse Gas Reduction Act Plan.
[41] American Public Health Association. 2013. Improving health and wellness through access to nature. Available at: http://apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/08/09/18/improving-health-and-wellness-through-access-to-nature.

Maryland's proposed multi-pollutant framework

In the 2013 GGRA Plan, Maryland proposed a framework to take advantage of co-benefits of reducing co-pollutants along with greenhouse gas reductions. Co-pollutants include nitrogen oxides, sulfur dioxides, ozone, fine particulates and mercury. Since a third of the nitrogen going into the Chesapeake Bay comes from cars and trucks, power plants and industry, the health of the Bay also depends on co-benefits from reduced carbon emissions. Secondary goals include highlighting tradeoffs and co-benefits of policies and analyzing "environmental, public health, economic and energy implications of various potential control strategies."

The framework is part of a regional approach through the Northeast States for Coordinated Air Use Management. Maryland is relying on the Maryland Healthy Air Act, the Maryland Clean Cars Program and the EmPOWER Maryland Program to set the stage for multi-pollutant planning. For instance, within two years of the passage of the Healthy Air Act in 2010, nitrogen oxide emissions were reduced by 70 percent, sulfur dioxides by 80 percent and mercury by 80 percent. The Healthy Air Act also requires Maryland's participation in RGGI, a key regional climate program.

Moving forward Maryland will also base the multi-pollutant framework on the U.S. EPA's policies including the 2015 State Implementation Plan (SIP) requirements for the 2008 8-hour Ozone National Ambient Air Quality Standards, for particulate matter and on the 2015 Clean Power Plan to cut carbon pollution from power plants.

Moving forward, the state's multi-pollutant framework could include requirements to conduct a multi-pollutant analysis as stated in the proposed Cumulative Impacts Bill of 2014 (SB 706/HB1210). This could include supporting the passage of the proposed bill or similar legislation.

A multi-pollutant (co-pollutant) analysis could require:

- A formal evaluation of potential changes in criteria air pollutants and other air toxins (co-pollutants) so that carbon reduction strategies do not increase concentrations of criteria air pollutants. This evaluation could include a comparison of average and elevated emissions per unit of energy expended.

- State agencies to use a range of data to assess environmental and health risks, including indoor, outdoor and personal monitoring data. When gaps are identified, permittees could be required to collect the data through monitoring collaborations with the community and state and local agencies.

- Public access to air pollutant concentrations at the neighborhood scale, associated health risks from each pollutants and social vulnerability metrics.

- Identification of gaps in data from the Statewide Ambient Air Monitoring Program that, if filled, could help develop effective models for studying cumulative impacts. These gaps could be identified via community discussions and residents could be encouraged and trained to collect monitoring data to fill these gaps and support permit decisions. Standardized guidance and a list of approved monitoring equipment could be created to support community-based air quality monitoring.

Global Community Monitor: Community monitoring to support regulatory decisions

Tracking the emissions of air pollutants in each neighborhood can shed light on community health. However, Maryland's air quality monitoring stations (supported by the Statewide Ambient Air Monitoring Program) do not provide sufficient coverage to evaluate neighborhood-level trends in emissions. Community members often have first-hand knowledge of when emissions are likely to occur and can help monitor these pollutants during accidental releases, but federal and state agencies often hesitate to use citizen information due to concerns with data quality and reliability of the collection process. To overcome this issue, some communities have developed data quality assurance plans that are approved by government agencies and include specific monitoring protocols and equipment. To facilitate such an effort, Global Community Monitor uses the Bucket Brigade program to train communities to address the impacts of fossil fuel industry pollution on their health and the environment. Through the Bucket Brigade program, Global Community Monitor has developed agency-approved protocols and helped communities monitor neighborhood-level emissions from diesel exhaust, oil and gas refineries and hydraulic fracturing. Read more at: http://www.gcmonitor.org

Provide support for innovative financing tools and partnerships

Through this report, a number of financing opportunities are identified to support climate and energy equity initiatives. Three overarching tools, supplemental environmental projects (SEP) green banks and Maryland's Public Benefit Fund, are discussed below.

- **Supplemental Environmental Projects:** The state could collaborate with the federal government to promote the use of SEP funds and state compliance agreements to reduce community exposure to air toxins. This could be encouraged as part of any legal settlement or enforcement action against a polluter, with the goal of improving environmental and health conditions in communities impacted by the enforcement action, rather than creating further social disparities by diverting funds to other regions or general treasuries.

- **Green Bank Initiatives:** In 2014, the Maryland General Assembly directed the Maryland Clean Energy Center to study the opportunities for developing a Maryland Green Bank. A green bank

leverages public funds for energy efficiency and renewable energy projects to bridge gaps in affordability. Much like financing for a car, green banks allow upfront purchasing of household renewable energy systems using long-term financing mechanisms. The study found that green banks could help fill a $5.7 billion gap in meeting Maryland's Renewable Portfolio Standard goals. The study also found that small businesses and low-to moderate-income residents are most in need of such financing. A few options were presented to assist low-income households in accessing clean energy, including Connecticut Green Bank's low- and moderate-income focused program that wraps energy efficiency upgrades and solar installation into one financing product with no money down, providing immediate savings. In Maryland the Southern Maryland Electricity Cooperative has launched a low and moderate income financing program and Grid Alternatives and Fuel Fund are beginning to address this gap as well.[42] Similarly, the Southeast Rural Community Assistance Project (SERCAP) provides funding support for rural low-income communities in Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia and Florida to improve water, sewer and energy infrastructure.[43]

- **Maryland's Public Benefit Fund** for energy efficiency and low-income assistance requires local utilities to implement clean energy and weatherization programs for low-income communities. Utilities are allowed to increase rates to account for these programs.[44] As recommended by the Clean Energy Group, the Public Service Commission (PSC) could require utilities to use the Public Benefit Fund to assist disadvantaged communities and provide clean energy solutions based on the recommendations below. The PSC could also explore the implications of increasing the system benefits charge to support additional communities.[45]

Integrate and align federal and regional carbon reduction programs to address environmental justice

Over the next year, two policies will offer Maryland an opportunity to influence climate and energy equity within and beyond the state's borders. These include the 2016 programmatic update to the Regional Greenhouse Gas Initiative (RGGI) and the development of State Implementation Plans under the U.S. EPA's Clean Power Plan.

The RGGI is a cap and trade greenhouse gas reduction program that includes the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island and Vermont. Funds from RGGI proceeds go towards energy efficiency, renewable energy and other energy-related programs as determined by each state. In Maryland, most of the $278 million are spent on direct bill

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[42] Maryland Clean Energy Center, 2015. Blueprint for Building the Energy Economy in Maryland: Green Bank Preliminary Findings Report (Phase 1 Study), Coalition for Green Capital, Green Bank Study Final Report.

[43] Southeast Rural Community Assistance Project. http://www.sercap.org/

[44] U.S. Department of Energy. 2010. Public benefits funds: Increasing renewable energy and industrial energy efficiency opportunities. Available at: https://www1.eere.energy.gov/manufacturing/states/pdfs/publicbenefitfunds.pdf.

[45] https://www.greentechmedia.com/articles/read/newyorkplans40minprizesforstormresilientmicrogrids cited in Sanders, R. and L. Millford. 2014. Clean energy for resilient communities: Expanding solar generation in Baltimore's low---income neighborhoods. Available at: http://www.abell.org/sites/default/files/reports/env-cleanenergy214.pdf.

assistance, including $100.5 million to help 215,800 low-income households pay their energy bills. RGGI has also supported energy efficiency upgrades for 11,880 low- to moderate-income households.[46] However, there does not appear to be a systematic approach to addressing environmental justice issues with these funds. In the 2016 program update to RGGI, there is an opportunity to address environmental justice by:

- Advocating for environmental justice principles in the 2016 RGGI Plan as described throughout this report.

- Assessing whether RGGI funds have contributed to rate increases or hotspots of pollution emissions in environmental justice communities.

- Implementing RGGI-funded programs to benefit environmental justice communities, such as grants, community renewable energy systems, sustainable planning and green-collar job training.[47]

EPA's Clean Power Plan: An opportunity to address equity in Maryland

On August 3, 2015, President Obama and the U.S. EPA Administrator Gina McCarthy announced the Clean Power Plan, anticipated to reduce carbon pollution from power plants by 32 percent by 2030. According to EPA, the Plan will prevent: "3,600 premature deaths, 1,700 heart attacks, 90,000 asthma attacks and 300,000 missed work and school days" each year. State Implementation Plans (SIP) are required to demonstrate how the state has engaged vulnerable communities in the development of the SIPs and how vulnerable communities will be engaged during implementation. EPA will also increase the public's access to monitoring data and success measures, and provide credits for energy efficiency programs in low-income, tribal and communities of color. Maryland could move beyond these EPA requirements by:

- Expanding on coarse-level data provided by EPA's EJ Screen to include census data on social, environmental and climate vulnerabilities at the local level.
- Assessing cumulative impacts and co-benefits for health and environmental vulnerabilities, including a need to fill gaps in air-monitoring data.
- Ensuring an equitable trading program is implemented in coordination with RGGI investments.
- Participating in the Clean Energy Incentive Program (CEIP) to reward early investments in wind and solar generation, as well as demand-side energy efficiency programs implemented in low-income communities.
- Addressing potential challenges regarding allowable renewable energy sources, such as waste incinerators.

http://www.epa.gov/cleanpowerplan/clean-power-plan-community-page

[46] Regional Greenhouse Gas Initiative. 2015. Investment of RGGI proceeds through 2013. Available at: https://www.rggi.org/docs/ProceedsReport/Investment-RGGI-Proceeds-Through-2013.pdf.
[47] Natural Resources Defense Council. 2011. The Regional Greenhouse Gas Initiative is a Model for the Nation. Available at: http://www.nrdc.org/energy/rggi.

The section below focuses on specific sectors within the 2013 GGRA Plan, including energy, transportation, land use, buildings, agriculture, forestry and waste. These categories correspond with the sectors in the GGRA Plan and generally align with specific state agencies that have key responsibilities for each sector.

Energy Sector (A-D, I.4, M.1-4)

Clean energy programs are among the largest carbon reduction sectors and provide some of the best opportunities to enhance energy equity, improve emergency preparedness and serve low-income households. Energy efficiency and renewable energy reduce air pollution, improve respiratory health and lower energy costs for households and businesses, reducing existing burdens. But if not carefully designed, energy efficiency and renewable energy programs may fail to serve low-income households.

Figure 3. Location of fossil fuel power plants near disadvantaged communities in Maryland (Source: UMCES).

Data source: iMap.
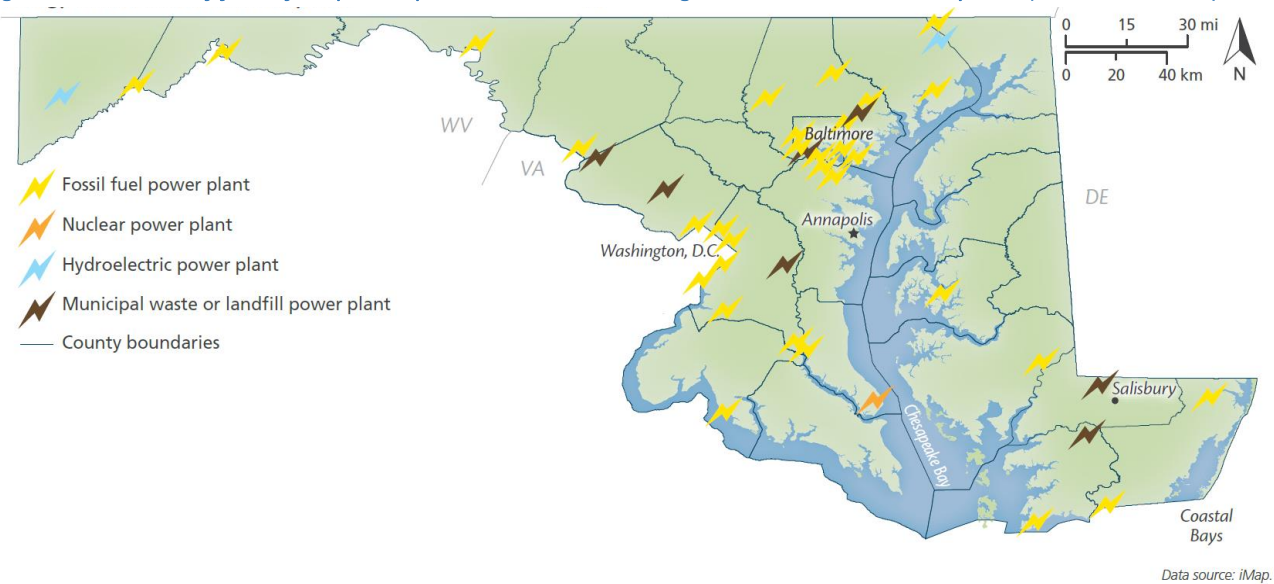
Low-income households have high energy burdens, but direct assistance programs currently address the bills rather than the energy usage. In Maryland, the average energy burden is 3 to 4 percent of total household income, while the energy burden in low-income households can range from 10 to 20 percent. Households with incomes less than 50 percent of the poverty level in 2014 had an average energy burden of 40 percent of their total household income.[48] In many cases, energy assistance programs still leave the lowest-income households with energy burdens that are two to three times that of the average ratepayer. In addition, renters tend to have energy bills that are, on average, 50 percent higher per square foot. This is partly due to less-efficient appliances and less-insulated homes, as landlords have few incentives to embrace energy-related low-income programs. For instance, a 2011 national survey found

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[48] Fisher, Sheehan and Coulton. 2015. Maryland: The home energy affordaibility gap 2014. Second series. Available at: www.homeenergyaffordabilitygap.com/03a_affordabilityData.html.

that one-third of households receiving energy assistance did not have sufficient resources to buy medicine or medical and dental care because of high energy bills.[49]

Opportunities for low-income populations and communities of color to participate in energy efficiency and renewable energy programs could be expanded and enhanced. For example, existing program marketing and enrollment messages may not ever reach low-income communities of color, or immigrant and non-English speaking communities. Designing equitable, inclusive clean energy programs that deliver full benefits to high-need households requires the thoughtful involvement of diverse partner agencies and community stakeholders.

Breaking through the "split-incentive" barrier

A "split-incentive" occurs when a building owner would not benefit from the cost reductions of energy efficiency measures, as is common in multi-family buildings. Because of this, renters have access to fewer resources to reduce their energy use and save money. Few programs within the 2013 GGRA Plan provide support for multi-family buildings. In addition, many landlords are not willing to provide access to units for energy efficiency improvements and are even less likely to provide access for renewable energy modifications such as solar panels or geothermal units. Baltimore's Green and Healthy Homes Initiative found that half of tenants who applied for assistance did not receive permission from landlords to receive it. Many of these homes were not kept up to existing housing codes, likely contributing to lack of access.

The fact that landlords often do not directly benefit from improvements is a significant challenge. A first step would be to evaluate the extent of this occurrence statewide based on the outcomes in Baltimore, particularly in disadvantaged communities. The State could explore "green" lease mechanisms that enable allocation of a fair proportion of the costs and benefits to both tenants and landlords and include a component on landlord outreach and education. From an enforcement perspective, the state could evaluate compliance with "minimum livability codes." The U.S. Department of Energy's Better Building Alliance provides examples of these programs, available at: https://www4.eere.energy.gov/alliance/

Implement a comprehensive Affordable Energy Program

While the state's low-income energy assistance programs provide opportunities for many Marylanders, they continue to lag behind the amount of support needed. For instance, EmPOWER residential energy efficiency programs (A.1-4) reach an average of 3,400 low-income households each year. At the current

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[49] National Energy Assistance Directors Association. 2011. 2011 national energy assistance survey. Available at: http://www.appriseinc.org/reports/Final%20NEADA%202011%20Report.pdf.

rate, it would take nearly 100 years to reach all 361,000 eligible low-income households.[50] The goal of any affordable energy program should be to provide for a sustained reduction in the number of households requiring direct bill assistance. At its current rate of enrollment, the EmPOWER energy efficiency program benefits less than 10 percent of eligible households.

In 2012, the PSC proposed an Affordable Energy Program (AEP) aimed at reducing energy burdens to less than 6 percent of household incomes. The proposed program would provide for improved efficiency through EmPOWER (A.1-4). PSC stated that the "AEP puts eligible (low-income) customers on a footing equal to non-low-income customers." The Maryland Department of Human Resources also recommended that the state streamline all of its energy assistance programs into a single application process and use case managers to reduce confusion and additional effort on the part of already stressed low-income households. Part of this streamlining could include integrating federal funds into the streamlined system, as has been done in Ohio.[51]

Lastly, PSC could consider measuring non-energy benefits of each program. Accounting for social benefits – reduced health costs and the costs of homelessness, for example – highlights collective cost savings in related programs. The GPI provides a tool to make such assessments and is already in use by some state agencies. Baltimore's Green and Healthy Homes Initiative, which takes a holistic approach to home energy and health, demonstrates the non-energy benefits of energy-efficiency programs. Its focus includes mold and lead remediation and reduction of other indoor air pollutants, some of which could increase due to rising heat and more frequent storms due to climate change. Households enrolled in the Initiative experience a lower rate of foreclosure, reducing the load of vacant and abandoned housing. Other non-energy benefits could include job training and community economic development, reduced air pollution and reduced healthcare costs. As suggested in a report by the Institute for Energy and Environmental Research, the AEP could begin with a pilot program(s) in areas in far western Maryland, Baltimore and most counties on the Eastern Shore where more than 10 percent of households seek energy assistance.[52] This program could emerge from HB 1087 enacted on May 2015 that authorizes the PSC to establish a three year pilot program for community solar projects in the state.[53] The legislation explicitly states the pilot program should support enrollment of renters and low- and moderate-income communities in existing and new housing developments.[54]

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[50] Makhijani, A., C. Mills and A. Makhijani. 2015. Energy justice in Maryland's residential and renewable sectors. Institute for Energy and Environmental Research.

[51] Makhijani, A., C. Mills and A. Makhijani. 2015. Energy justice in Maryland's residential and renewable sectors. Institute for Energy and Environmental Research.

[52] Makhijani, A., C. Mills and A. Makhijani. 2015. Energy justice in Maryland's residential and renewable sectors. Institute for Energy and Environmental Research.

[53] Draft regulations were released in November of 2015 and will be finalized by May 2016. Available at: http://webapp.psc.state.md.us/intranet/Maillog/content.cfm?filepath=C:\Casenum\Admin%20Filings\160000-199999\177713\CommunitySolarreswithCOMAR20.32and20.50.10.pdf

[54] House Bill 1087. Electricity –Community Solar Energy Generating System Program. Available at: http://mgaleg.maryland.gov/2015RS/Chapters_noln/CH_347_hb1087e.pdf

Provide access to affordable and resilient energy choices (B.1-4)

Extreme weather and power outages deprive disadvantaged communities of basic needs by taking away heating and cooling. Providing disadvantaged communities with access to energy during emergencies is an issue of both climate preparedness and energy equity. The Derecho of 2012 and "Snowmaggedon" in 2010 demonstrate the need to integrate the planning of energy systems with climate resiliency. If these communities were provided with adequate emergency planning resources and had access to backup systems such as those available through solar panels with battery storage, many of these burdens may have been lessened. Additional details on resilient communities is described in the section on climate adaptation.

Climate change leaves disadvantaged communities at risk from storms

On June 29, 2012, a major storm system known as a Derecho formed over Illinois and moved across Maryland, with peak wind gusts ranging from 80 to 100 miles per hour. The storm left 4.2 million people without power, including 900,000 people in Maryland, a third of all state residents. Near-record summer temperatures in the days that followed led to 34 deaths due to extreme heat; half of them were in Maryland.[1] Most victims were elderly and could not easily get to air-conditioned locations; many residents in remote areas had no water and could not refrigerate medication.[2] At the other end of the spectrum, the 2010 "Snowmageddon" left thousands in Maryland without power for days after blizzards dumped over two feet of snow on the D.C. area. PEPCO failed to adequately plan for this storm, leaving many without power for a week or more. Some families were able to evacuate their homes, while low-income and medically fragile families were affected the most.[3]

Both storms most affected vulnerable communities and those without the resources to respond. Disadvantaged community members are less likely to have resources to relocate when needed, which is made even more challenging when public transit is not available. During "Snowmageddon," low-income families lost wages when businesses closed and were further burdened when PEPCO raised rates to account for their error.[4]

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[1] U.S. Department of Energy. 2012. A Review of power outages and restoration following the June 2012 Derecho. http://www.oe.netl.doe.gov/docs/Derecho%202012_%20Review_080612.pdf.
[2] National Weather Service. 2013. Service assessment: The historic Derecho of June 29, 2012.http://www.nws.noaa.gov/os/assessments/pdfs/derecho12.pdf.
[3] Mary Pat Flaherty, In Storm, Pepco Last to Seek Aid, WASH. POST, Jan. 28,2011, available at http://www.washingtonpost.comlnational/in-storm-pepco-last -to-seekaid/2011/0Il27/ABTi4LE_story.html.
[4] Payne, E. 2013. Comment: Getting the lights back on: An analysis of the Maryland Energy Service and Reliability Act's impact on utility liability and consumer rights. Law Forum. 43:2:3.

Utilize household fuel switching as a tool to improve equity (B.2)

The programs in the 2013 GGRA Plan create a number of potential barriers to environmental justice when the implications of fuel switching are considered at the household scale. The first potential challenge includes the type of fuel switching being promoted. For instance, the switch to natural gas as a clean fuel

has created some unexpected environmental justice concerns. Traditionally, urban disadvantaged communities have endured the bulk of environmental burdens from energy generation, such as living in neighborhoods where power plant emissions are highest and residual coal ash waste is stored or landfilled. Natural gas creates another set of risks. In Maryland, for instance, much of Baltimore receives energy for heating from natural gas. Recently, communities in western Maryland and others across the country, where natural gas reserves lie in fractured rock, are becoming aware of the local risks of hydraulic fracturing, which include air and water impacts as well as potential significant health impacts.

Moreover, the renewable energy sources allowed by the Renewable Portfolio Standards (B.1), such as black liquor and waste-to-energy incinerators for wood, solid waste and poultry litter, are byproducts of processes that pose environmental risks during both production and energy generation. Black liquor produced from paper mill operations and poultry litter from industrial-scale chicken farms can both have substantial impacts on water quality and air quality in their surrounding communities, often rural areas. The same is true of waste-to-energy incineration, as discussed further in the Waste section. The State could consider omitting these as sources of renewable energy or at least requiring mitigation based on the impacts on disadvantaged communities.

The second potential challenge involves restrictions on the use of EmPOWER (A.1-4) funds. Many households in western Maryland and the Eastern Shore use expensive and dirty heating oil, wood stoves and propane fuel, which drive the need for sustained energy assistance in these areas. Switching over to efficient electric HVAC (Heating, ventilation and air conditioning) systems could reduce emissions while reducing energy burdens. However, EmPOWER does not allow energy efficiency measures to support investment in fuel switching, such as allowing low-income households to switch from dirty and expensive fuel oils or propane to efficient electric HVAC systems. Fuel switching is, however, available for households that do not need assistance with their bills. Removing this barrier for low-income households could be a priority for the state.

Finally, disadvantaged and low-income assistance recipients could be given a choice of receiving solar and other sources of renewable energy. As suggested in a recent Institute for Energy and Environmental Research (IEER) report, community choice aggregation could be implemented so that low-income households applying for assistance are automatically signed up for renewable energy resources such as solar unless they opt out. One example of this is CleanPowerSF, launched by the San Francisco Public Utility Commission in 2015. CleanPowerSF is a Community Choice Aggregation program that automatically enrolls all residents, including those receiving direct bill assistance, in a clean energy program that provides access to 33-50 percent clean energy sources, without increasing rates. For a small fee, residents can opt into the "SuperGreen" program that supports 100 percent renewable energy.[55]

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[55] CleanPowerSF. 2015. Powering Change. Available at: http://sfwater.org/modules/showdocument.aspx?documentid=8008

Remove policy barriers to shared renewable energy (B1-4)

In Maryland, the use of solar energy is growing – photovoltaic installations tripled between 2011 and 2012, placing the state 8th in the U.S. in terms of the number of systems installed and 12th in total capacity.[56] However, low-income households are almost completely excluded from solar energy installation due to barriers such as low homeownership, lack of community solar programs and lack of broadly applicable net metering laws. By mid-2016 PSC will implement a three-year community solar pilot, which requires support for access to community solar by renters and low- and moderate-income communities in existing and new housing developments. Support will be needed to develop outreach programs to these communities so that they are able to take advantage of this program. This program could be supported by universal solar access, which would lower the cost of energy assistance, especially given that installations are now cheaper than residential electricity costs. However, there are substantial barriers to broad implementation in low-income communities, particularly for rental homes where roof access or other conditions may not allow for it.

Strategies to address community solar energy use

In mid-2015 President Obama launched the National Community Solar Partnership to provide access to resources and partnerships to accelerate implementation of community solar programs, especially for low-income communities. Some states have also developed policies that address these concerns. For example, Arizona and California allow a small utility fee so that solar customers can help pay for grid maintenance and backup. Colorado allows for the creation of "community solar gardens" to allow multiple customers to access solar not on their property and receive credit.

California developed the Community Solar Initiative in 2006, by mandating 10 percent of a public benefit charge to go toward solar installation on low-income housing for single and multi-family homes. The owner of Las Serenas Apartments in San Diego took advantage of this program and used virtual net metering to reduce tenants' bills by 20 percent. The solar company also provided training and jobs to some residents through the GRID Alternatives program.

In Maryland, the Public Service Commission is preparing to launch a 3 year community solar pilot beginning May 2016. Three programs are already improving access to solar for low-income communities, the Civic Works and GRID Alternatives partnership funded by the Abell Foundation, Power 52 and the Maryland Fuel Fund's low-income solar energy project. The Civic Works and GRID Alternatives partnership was launched in the Caring Active Restoring Efforts community of East Baltimore to install solar, provide backup power and provide job training at 10 low-income homes. Power52 is a non-profit launched by former Ravens linebacker Ray Lewis to support clean energy projects and community solar in low-income communities and to provide job training and college or trade school scholarships to people in these communities.

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[56] Sanders, R. and L. Millford. 2014. Clean energy for resilient communities: Expanding solar generation in Baltimore's low-‐income neighborhoods. Available at: http://www.abell.org/sites/default/files/reports/env-cleanenergy214.pdf.

In Maryland, aggregate net metering is available to nonprofit customers, municipal governments and customers who use electrical service for agricultural purposes. Generally, it has not been available to residential customers. Aggregate net metering allows electricity generated by a renewable energy system to be allocated to multiple meters even if in a different building or not attached to the system. Although the policy does not allow individuals to use net metering, a co-op, Community Development Corporation, Homeowner Association or other community entity could distribute power to residential or other users if their name was under the same account, though the current limit allows only 20 users.[57] To overcome this barrier, the state could revise the policy to allow for aggregate net metering for residential and commercial multi-tenant buildings. The State could also revisit the community solar legislation proposed in the past year. To address equity effectively, these programs would need to involve communities in the facility siting decision-making process. As suggested in a recent IEER report, PSC could use community choice aggregation to address this, adding this strategy to agreements under the Electric Universal Service Program.[58]

Utilize clean energy funds to support reliable renewable energy systems (B.1-4).

A report by the Clean Energy Group (CEG) recommended that stronger, more resilient communities are at the core of sustainable community development practices. To be resilient to extreme weather, resilient communities should have access to clean and affordable, community-based backup systems to provide basic needs during power outages.[59] Rather than focus on expensive subsidies to provide each household with solar power, the CEG recommends the use of solar power combined with battery storage in disadvantaged communities to give community buildings, schools and other critical facilities access to power during extreme events. The systems would be connected to the grid, but could also disconnect during emergencies, providing a resilient source of power for critical facilities such as hospitals, police departments, fire stations and cooling stations.[60] The batteries would address the challenge of ensuring power during outages. Such a program could also build on the Maryland Energy Administration's Net Zero school program.

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[57] Sanders, R. and L. Millford. 2014. Clean energy for resilient communities: Expanding solar generation in Baltimore's low---income neighborhoods. Available at: http://www.abell.org/sites/default/files/reports/env-cleanenergy214.pdf.

[58] Makhijani, A., C. Mills and A. Makhijani. 2015. Energy justice in Maryland's residential and renewable sectors. Institute for Energy and Environmental Research.

[59] Sanders, R. and L. Millford. 2014. Clean energy for resilient communities: Expanding solar generation in Baltimore's low-income neighborhoods. Available at: http://www.abell.org/sites/default/files/reports/env-cleanenergy214.pdf.

[60] https://www.greentechmedia.com/articles/read/newyorkplans40minprizesforstormresilientmicrogrids cited in Sanders, R. and L. Millford. 2014. Clean energy for resilient communities: Expanding solar generation in Baltimore's low---income neighborhoods. Available at: http://www.abell.org/sites/default/files/reports/env-cleanenergy214.pdf.

State-level support for battery backup photovoltaic systems

A number of states have provided support for more resilient community-based renewable energy systems.

In Massachusetts, the Governor supported solar power with backup batteries by providing $50 million to help communities prepare for and protect themselves from the increasing number of destructive storms and rising sea levels associated with climate change. A total of $40 million was dedicated to the installation of backup systems in cities using clean energy technologies, including batteries that store energy from solar panels.

New York State supported a $40 million competition to develop at least 10 community-based electric distribution systems.

Florida's SunSmart E-Shelter program has installed 100 photovoltaic systems with battery storage on emergency shelter schools throughout the state, increasing reliability and reducing the exposure to health and environmental impacts of using diesel generators. In addition, 250 teachers have received professional development in the development, operation and use of photovoltaic systems.

From: Sanders, R. and L. Millford. 2014. Clean energy for resilient communities: Expanding solar generation in Baltimore's low-income neighborhoods. Available at: http://www.abell.org/sites/default/files/reports/env-cleanenergy214.pdf.

Adopt an equitable demand response program (A.1-5)

Effective demand-response programs can provide significant air quality benefits for environmental justice communities by reducing or avoiding the use of peaking generation units, those facilities operated solely to fulfill peak energy demand.[61] Disadvantaged communities are often located near peak generation facilities that may be inefficient, as was found in New York. In some cases, these units have no emission controls and stacks can be as short as 30 feet from ground level. The New York Public Service Commission proposed addressing this issue, noting that demand management could be used to replace some of the largest emitting peaking facilities. The New York Public Service Commission also recommended an analysis to determine if peak generation facilities within a half-mile of disadvantaged communities could be replaced with clean energy sources.[62] While many utilities in Maryland include peak demand reduction as part of EmPOWER (A.1-4), the state could assist with assessment and coordination of these programs as done in New York to better protect disadvantaged communities.

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[61] New York Public Service Commission. 2008. Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, Case 07-M-0548, Procedural Ruling Concerning EEPS Design Issues 5–6. Available at http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={FF69344F-1747-4559-8AAB-BE86D2AB994B}. Peaking generating units are generally "dirtier" than base-load generators; thus, avoiding deployment of these resources would provide disproportionate air-quality benefits for environmental-justice communities. See D. Ehrlich. 2001. Powering the Permit Process: A Mixed Review of Article X. ALB. L. Envtl. Outlook, 19.

[62] Van Nostrand, J. 2012. Energy and environmental justice: How can states integrate environmental justice into energy-related proceedings. Catholic University Law Review. 61(3)2. Available at: http://scholarship.law.edu/lawreview/vol61/iss3/2.

Transportation and Land Use (E.1-E.3, F.1-2, G, H.1-2, N.1, N.3, P.1, P.2)

In many cities, historic streetcar lines and other forms of public transit were dismantled to allow for the expansion of highways and roads for private vehicles.[63] Now that cars are the dominant mode of transportation, decreased access to public transit has disproportionately impacted disadvantaged communities. While cars and light trucks contribute substantially to carbon emissions, as noted in the 2013 GGRA Plan, many fuel efficiency standards – such as the Maryland Clean Cars Program, Corporate Average Fuel Economy (CAFE) standards and other national fuel emission and efficiency standards – are regulated at the federal level. Thus, there are limited opportunities to enhance manufacturer standards for new vehicles at the state level. However, there are substantial opportunities for retrofitting existing diesel systems; diesel vehicles last for decades and replacement from new vehicle programs will occur over an extended period.

Integrated equity planning to address environmental justice

EPA Region 4's Superfund Redevelopment Initiative has adopted an integrated planning approach to support communities facing environmental justice challenges. Rather than focusing on a single issue driven by media specific agency programs, such as contaminated sites, the integrated planning process starts by identifying the community's broader set of neighborhood goals and needs. Based on these goals, EPA has sponsored a process to connect community members with a range of resource partners to identify a set of strategies to address each goal. The goals and strategies are then summarized in an action plan ideally outlining phasing and roles for a range of partners to assist with implementation. This community-based, integrated planning approach supports communities in prioritizing what is needed most for the revitalization of their neighborhoods and leverages agency resources across programs to achieve a more comprehensive outcome. For an example of this integrated planning process, see the Northern Birmingham Community Coalition Action Plan.

http://www.skeo.com/projects/northern_birmingham_revitalization_action_plan

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[63] Chin, D. 2014. How race matters beyond Donald Sterling. http://www.centerforsocialinclusion.org/how-race-matters-beyond-donald-sterling.

Promote reduction in black carbon produced by all mobile sources (E.1-3, F.1-2)

Many environmental justice communities are part of neighborhoods that include or are adjacent to freight transport facilities or interstate trucking routes. People living in these communities are especially vulnerable to the health effects posed by diesel emissions. In the United States, an estimated 13 million people, including 3.5 million children, live near marine ports and rail yards.[64] While federal standards are in place for heavy-duty vehicles that will significantly reduce emissions and public health impacts of exposure, diesel engines can operate for decades. This leaves millions of older, dirtier engines in operation throughout the United States. Both public and private investment in clean diesel technologies, including truck replacements and retrofits, are needed to improve air quality and protect public health.

Net Zero ports and freight could move the needle on equity

It is not uncommon for low-income and communities of color to be intermixed with commercial and industrial businesses; this is largely a remnant of historical patterns of residential segregation. A comprehensive transition to renewable energy use and adoption of net zero policies by port and freight systems could drastically improve the health of the communities where they are located. Given these facilities typically have expansive open space which could be used for installation of solar, this should be a high priority. The 2013 GGRA Plan recommends the following actions that could move the state toward further support for improved quality of life in environmental justice communities. However, it is unclear what progress has been made towards these goals.

Port Strategies

- Green Port Strategy to address greenhouse gas emissions through the use of cleaner low sulfur diesel and reduced truck emissions.
- Purchasing additional alternative vehicles and retrofitted cranes to reduce pollutants in diesel exhaust.
- Participation in the Mid-Atlantic Regional Air Management Association Dray Truck Replacement Program.
- Electrification of power for docked ships and for ground equipment, to reduce idling and emissions and allow for the use of renewable energy.

Freight Strategies

- Installation of auxiliary power units on diesel trains to reduce the need for long idling.
- Plans to improve efficiencies and capacity to reduce greenhouse gases and other pollutants.
- Shifting diesel truck cargo transport over to train freight transport.

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[64] Bailey, D., T. Plenys, G. M. Solomon, T. R. Campbell, G. Ruderman Feuer, J. Masters and B. Tonkonogy. 2004. Harboring Pollution: The Dirty Truth about U.S. Ports. Natural Resources Defense Council. Available at: http://www.nrdc.org/air/diesel-exhaust/community-resources.asp.

In addition to carbon and other greenhouse gases, the heavy-duty trucks, cargo handling and similar equipment used to move freight are a source of diesel exhaust, which contains a broad range of toxic chemicals, including particulate matter referred to as black carbon. Recent research has also discovered that hydrocarbons emitted from diesel vehicles, due to unburned fuel, contribute to as much at 50 percent of ozone in urban areas and occur at up to 70 times greater than expected levels in regulatory inventories and manufacturer guidelines.[65] Exposure to fine particulate matter, including black carbon and other air toxics present in diesel exhaust, is harmful to human health, ecosystems and visibility. Health effects include respiratory and cardiovascular problems such as asthma, decreased lung function and low birth weight, as well as premature death.[66] Black carbon also contributes substantially to climate change by directly absorbing light, reducing the reflectivity of snow and ice through deposition and interacting with clouds.[67] Diesel emissions can also contribute to higher ozone levels, decreasing air quality and exacerbating health impacts from poor air quality as temperatures warm.

The 2013 GGRA Plan does not take a broad approach to reducing the negative impacts of black carbon from diesel emissions. Areas where the 2013 GGRA Plan does address diesel are discussed below, along with opportunities to address black carbon in the 2018 GGRA Plan update. An overarching recommendation is to establish a broad policy to include black carbon (particulates) in the calculation of the state's emissions and develop a comprehensive program to reduce black carbon and particulate emissions. The state could adopt a lead-by-example approach to retire any remaining diesel legacy fleets and require clean diesel technology or low emissions engines be used during any state-funded project. A focus could be on the support for the upgrade and retrofit of the oldest diesel vehicles and systems located next to residential areas in vulnerable communities. The state could also collaborate with U.S. EPA on the development and use of black carbon monitoring tools through the EPA's Smartway program.

Implement anti-idling policies and technologies more broadly (E.2)

In addition to comprehensive policies to address black carbon, transportation technologies could have a substantial impact on quality of life for people living in or near communities next to freight transportation corridors and facilities. Specifically, Section E.2 of the 2013 GGRA Plan addresses some of these through on-road, airport, rail and port technologies.

Anti-idling policies and enforcement of these policies have a substantial role in improving quality of life in environmental justice communities. Such policies would reduce emissions, odors and noise. These technology improvements would need to be combined with enforcement of anti-idling policies to be effective. The 2013 GGRA Plan references Washington, D.C.'s model, which does not allow gasoline or diesel idling beyond three minutes as an example. The GGRA Plan goes on to state that "Enforcement of this law is essential to achieving GHG [greenhouse gas] benefits."

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[65] Dunmore, R.E., J.R. Hopkins, R.T. Lidster, J.D. Lee, M.J. Evans, A.R. Rickard, A.C. Lewis and J.F. Hamilton. 2015. Diesel-related hydrocarbons can dominate gas phase reactive carbon in megacities. Atmos. Chem. Phys. 15: 9983-9996.
[66] U.S. EPA. 2014. Particulate matter: Health. Available at: http://www.epa.gov/airquality/particulatematter/health.htm.
[67] U.S. Environmental Protection Agency, Department of the Interior, Environment and Related Agencies Appropriations Act 2010. 2012. Report to Congress on Black Carbon. EPA 450-R-12-001 Available at: http://www.epa.gov/blackcarbon/2012report/fullreport.pdf.

The 2013 GGRA Plan recommends the following strategies to address anti-idling across all modes of transportation. These strategies could form the basis of a comprehensive anti-idling policy across all state and local government agencies:

- Provide electric hookups for truck stops to allow truckers to turn off their engines rather than idling them.

- Synchronize traffic signals to reduce idling at lights, especially in urban areas, to reduce local pollution.

- Provide electric hookups for docked ships and ground equipment to reduce idling and emissions and allow for the use of renewable energy.

- Install auxiliary power units (APUs) on diesel trains to reduce the need for long idling and improve efficiencies and capacity to reduce greenhouse gases and other pollutants.

- Require APUs for all trains and all new trucks in Maryland.

An integrated approach to reducing freight emissions

EPA's Smartway program is a public-private partnership with the freight industry to improve energy efficiency, reduce greenhouse gas and air pollutant emissions and improve energy security. SmartWay helps companies improve efficiency by measuring, benchmarking and streamlining freight supply chain operations. SmartWay partners have saved 6 billion gallons of fuel, lowered fuel costs by $20.6 billion and reduced carbon emissions by over 60 million metric tons since 2004. SmartWay is now developing its carbon assessment and monitoring tools to cover all modes of freight transport, including truck, train, barge, air and marine. U.S. EPA – in collaboration with other experts in the scientific community – will refine its methodologies and tools to incorporate black carbon, so that SmartWay partners can track and monitor their progress in reductions.

http://www3.epa.gov/smartway.

Provide opportunities for diverse, affordable and accessible housing during smart growth planning (P.1-2)

The growing investment in revitalizing urban centers, providing walkable and transit-friendly communities and redeveloping open space has presented both an economic boon and a substantial challenge for disadvantaged communities. As these developments occur, residents can be displaced as the cost of living increases in once-distressed communities and they become less affordable for longtime residents. An increase in regional funding and integrated planning practices in public transit can help ensure that residents who rely on transit can better access jobs, schools, healthcare, healthy food and retail; and can further help build regional systems that no longer rely on car ownership as the sole means of transportation.

Other proactive strategies include rental subsidies, home improvement loans and inclusionary zoning laws. In Macon, Georgia, a neighborhood association partnered with the local university to designate a

pool of funds to cover property tax increases for low-income residents. When a resident decides to sell, that money is repaid to the neighborhood association, keeping housing affordable. St. Louis, Missouri, created a participatory budgeting process, through which the mayor and city staff visited non-voters to collect ideas on how best to invest the municipal budget.[68]

The Opportunity Collaborative, a consortium of local governments, state agencies, universities and nonprofit organizations, working through the Baltimore Metropolitan Council, used a Sustainable Communities planning grant from the U.S. Department of Housing and Urban Development (HUD) to develop recommendations for fair and equitable housing in the Baltimore metro region. The study uncovered a deficit of 50,000 rental homes in the region for families earning less than 30 percent of the median family income.[69] Specific recommendations from the Opportunity Collaborative that could be applied to smart growth planning include:

A model demolition policy to protect communities

Baltimore City piloted and adopted a protocol to require safe demolition practices for older homes, buildings and structures, protecting nearby residents from exposure to lead dust during demolition activities. The economic impact of this policy is negligible; the pilot East Baltimore Development Initiative project demonstrated that spraying structures with water from above during demolition eliminates virtually all ambient lead dust. The State could adopt this policy into the MBPS and Rehabilitation Codes to reduce environmental and health impacts from demolition.

- Implementing inclusionary zoning policies, such as Montgomery County's 40-year-old Moderately Priced Dwelling Unit (MPDU) program to provide density bonuses for inclusion of income-restricted, below market units. The State could provide incentives by implementing policies to include affordable and accessible housing in transit-oriented development projects.

- Supporting the beneficial re-use of vacant and surplus property by utilizing and supporting community land trusts to purchase and retain affordable housing, which could include the purchase of surplus property and vacant homes at discounted prices. State and local governments could also require that these surplus and vacant lots include a specified percentage of affordable housing when redeveloped.

- Building community cohesion and confidence by maintaining and improving community assets such as schools and recreational facilities, providing resources to revitalize existing affordable housing and celebrating existing diverse neighborhoods.

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[68] Cox, A. 2014. Local leaders share strategies for revitalizing underserved neighborhood. Available at http://www.smartgrowthamerica.org/2014/07/22/local-leaders-on-the-challenges-of-revitalizing-underserved-neighborhoods.

[69] The Opportunity Collaborative. 2014. Strong communities, strong region: The Baltimore regional housing plan and fair housing equity assessment. Available at: http://www.opportunitycollaborative.org/housing-plan/

- Connect housing efforts to transportation and workforce development by ensuring that transit planning connects job centers and future employment districts and that programs such as HUD's Family Self Sufficiency (FSS) program are marketed to help residents remain in their homes.

> ## Equitable development toolkits
>
> EPA's Office of Sustainable Communities and PolicyLink both offer toolkits to prevent displacement. EPA's Building Blocks program provides guidance and technical assistance on a range of smart growth topics and recently unveiled the Equitable Development Toolkit. The Equitable Development Toolkit provides tools to evaluate whether a neighborhood is at risk of losing current residents and business due to displacement, along with policies that can help reduce, mitigate or prevent displacement. The PolicyLink Equitable Development Toolkit offers 27 tools to reverse patterns of racial segregation and disinvestment, prevent displacement and promote equitable revitalization in housing, jobs, health, land use and the environment. For more information see: http://policylink.org/equity-tools/equitable-development-toolkit/about-toolkit

Buildings (K)

Housing and office buildings are an important determinant of health. Poor housing and building conditions are associated with a wide range of health conditions, including respiratory infections, asthma, lead poisoning, mold induced allergic reactions and poisoning, injuries and mental health. The section of the 2013 GGRA Plan dedicated to buildings does not include an extensive list of programs. Largely, the state depends on the adoption of International Code Council for building policies and updates these standards in the Maryland Building Performance Standards (MBPS) every three years. However, local governments may amend the MBPS to meet specific conditions and needs of their jurisdiction, except for the Maryland Accessibility Code, which provides benefits to the disabled and elderly. The International Green Construction Code is also voluntary for local governments. Ultimately, the potential for revisions to the MBPS at the local level leaves room for inconsistencies in the renovation and construction of new buildings.

As the only building program to address climate change in the 2013 GGRA Plan, the MBPS does not address the needs of environmental justice communities, further widening the gap between the haves and have nots. Low-income people are less likely to own homes and buy new homes. Renters are likely to live in homes with very few updates, as demonstrated in the Baltimore Healthy Homes Initiative project, and it is likely in many cases that updates do not go through the permit process. Potential strategies to address housing affordability and quality gaps are included below.

Evaluate compliance with and opportunities to improve Maryland's building codes

Because the state of Maryland largely defers to local governments' selection of MBPS components that meet local planning needs, there are challenges for state-led enforcement of the standards. The series of International Building Codes adopted by the state have boosted energy efficiency in newer buildings, but present challenges during the reuse of existing buildings. For instance, the most recent update to the International Energy Conservation Code conflicts with federal historic preservation standards, making it difficult to add exterior envelope insulation and replace inefficient windows. However, the Maryland Building Rehabilitation Code put Maryland in the forefront of states that have modified their building codes to help save older buildings.

The state could benefit from formation of a Reuse Advisory Council, consisting of local government representatives from key counties experiencing high vacancy rates and those with experience reducing vacant buildings. The impact of vacant buildings is a concern in many Maryland counties. Those with higher than state average vacancies span across the state and include Baltimore City and the counties of Worcester, Somerset, Dorchester, Kent, Allegany, Garrett, Talbot, Caroline, Wicomico and Washington.[70]

First steps of the Reuse Advisory Council could include:

- Engaging the National Building Reuse Partnership and the Center for Community Progress to review best practices in reusing vacant buildings nationally.

- Reviewing the MBPS and Rehabilitation Code to identify barriers to energy efficiency, renewable energy systems and weatherization. The review could include strategies to account for embedded energy and demolition waste to incentivize reuse of existing structures.

- Exploring outcome-based performance metrics to assess compliance with energy codes, which assess actual energy use over a year long period. Many existing buildings have passive design features such as daylighting and natural ventilation that contribute to energy savings, but are not accounted for in energy efficiency calculations. The city of Seattle collaborated with Preservation Green Lab to develop and implement an outcome-based option for energy code compliance.[71]

Improve existing housing stock quality to support healthy, affordable and energy-efficient homes

Broad implementation of energy efficiency upgrades, weatherization and installation of renewable energy in Maryland homes will depend on the maintenance and improvement of existing, aging housing stock. Existing homes have embedded energy, meaning that the energy used to extract and produce the materials has already been accounted for. This is not the case for new buildings. For instance, it takes

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[70] Maryland State Data Center. Census 2010. Available at: http://census.maryland.gov/census2010/datahousing.shtml
[71] The Seattle code and other case studies are available at: http://www.preservationnation.org/information-center/sustainable-communities/green-lab/outcome-based-energy-codes.html

between 10 and 80 years for a new building to zero out the carbon footprint required to produce the material needed to demolish an old building and construct a new one.[72]

In Maryland, many homes are more than 30 years old and nearly 60 percent of homes were built prior to 1980 (12.8 percent are pre-1940).[73] In many cases, the condition of these homes prevents energy efficiency upgrades and installation of renewable energy systems. Aging roofs, for instance, often are too deteriorated to support solar energy installations. These older homes are often rented or owned by people with fewer resources to renovate or upgrade them. For instance, the Census Bureau's 2013 American Community Survey data shows that those with a higher family income live in newer residential units: The average household income for residents of homes built after 2010 is $110,099 nationally.

However, older housing stock is also more likely to impact the health of residents via exposure to mold, unvented heaters and toxic chemicals. For instance Baltimore ranked second behind Atlanta with 42 percent of homes having health and safety hazards in a national audit of 10 cities by the Green and Healthy Homes Initiative.[74] Older housing is also less likely to be accessible to those with disabilities and seniors. These concerns are likely to be exacerbated as the divide between more energy-efficient newer housing becomes available and older housing stock is not updated. Additionally, climate change could bring warmer, wetter days, negatively impacting indoor air quality by increasing mold growth and making pollen more prevalent. When homes become vacant, the health hazards multiply for those living in the vicinity of the vacant homes. Unheated rowhomes decrease energy efficiency and potentially decrease the indoor air quality of neighboring homes. Nearly all vacant homes serve as safety and health hazards. The recommendations below could improve housing quality and improve access to energy efficiency and renewable energy for those most vulnerable to climate change:

- **Take stock of homes and rental units that are ineligible for energy efficiency and renewable energy programs due to housing quality.** Local governments could support this effort by tracking building permit data to determine which homes have not undergone rehabilitation activity in the last 10 years. Such an assessment could be followed up with specific state and local policies to address this gap using funds identified in the Energy section of this report. Additionally, these homes could be prioritized for funding from a number of state and local programs and could be a priority of the CEIP process under the EPA's Clean Power Plan.

- **Enforce and incentivize building code updates in distressed communities.** Stronger energy codes may have a detrimental effect on older buildings, particularly in distressed communities where the marginal returns on building improvements don't yield equity for the property owner.

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[72] Preservation Green Lab of the National Trust for Historic Preservation. 2012. The Greenest Building: Quantifying the environmental value of building reuse. Available at: http://www.preservationnation.org/information-center/sustainable-communities/green-lab/lca/The_Greenest_Building_lowres.pdf
[73] National Center for Healthy Housing. 2015. Maryland healthy housing fact sheet. Available at: http://www.nchh.org/Portals/0/Contents/Healthy_Housing_Fact_Sheet--Maryland_2015_7.15.15_final.pdf
[74] National Coalition to End Childhood Lead Poisoning. 2010. Identified Barriers and Opportunities to Make Housing Green and Healthy Through Weatherization. Available at: http://www.greenandhealthyhomes.org/sites/default/files/GHHI-Weatherization-Health-and-Safety-Report1.pdf

Stronger codes could actually render older buildings functionally obsolete, which creates problems for the owner, the tenant and eventually the neighborhood. However, enforcement of existing housing codes could provide low-income households with improved access to the cost savings from clean energy.

- **Develop policies to prevent building vacancy and accelerate reuse or repurposing of existing vacant buildings.** Housing vacancy is a statewide issue in Maryland, with more than 222,000 vacant homes across the state. According to the 2010 Census, housing vacancy rates in Maryland range from 3.8 percent in Howard County to 21 percent in Worcester County. Baltimore City and Somerset County follow with the next highest vacancy rates.[75] Strategies to improve existing housing stock quality and create jobs in the community, as described above, could help keep people in their homes. Additional strategies include estate planning or donation protocols so that abandoned properties can be transferred to a responsible party.

Engage with and scale up recommendations from the Partnership for Building Reuse

The Partnership for Building Reuse – a joint effort between the National Trust for Historic Preservation and the Urban Land Institute – engages real estate developers, historic preservation advocates, government agency staff, land use professionals and community leaders. The Partnership engaged the Baltimore community to develop recommendations for increasing building reuse and revitalization. A study resulting from this engagement found that older buildings in Baltimore's older neighborhoods provide a strong economic base; produce twice as many small business jobs as newer, larger buildings; attract more 18-34 year olds and are home to the city's best restaurants and bars. Recommendations from this study could be applied to older neighborhoods with vacant buildings statewide.

Key recommendations include:[76]

- Developing region-wide master plans for reuse of vacant buildings and promoting neighborhood commercial districts and mixed-use industrial zones to repurpose industrial structures.

- Developing a model code database and "Code Innovation Zones" to share creative energy code solutions for existing and vacant buildings.

- Increasing funding for the Maryland Sustainable Communities Tax Credit, with a focus on marketing and engaging low-income communities and leveraging Community Development Corporations to amplify resources.

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[75] Maryland State Data Center. Census 2010. Available at: http://census.maryland.gov/census2010/datahousing.shtml
[76] The Partnership for Building Reuse. 2014. Building on Baltimore's history. Available at: http://www.preservationnation.org/information-center/sustainable-communities/green-lab/partnership-building-reuse/Building-on-Baltimores-History-11-3-14-Final-No-Pics.pdf

- Exploring the use of federal demolition mitigation funding to support the creative reuse of older and historic properties.

- Developing tax incentives for neighborhoods dominated by rental homes.

Baltimore's innovative plans will put old, vacant buildings to good use

A range of interventions are being used in Baltimore to incentivize the reuse of vacant buildings, including streamlined disposition for city-owned properties, stepped up code enforcement, increased policing and rehabilitation grants. The city also implemented a 15-year tax credit for building reuse.

Vacants to Value is Baltimore Mayor Stephanie Rawlings-Blake's initiative to reuse and market the city's vacant buildings. The initiative provides rebates for buyers, encourages Baltimore city employees to live in the city, supports outreach through the "Live Baltimore" campaign and provides down payment assistance to first-time home buyers who have a total family income at or below 80% of the area's median income. The initiative also seeks to improve code enforcement in transitioning areas and includes large-scale redevelopment, demolition and land banking in highly distressed areas.

Come Home Baltimore is a privately-funded organization that rebuilds Baltimore neighborhoods, specifically marketing vacant home as customizable assets. The goal is to create energy-efficient homes that are child and elderly friendly, that reduce displacement of existing residents and improve local economies. The organization supports the community by engaging churches, veterans groups and community leaders.

Agriculture and Forestry (I.1-7, J.1-2, N.2)

The agricultural industry in Maryland, one of the largest industries in the state, offers an opportunity to reduce emissions and promote environmental justice. However, the 2013 GGRA Plan provides little direct support to disadvantaged communities through agricultural initiatives. Important existing programs are highlighted below, as are potential improvements to these programs that could promote equity.

Potential environmental justice issues related to agriculture in Maryland include:

- Loss of family farms to large-scale agriculture and suburban development, who now control 83 percent of the food system[77] and produce 20 percent of emissions nationally.[78]

- Impacts of agricultural practices on neighbors and downstream communities, including methane production and runoff from inadequate nutrient management or carbon sequestration practices.

- Inadequate connection between rural farmers and urban customers, leading to greater availability of unhealthy foods and the creation of urban "food deserts".

- Elevated food prices connected to climate change, which may be particularly burdensome for low-income residents with limited resources.[79]

- Disproportionate allocation of tree planting and other ecosystem restoration resources, which excludes underserved communities from the associated health and energy saving benefits.

Accelerate strategies to improve access to forests and natural resources. (I.1, I.2, I.6)

Expanding urban forest canopy and protecting natural systems create opportunities to address disparities for low-income populations and communities of color related to tree canopy cover, access to nature, air quality and asthma rates. While rural forests cover far more area than urban forests, urban forests can have a greater impact per acre of tree canopy than non-urban forests due to faster growth rates, increased proportions of large trees and secondary effects of reduced building energy use.[80] Lower surface temperatures of sidewalks and roads resulting from the shade of tree canopies reduce the need for air conditioning in buildings, thereby reducing the need for the production and transmission of electricity. Reduced energy production, in turn, reduces greenhouse gas emissions from power plants. Shade and lower surface temperatures reduce roadway infrastructure maintenance needs, which, in turn, reduces the need for conversion of raw materials to asphalt and concrete, which reduces the production of greenhouse gas emissions from manufacturing plants, transportation and heavy equipment. Planting trees in urban areas thus contributes to both carbon dioxide reductions and climate preparedness through the benefits described above.

The 2013 GGRA Plan aims to plant 12.5 million trees by 2020 through the Marylanders Plant Trees program. The Urban Tree Canopy Initiative has reached a number of disadvantaged communities, including areas in Baltimore, Cumberland, Edmonston, Greenbelt and Hyattsville. The Department of Natural Resources (DNR) is working to encourage policies requiring tree canopies around schools (the

[77] Center for Social Inclusion. Food Equity: Building a Fair Food System For everyone. http://www.centerforsocialinclusion.org/ideas/food-systems.
[78] Humane Society International. 2011. The impact of animal agriculture on global warming and climate change. Available at: http://www.humanesociety.org/assets/pdfs/farm/hsus-the-impact-of-animal-agriculture-on-global-warming-and-climate-change.pdf.
[79] Luber, G., Knowlton,K., Balbus,J.,Frumkin,H.,Hayden,M.,Hess, J., McGeehin,M.,Sheats,N.,Backer,L.,Beard,C.B.,Ebi,K.L.,Maibach,E,.Ostfeld,R.S., Wiedinmyer,C.,Zielinski-Gutiérrez,E.,and Ziska,L. 2014. Ch. 9: Human Health. In Melillo, J.M.,Richmond,T.C. and Yohe,G.W.(Eds.), Climate Change Impacts in the United States: The Third National Climate Assessment,(pp. 220-256). U.S. Global Change Research Program.
[80] Locke, D.H. and J. Morgan Grove. 2014. Doing the hard work where it's easiest? Examining the relationships between urban greening programs and social and ecological characteristics. Applied Spatial Analysis and Policy. Pp. 1-20.

Green Schools Program), nursing homes, shelters and public buildings located near at-risk populations. Moving forward, the program could continue to reach out to disadvantaged communities and focus the planting of 12.5 million trees in areas where they could have the greatest impact for these communities.

Ensure ecosystem markets benefit all people and do not contribute to pollution hotspots (J.1, J.2)

The 2013 GGRA Plan highlights two key markets to support ecosystem services; the idea that ecosystems such as wetlands and trees provide quantifiable monetary resources. These include general markets to reduce greenhouse gas emissions such as carbon storage through wetland restoration and tree planting and specific markets for nutrient trading, which are already operating. There are at least two key challenges to creating equitable programs to promote ecosystem markets. The first challenge is access to land ownership. Typically, only large areas of land are eligible or profitable for ecosystem markets. This obviously excludes many low-income families who do not own homes or large parcels of land. This also excludes many small family farmers and small forest landowners. The second challenge is that low-income households have less access to reap the benefits of ecosystem markets. They also are more likely to incur the negative outcomes of ecosystem markets, which include pollution hotspots or shifting development that creates additional pollution. This disparity was highlighted in a 2014 study of Maryland's watershed restoration programs, which found that "predominantly non-white [communities] of the state received few to no wetlands projects" through Maryland's Non-tidal Wetlands Mitigation program and the state's Clean Water Act Section 319 program.[81]

Several strategies could address these disparities. The state could:

- Screen ecosystem services and ecosystem restoration programs for disparities, starting from the analysis cited above. If these disparities are commonplace, "no harm" policies could be put in place so that these programs do not place environmental justice communities at further risk from pollution.

- Support voluntary efforts to develop co-ops so that some low-income communities or small businesses could participate more fully in ecosystem markets. For instance, small family farmers and small forest landowners could form Limited Liability Companies (LLC) to take advantage of carbon sequestration markets. Similarly, the state could explore the viability of similar co-ops and land banks in urban areas to support neighborhood forests and parks that could receive economic benefits from these ecosystems. These efforts would provide economic benefits, support community cohesiveness and allow smaller landowners to retain their land.

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[81] Dernoga, M.A. et al. 2015. Environmental justice disparities in Maryland's watershed restoration programs Envtl. Science & policy. 45: 67-78.

Enhance connectivity between rural and urban environmental justice communities (N.2)

There is a strong connection between healthy eating and a low-carbon diet. Eating more fresh fruits, vegetables and less processed foods helps support healthy bodies while at the same time reducing carbon emissions associated with food production. However, disadvantaged communities may not have equitable access to healthy and affordable food. Consequently, access to lower-carbon food choices, especially fruits, vegetables and less processed or packaged foods, may be constrained by price and accessibility.

One program that begins to address this in the 2013 GGRA Plan is the MDA's "Buy Local" campaign. The campaign promotes local farms as preferred sources of food for Marylanders by helping agricultural producers market their products directly to supermarket, food service, institutional and other wholesale buyers as well as consumers. By 2020, MDA aims to raise the number of farmers' markets by 20 percent, establish a state farmers' market association and increase direct sales (buyer/grower) by 20 percent.

What appears to be missing from the program is a focus on purposely connecting communities designated as food deserts to small family farmers and an inclusion of small-scale urban farmers. Making this connection would require few institutional resources, while offering a large return on investment. At a community scale, MDA could increase outreach to environmental justice communities to enhance availability of healthy, local food at schools and other community gathering places.

To make this work, the state could:

- Provide resources to support the acceptance of Supplemental Nutrition Assistance Program (SNAP) benefits at all local farmers markets.

- Create and support regional food hubs that connect local producers with retail outlets and local institutional buyers, such as school districts, universities and hospitals.[82] This effort could support ecosystem restoration by connecting farmers who are enrolled in environmental programs and those in drinking water supply watersheds first.

- Increase the availability of Community Supported Agriculture opportunities in communities designated as food deserts and low-income and environmental justice communities. This could establish relationships between families in need and local farmers and provide access to a variety of fresh, healthy food sources at affordable prices.

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[82] U.S. EPA. 2015. Smart Growth Self-Assessment for Rural Communities. Available at: http://www2.epa.gov/smartgrowth/smart-growth-self-assessment-rural-communities.

Waste (L)

Develop and implement a sustainable materials management policy

Reducing solid waste can substantially improve quality of life in disadvantaged communities. Solid waste facilities are often co-located in disadvantaged and environmental justice communities, potentially contributing to excessive noise, odor and diesel particulate emissions from waste hauling and sanitation trucks. The primary waste program in the 2013 GGRA Plan references the state's Zero Waste Action Plan. A key benefit to disadvantaged communities in the action plan is the mandate that all apartment and condominium buildings with 10 or more units provide access to recycling. This helps to overcome a key challenge nationally of lower-than-average access to recycling in disadvantaged communities, particularly in linguistically isolated communities. The State could improve upon the program by including composting as a required action item and by ensuring outreach to low-income households and those with limited English proficiency.

For a more comprehensive approach, the state could implement sustainable materials management practices, which encourage industry sectors to identify waste outputs from one sector as potential inputs for another sector, thereby removing substances from the waste stream and reducing the environmental impacts of landfilling or burning materials that may break down into hazardous or toxic substances. The U.S. EPA recently released a new Sustainable Materials Management (SMM) Program Strategic Plan that incorporates the best thinking across a broad cross-section of external stakeholders and agency-wide staff and discusses how to incorporate these principles from the community level to the global economy. The EPA's SMM Program addresses life-cycle based decision-making and systems-based approaches that focus on three areas – the built environment, sustainable food management and sustainable packaging. This program will build on the EPA's ongoing work around sustainable electronics management, materials measurement and life cycle assessment.

Evaluate cumulative impacts from waste-to-energy projects

The second component of the 2013 GGRA Plan for waste reduction includes a focus on waste-to-energy facilities. In 2010, nearly 40 percent of solid waste was incinerated in Maryland, approximately 17 percent of the total renewable energy generated in Maryland in 2007. Maryland has recently reclassified waste-to-energy incinerators as Tier 1 renewables under the state's Renewable Portfolio Standard (RPS). Maryland has two tiers: Tier 2 credits make up a small portion of the RPS and are no longer included in the RPS after 2018, while Tier 1 credits will be available for long term use in greenhouse gas reductions. The transfer of waste-to-energy facilities to Tier 1 credits indicates they will be an allowable source of renewable energy for the foreseeable future. According to the 2013 GGRA Plan, waste-to-energy can reduce greenhouse gas emissions and capture metals that can be reused and generally produce fewer emissions than flaring from landfills.

However, waste-to-energy incinerator projects have become controversial, with environmental justice advocates citing concerns about air quality impacts and truck traffic; a current case in point is underway in Brandywine, MD. Waste-to-energy as an emission reduction strategy also could act as a disincentive from developing more sustainable waste reduction strategies. It may work better in the short term with strict pollution standards and as a last-resort for waste disposal, but it does not offer a sustainable long-term solution.

Concerns associated with waste-to-energy incinerators include:

- Ash and emissions that contain toxins such as particulate matter, organic pollutants such as dioxins, phthalates and PCBs, heavy metals such as lead, cadmium and mercury and the potential health impacts from these chemicals. Many of these chemicals currently lack established National Ambient Air Quality Standards.

- Reports from existing waste-to-energy incinerators suggest these facilities emit air pollutants at higher levels per unit of energy than coal power plants, including lead emissions at rates 3-18 times that of coal plants and nitrous oxides 2-5 times higher.

- Recycling provides more benefits than incineration by producing less solid waste, air and water discharges[83] and supporting 10 times as many jobs.[84]

- The proximity of waste-to-energy incinerators to environmentally and socially burdened communities with particular concern about noise, truck traffic and air pollution.

To reduce the potential impacts of waste-to-energy incinerators on local communities, the state could take a multi-pronged approach by:

- Re-evaluating the decision to elevate waste-to-energy incinerators to Tier 1 RPS standards through engagement with communities where incinerators are present or are in the pipeline and through a cumulative impacts analysis.

- Investing first in recycling and source reduction programs, as well as the sustainable materials management approach suggested above.

- When other options do not exist, the state could consider life cycle impacts, cumulative pollutant impacts from a facility and from truck traffic, effective engagement strategies and community benefits agreements and a comparison of the facility to other alternatives, including landfills and recycling.

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[83] R. A. Denison. 1996. Environmental Life-Cycle Comparisons of Recycling, Landfilling and Incineration: A Review of Recent Studies, 21 Annu. Rev. of Energy and the Env't 191, 231–34.
[84] Institute for Local Self Reliance. 2002. Recycling Means Business. Available at: https://ilsr.org/recycling-means-business/

Climate Change Adaptation

Climate change will affect Maryland in a variety of ways. More obvious impacts include increased risk from extreme events such as drought, storms, flooding and forest fires; more heat-related stress; the spread of existing or new vector-borne disease; and increased erosion and inundation of low-lying areas along the state's shoreline and coast. Maryland is already experiencing many of these problems to some degree. Climate change raises the stakes by changing the frequency, intensity, extent and magnitude of these impacts. Actions that reduce a community's exposure to climate change can directly benefit health, particularly if those actions are focused on communities at highest risk. In addition, reducing a community's risk of natural hazards (e.g., flooding and extreme heat) and strengthening emergency responsiveness can reduce the number and severity of climate-related illnesses, injuries and death.

In general, many of the actions in the 2013 GGRA Plan to reduce carbon emissions could and likely should, be enhanced to improve preparedness. The 2013 GGRA Plan outlines key policies and studies underway to plan and prepare for the impacts of climate change. The strongest planning efforts in the Plan are focused around sea level rise, coastal storms and human health. In 2010 and 2011, the state coordinated efforts to establish key areas where each state agency could devote resources to adapt to climate change. These plans and summaries are available online.[85] The Climate Adaptation Workgroup could devote time to prioritize, track and benchmark these proposed actions from an equity perspective. General recommendations based on the programs outlined in the 2013 GGRA Plan are described below.

Agriculture: Support agricultural investments that protect disadvantaged communities and benefit small farmers

The agriculture section of the 2013 GGRA lacks substantial policy, programmatic or investment support to prepare for climate change impacts, even though agriculture is the largest commercial industry in Maryland and employs about 350,000 people, primarily in the north-central part of the state and the Eastern Shore. The 2013 GGRA Plan states, "Many of the stressors farms already face are likely to intensify or become less predictable: drought frequency, winter flooding, pests and disease and elevated ozone levels. These changes occur in the current context of the high economic uncertainty and small profit margins and are likely to result in increased costs to both farmers and consumers." In addition, farms on the Eastern Shore already struggle with land erosion from sea level rise, saltwater intrusion and coastal storms. Small farms and family farms are highly vulnerable to climate change and could suffer significant loss of land and crops in the absence of plans to address these impacts.

Maryland DNR's policy to support wetland migration could also protect small farmers. However, additional planning efforts and incentives will be necessary to support family farmers, new farmers and

[85] Maryland Department of Natural Resources. 2008. Comprehensive strategy for reducing Maryland's vulnerability to climate change: Reducing Maryland's Vulnerability to Climate Change Phase I. Available at: http://climatechange.maryland.gov/wp-content/uploads/sites/16/2014/12/ian_report_1971.pdf; Maryland Department of Natural Resources. 2011. Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change, Phase II: building societal, economic and ecological resilience. Available at: http://climatechange.maryland.gov/wp-content/uploads/sites/16/2014/12/ian_report_2991.pdf

organic farmers, all of whom have smaller than average profit margins. To address these gaps, MDA could increase investment in permanent easements in areas where marshes are expected to migrate, consistent with DNR's policy and provide support for crop adaptation policies that account for changing soil types and inundation rates. Additionally, connecting local food producers with residents of urban food deserts could boost community resiliency, as described in the mitigation section of this report.

Chesapeake Bay ecosystems and forests: Support land and water conservation activities that reduce hotspots and enhance social benefits

The 2013 GGRA Plan's efforts to address conservation generally protect the best available resources for ecosystems and species. Overall, this could promote environmental justice by maintaining resources for small-scale commercial fishing operations and subsistence fishing; maintaining and enhancing access to wild areas that improve mental health and reduce stress; and providing access to clean water and air for downstream communities. But in reality, many members of disadvantaged communities do not have the resources to travel by car to sites that would provide these benefits. Additionally, water and air quality are often poor in disadvantaged communities. Directing investments to pristine areas could leave underserved communities behind and create hotspots of pollution. As discussed in the ecosystem services section, ecosystem markets could be improved to benefit disadvantaged communities.

Water resources: Evaluate aquifer studies based on climate and social vulnerabilities

MDE has initiated studies and programs that could benefit environmental justice communities. The coastal plain and fractured rock studies could provide information on risk of aquifer contamination from sea level rise and pollutants as well as determine the impacts of overuse of source water during droughts. Information on aquifer vulnerability is of particular use in rural communities that depend on private water wells and may not have resources for well testing. The information benefits rural communities that rely on septic systems and may assume the costs of moving or replacing these systems due to sea level rise. These studies could also benefit disadvantaged communities by assessing whether sea level rise and flooding will carry pollutants from nearby facilities and contaminated sites into drinking water supplies and whether chemicals used in the hydraulic fracturing process will contaminate source water supplies.

Sea-level rise, coastal storms and flooding: Assess and update policies to protect communities from flooding

Building for the future

In 2012, former Governor O'Malley signed the Climate Change and CoastSmart Construction Executive Order, requiring new and rebuilt state structures to be elevated at least 2 feet above the 100-year base flood level. It also requires state agencies to develop additional guidelines for the siting and construction of new and rebuilt state structures, as well as other infrastructure improvements such as roads, bridges, sewer and water systems and other essential public utilities. This requirement is important; climate change may lead to more frequent or intense flooding and saltwater intrusion can be especially damaging

to underground cable and fiber optic lines. Similarly, infrastructure may be under-designed, leading to overflows from stormwater facilities, storm drains and sewers, sewage treatment plants and bridges. Already, nearly all sewage overflows into streams, creeks and rivers occur due to severe storms.

Further, the Climate Change and CoastSmart Construction Executive Order requires that the Critical Area Commission consider the adoption of new or revised provisions that address climate change and the risk of sea-level rise and other extreme weather-related impacts on state-owned land. This is an important step, as disadvantaged communities often do not have the resources or capacity to flood-proof homes. Having access to government buildings during flood events could benefit disadvantaged communities. However, there is a need to assess which state-owned buildings would be accessible to disadvantaged communities during floods.

MDE is also helping communities prepare for sea level rise and flooding by providing insurance companies with a template called the Maryland Model Floodplain Management Ordinance, which is designed to help residents and municipalities prepare for sea level rise and reduce flood premiums by implementing higher regulatory standards such as a 2-foot freeboard requirement. The Department of Housing and Community Development (DHCD) also conducted reviews and examined "… enhanced building codes for coastal regions of the state that promote disaster-resistant construction …" In other coastal states such as Florida, insurers have pulled out of vulnerable high-risk areas, nearly eliminating access to private insurance and doubling insurance rates. Maryland could assess the likelihood of this outcome and work with insurance companies to reduce this possibility.

The State could also continue to expand these policies to new construction and renovations, particularly in the development of affordable housing where the funding source may allow the state to do so.

Additional recommendations, adapted from a recent EPA report, are outlined below.[86]

- *Reduce flooding in downstream and adjacent communities* by preserving land in floodplains and implementing green infrastructure projects in disadvantaged communities. Upstream farmers could be incentivized to provide flood storage for downstream disadvantaged communities through pre-disaster planning. Disadvantaged communities could benefit from increased flood storage through greater access to bioswales, rain gardens and water retention ponds built into parks and open space to store floodwaters, protect against flooding and divert floodwaters from homes without basement-level flood water disposal systems. This could be addressed through watershed-scale green infrastructure planning.

- *Protect vulnerable people and buildings already at risk* from flooding by requiring compliance with existing standards, but require new or renovated structures to meet new standards. Many areas of the country were developed before implementation of the National Flood Insurance Program. As a result, many communities have large stocks of development that do not comply with current flood damage prevention requirements. This approach could benefit renters with landlords

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[86] U.S. EPA. 2014. Planning for flood recovery and long-term resilience in Vermont: Smart Growth Approaches for Disaster-Resilient Communities.

unwilling or unable to make substantial flood protection upgrades. These updates can be coupled with redevelopment incentives to increase property values and encourage compliance.

- *Help people connect with rivers, streams and creeks*. In some historic waterfront towns and villages, development faces away from the water. Except at bridge crossings, residents might rarely see, have access to, or consider their local river, stream or creek as a part of community life until a flood occurs. In cities, many streams are piped underground. A river, stream or creek can be a social and economic asset if residents can safely access the waterfront. Opportunities to connect with local rivers, streams and creeks can increase residents' awareness of nearby water bodies and motivate them to plan for future flooding and river, stream and creek protection.

- *Relocate structures to less vulnerable areas as a last resort*. As sea levels rise and flooding becomes more common, the state could work with communities to assess their interest in relocation. Relocating can impose a

Walkable watershed initiative

Guided by the principles of sustainability, social equity and community engagement, the Walkable Watershed initiative is unique in linking water quality, community health and smart growth. Using water as a starting point, the initiative implements pedestrian amenities that restore the health of watersheds and communities alike. This integrated approach helps local communities leverage financial and human resources, establish and strengthen partnerships among stakeholders and increase success via simultaneous action on multiple fronts. The result is a community-based concept plan that outlines a range of physical improvements to clean water while transforming a neighborhood through better creek access, enhanced sidewalks, street plantings, parks and other communal spaces. For examples of the Walkable Watershed approach in the Chesapeake Bay, see: http://www.walkablewatershed.com/

disproportionate burden on low-income communities. Additionally, relocating a community away from a place where people have lived for generations and their physical, cultural and social ties can be devastating. This option must be weighed very carefully. Making a concerted effort to engage low-income, people of color, immigrant and underserved community members in any discussion of relocation can help ensure their concerns are well understood and that they are informed about their risks. Resources to assist with these efforts could be provided through federal hazard mitigation funds and the U.S. Department of Transportation under the Uniform Federal Relocation Act.

Planning for and assessing vulnerability

DNR's CoastSmart Communities Initiative provides funding for coastal communities to plan for coastal hazards and sea level rise. The state is using a mapping tool called the Coastal Atlas to assess sea level rise and erosion vulnerability.[87] This tool could be combined with social vulnerability tools to target this planning assistance in communities most in need and to support local climate resilience strategies. Funding from this program was used to create Baltimore's Disaster Preparedness and Planning project.

The Maryland Port Authority (MPA) developed a policy titled "Incorporating Climate Change and Sea-level Rise Information into the Public Marine Terminal and Harbor Development Process." The MPA will account for sea level rise and storm surge inundation in its Strategic Plan, Marine Terminal Development Plans and Dredged Materials Program. Given that disadvantaged communities are more likely to live near port facilities, the MPA policy could protect adjacent communities from flooding. While implementing its policies, MPA could consider:

- Engaging community members in adjacent communities to understand flood risks and how they fit into adaptation policies.

- Assessing the potential environmental burdens placed on communities from flooding of port facilities and any facility relocations due to climate change.

- Supporting green infrastructure strategies at and adjacent to, port facilities to reduce neighborhood flooding.

Human health: Collaborate with agencies to improve use of health risk information

Climate change poses serious health risks to people in Maryland, including heat-related stress and cardiovascular mortality and morbidity, respiratory illness, altered infectious disease patterns (both vector-borne and water-borne diseases), impacts to water supply and quality and direct mental and emotional stress and harm from extreme storm events, flooding, loss of habitat and displacement. The DHMH received a grant from Centers for Disease Control and Prevention (CDC) to better understand the potential spread of injuries and disease during disasters and provide training in Health Impact Assessments using DHMH's Environmental Public Health Tracking tool. The DHMH is also developing key health-related indicators for use in adaptation and mitigation strategies. Given the existing resources, DHMH could partner with the University System of Maryland (particularly the School of Public Health's Maryland Institute for Applied Environmental Health's Community Engagement, Environmental Justice and Health [CEEJH] program) to develop an environmental justice and climate change screening tool. Partnership with academic institutions could provide funding flexibility and help address logistical challenges.

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[87] Maryland Department of Natural Resources. Coastal Atlas. Available at: http://dnr.maryland.gov/ccp/coastalatlas/ index.asp.

Heat waves may impact African Americans, low-income residents and perhaps Latinos[88,89,90] to a greater degree than they do other people. One study showed that African Americans in Los Angeles are twice as likely as others to die in a heat wave, due to limited access to vehicles and air conditioning and residing in neighborhoods that are concrete-dense and provide little shade.[91] The DHMH released the Maryland State Heat Emergency Plan in 2012, guiding state actions during an extreme heat event (defined as a day or set of days when "1) the heat index is forecasted to be approximately 105 degrees or higher; 2) the National Weather Service has issued a Heat Advisory or; 3) weather or environmental conditions are such that a high incidence of heat-related illnesses can reasonably be expected.") This tool is key in supporting the health of community members and workers during extreme heat. It would be useful to explore the success of this tool and to use the tool to map populations at greatest risk from extreme heat, such as elderly and medically sensitive residents. Hotspots could be targeted with tree-planting efforts and cooling centers and flagged for first response. New York City mapped vulnerable households without air conditioning, an effort that could be incorporated into the recommended mapping platform.

Emergency preparedness: Identify and implement pre- and post-disaster mitigation strategies in disadvantaged communities

As discussed in the Energy section of this report, disadvantaged communities are highly vulnerable to the impacts of natural disasters. During Tropical Storm Irene and Superstorm Sandy, city officials in New York City did not adequately consider disadvantaged people, leaving seniors and residents with disabilities stranded for days in high-rise apartments.[92] According to interviews with community members, lack of communication was another major issue during Superstorm Sandy. Cell phone towers and land-line phones were disconnected due to fallen trees and flooded underground telecommunication cables. Additionally, the availability of plain language or multilingual information was lacking and obtaining government assistance was especially burdensome for disadvantaged community members.[93]

The primary tool outlined in the 2013 GGRA Plan for addressing emergency preparedness is Maryland's 2011 State Hazard Mitigation Plan (SHMP). The 2011 SHMP included discussions about vulnerability to climate change, coastal hazards and sea-level-rise issues. Future iterations of the SHMP are expected to include risks associated with non-coastal impacts of climate change. In addition, the State Highway

[88] Uejio, C. K., Wilhelmi, O. V., Golden, J. S., Mills, D. M., Gulino, S. P., and Samenow, J. P. 2011. Intra-urban societal vulnerability to extreme heat: the role of heat exposure and the built environment, socioeconomics and neighborhood stability. Health & Place,17 (2), 498-507; Basu, R. 2009. High ambient temperature and mortality: a review of epidemiologic studies from 2001 to 2008. Environmental Health 8(1); O'Neill, M. S., Zanobetti, A. & Schwartz, J. 2003. Modifiers of the temperature and mortality association in seven US cities. American Journal of Epidemiology 157(12), 1074-1082; Curriero, F. C., Heiner, K. S., Samet, J. M., Zeger, S. L., Strug, L., & Patz, J. A. 2002. Temperature and mortality in 11 cities of the eastern United States. American Journal of Epidemiology, 155(1), 80-87.
[89] Uejio, C. K., Wilhelmi, O. V., Golden, J. S., Mills, D. M., Gulino, S. P.,and Samenow, J. P. 2011. Intra-urban societal vulnerability to extreme heat: the role of heat exposure and the built environment, socioeconomics and neighborhood stability. Health & Place,17(2), 498-507.
[90] Balbus, J. M. and Malina, C. 2009. Identifying vulnerable subpopulations for climate change health effects in the United States, Journal of Occupational and Environmental Medicine 51(1), 33-57.
[91] Fischer, D. 2009. Climate change hits poor hardest in U.S. Available at: http://www.scientificamerican.com/article.cfm?id=climate-change-hits-poor-hardest
[92] Peterson, M. 2015. Cities urged not to ignore marginalized communities in climate change plans. Available at http://thinkprogress.org/climate/2015/05/20/3660371/national-climate-adaptation-forum-equity.
[93] Sheats, N. (New Jersey Climate Adaptation Alliance). 2014. Stakeholder Engagement Report: Environmental Justice. Climate Change Preparedness in New Jersey. Available at http://njadapt.rutgers.edu/docman-lister/resource-pdfs/116-environmental-justice-stakeholder/file.

Administration (SHA) is studying the effects of severe weather and climate change on highway infrastructure. Initial mapping has documented road closures in 2011 that includes flooding on SHA-maintained roads.

During the next update to the SHMP, which was required in 2014[94], but has not yet occurred, the state might consider:

- Accounting for climate change impacts on vulnerable communities in the criteria for pre- and post-disaster mitigation funding and using a mapping tool (such as the one proposed previously) to prioritize disadvantaged communities. For instance, properties experiencing repetitive loss could be flood-proofed and, if vacant, could be purchased using mitigation funds and repurposed as open space to reduce flooding.

Baltimore's Disaster Preparedness and Planning project

Baltimore took Maryland's 2011 SHMP one step further to develop a local hazard mitigation plan that explicitly addresses climate change risks. The Plan, known as DP3, includes a number of potential climate impacts such as severe weather and extreme heat, sea level rise, air pollution and drought. DP3 takes an innovative look at each through a risk analysis to determine exposure, sensitivity and adaptive capacity of the city's infrastructure under each impact. Recommendations include:

- Improving the resilience of the electrical system which includes backup power systems.
- Strengthening emergency preparedness communications, coordination with community leaders and developing an early warning system.
- Improving codes to protect critical facilities and updating buildings to increase resiliency to floods and wind.

Some of this could be supported through resilience hubs – central community locations that provide critical resources during disasters and rebuilding efforts.

- Prioritizing and quantitatively assessing the impacts of climate change hazards on disadvantaged communities. Baltimore's Disaster Preparedness and Planning Project provided a quantitative risk assessment of climate change impacts. This could serve as a starting point, while additions to this approach could include potential economic impacts to public health and social cohesion and an economic assessment of all hazards to disadvantaged communities.

- Developing community relationships before a disaster and building trust with leaders in the community. This includes supporting communities in the development of neighborhood-specific preparedness plans that account for climate, social and environmental burdens and capitalize on community assets. In the 1995 Chicago heatwave, three of the 10 neighborhoods with the fewest

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[94] Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act

heat-related deaths were low-income communities of color. This is thought to result from high community cohesion and social and familial relations.[95]

- Providing clear and easy to understand materials in multiple languages and working with community leaders on outreach and distribution.

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[95] We ACT for Environmental Justice. 2015. Northern Manhattan Climate Action Plan. Available at http://weact.nyc/climate/nmca-201508.pdf.

CHAPTER 3: CLIMATE AND ENERGY EQUITY FRAMEWORK

Maryland's communities of color contribute less greenhouse gas emissions than other groups, yet they experience a disproportionate level of exposure to pollutants from fossil fuel use. Equity-positive land use and transportation planning could ensure that people of color benefit from economic and environmental improvements in the revised 2018 GGRA Plan. This chapter proposes a process to embed equity in climate-related decisions when revising or developing policies and programs. Process steps include: 1) developing a vision; 2) selecting criteria for evaluating processes and programs; and 3) implementing a planning process that engages communities in assessing conditions, setting goals and selecting strategies.

Defining environmental justice

Dr. Bunyan Bryant, retired director of the Environmental Advocacy program of the School of Natural Resources and the Environment at the University of Michigan, defines environmental justice as those cultural norms and values, rules, regulations, behaviors, policies and decisions that support sustainable communities, where people feel confident that their environment is safe, nurturing and productive. Environmental justice is supported by decent paying and safe jobs, quality schools and recreation, affordable housing, adequate health care, personal empowerment and communities free from violence, drugs and poverty. In these communities, cultural and biological diversity are revered and distributive justice prevails.

Bryant, B. 2007. *Environmental Justice Advocacy: Working for Economic and Environmental Justice*.

Climate and Energy Equity Vision

Environmental justice is defined by the EPA as the fair treatment and meaningful involvement of all people – regardless of race, color, national origin or income – in the development, implementation and enforcement of environmental laws, regulations and policies. The first phase of climate action plans developed across the nation have little to no mention of environmental justice or sound strategies to promote environmental justice in climate investments.

In 2015, Portland, Oregon, developed one of the first equity-positive climate action plans in the nation. The plan includes the following vision statement:

"Every resident, regardless of socio economic status, has easy access to a walkable and bikeable neighborhood that includes retail, schools, parks, jobs and affordable housing. There are plentiful employment and small business opportunities led by and employing under-served and under-represented communities. Communities of color and low-income populations are involved in the development and implementation of climate-related programs, policies and actions."[96]

The State of Maryland could develop a similar equity vision that aligns with the culture and future goals of Marylanders. For example, Maryland's climate and energy equity vision may want to include a statement on reducing risks and improving environmental and community health.

Climate and Energy Equity Criteria

The Portland plan proposed screening criteria to determine if climate and energy equity is being addressed in policies, programs and investments. Specifically, Portland's Climate and Energy Equity Workgroup asked if the proposed action would:

- Build long-term community capacity by building trust, aligning projects with community priorities and engaging and empowering communities in meaningful, authentic and culturally appropriate ways.

- Provide benefits, including economic ones that are accessible to every household and business in the community and prevent disproportionate impacts to reduce historical, current, or future disparities.

- Provide institutional accountability and improve staff diversity at all levels to ensure that implementation is equitable and will not harm communities.

Climate and Energy Equity Planning Process

The sections below outline a process to start a new conversation around climate justice and energy equity in Maryland. In each section, relevant case studies and research showcase existing and future GGRA Plan proposals from an environmental justice and equity perspective. The climate and energy equity planning process below relies on community engagement. Meaningful engagement involves empowering each community in the development of outcomes so that it is clear how the community's input did or did not influence the final decision. When using this process, it is important to set clear goals and assess existing needs and conditions related to climate and energy equity before moving too far along. Figure 4 outlines the process steps and the text below provides additional detail.

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[96] City of Portland. 2015. Climate Action Plan. Available at: https://www.portlandoregon.gov/bps/article/531984.

Figure 4. Proposed planning process to increase climate and energy equity.
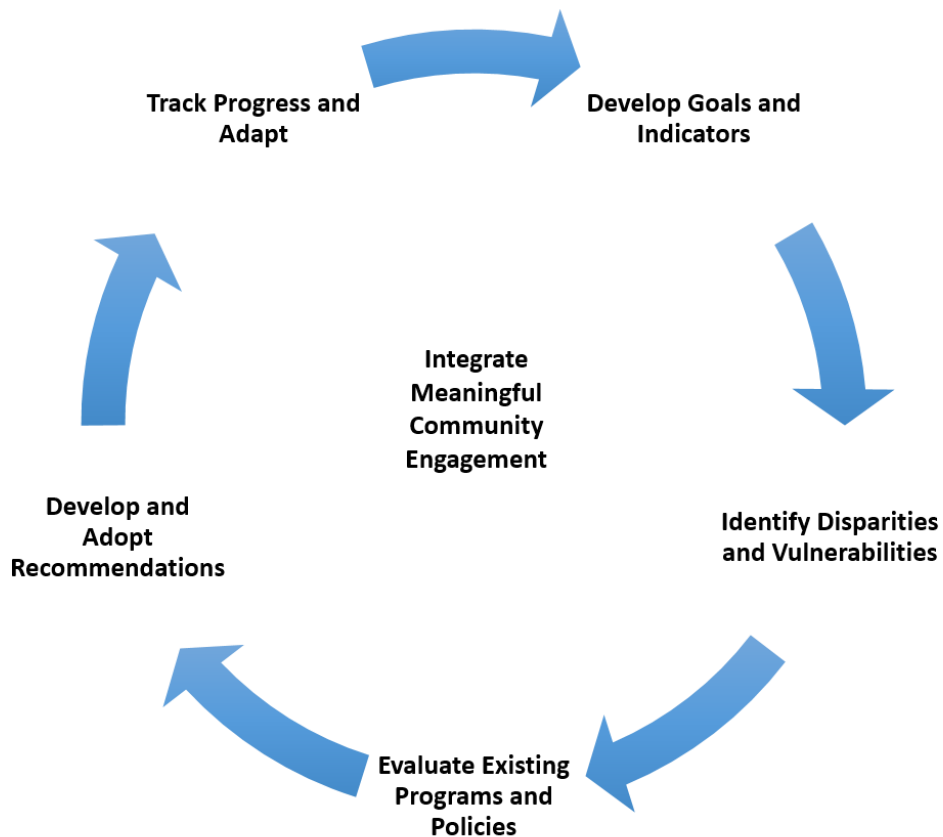
1. Develop goals and indicators

To evaluate progress on a climate and energy equity plan, clear goals and indicators must be established at the outset. Based on a literature review of best practices and tools for promoting social and environmental equity, few quantitative indicators have been developed that concurrently take social, environmental and climate/energy equity into account.

The literature review for this report included a broad survey of peer-reviewed journals and agency publications addressing environmental justice and climate and energy equity. Criteria and indicators were derived from the Sustainable Communities Index, the Portland Plan, PERE, King County's Equity Report, the federal Partnership for Sustainable Communities, the National Association for the Advancement of Colored People (NAACP) and the International Council for Local Environmental Initiatives (ICLEI) STAR rating system. Based on this literature review, Table 1 outlines a framework of equity goals that can guide indicator selection and measure progress toward climate and energy equity.

Throughout the process, a principal goal is fair decision-making to provide opportunities for meaningful social and civic engagement. These goals could be used to further evaluate existing disparities and vulnerabilities and set targets for future climate change policies and programs.

Table 1. Equity goals to consider in climate and energy equity planning.

Category	In An Equitable Community, Members Will Have:
Environment/Open Space	Access to clean air, water, natural habitats and environment and limited exposure to toxins.
Community and Culture	Community cohesion and support of existing cultures, diversity and neighborhoods.
Health and Wellness	Access to affordable healthcare and health-promoting infrastructure, both natural and man-made.
Housing	Clean, safe and affordable housing.
Transportation	Access to affordable, efficient and nearby public transit.
Food	Local, fresh, healthy and affordable food.
Workforce and the Economy	Meaningful and fair employment opportunities and economic competitiveness.
Energy	Reliable access to clean, affordable and renewable energy.
Emergency Preparedness	Accessible, reliable and affordable opportunities to prepare for, reduce impacts from and rebound from disasters.

2. Identify disparities and vulnerabilities

Identifying communities with disproportionate vulnerabilities to social, environmental and climate related impacts is necessary so that progress can be made toward reducing these susceptibilities. Geographic Information Systems (GIS) mapping is a powerful tool to visually assess and prioritize the burdens experienced by communities. While some climate mitigation and adaptation plans include vulnerability mapping, many do not consider racial or economic inequities, or do not explicitly address the well-being of populations that are most vulnerable to the health effects of climate change.[97] This is not due to a lack of data. As shown in the text boxes below, tools such as California's CalEnviroScreen 2.0 and the

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[97] Preston, B., E.J. Yuen, and R.M. Westaway. 2011. Putting vulnerability to climate change on the map: a review of approaches, benefits and risks. Sustainability Science, 6:177-202.

Socioeconomic Vulnerability Index use various levels of mapping data to assess climate and/or social vulnerability.

The indicators used in California's CalEnviroScreen 2.0 and the Socioeconomic Vulnerability Index mapping tools provide a foundation that can be refined based on the goals from Step 1 and the availability and accessibility of data in Maryland.

Mapping can inform state-level investments in social equity

In collaboration with the University of Southern California, the state of California developed one of the most comprehensive state-level mapping tools to screen communities for environmental justice burdens. The CalEnviroScreen 2.0 mapping tool includes an index score based on a suite of science-based environmental, social and health indicators. The State of California uses this tool to prioritize and distribute nearly all funding resources targeted at disadvantaged communities. These resources include several climate programs. More information available at: http://oehha.ca.gov/ej/ces2.html

One of the first holistic social equity mapping tools, the Socioeconomic Vulnerability Index (SoVI), was developed to assess the risks of coastal communities facing coastal hazards such as hurricanes. The index synthesized 42 socioeconomic variables. It now focuses on seven primary social indicators for preparing and responding to coastal hazards: race and class, wealth, elderly residents, Hispanic ethnicity, special needs individuals, Native American ethnicity and service industry employment. The National Oceanic and Atmospheric Administration (NOAA) used this index to assess vulnerability to sea level rise and storm surge in its Digital Coast mapping tool, available in Maryland.

Once indicators are selected, they can be mapped to areas that have social equity concerns, are vulnerable to climate impacts and energy decisions and are currently receiving few investments (e.g., distributional equity). The areas where communities are most vulnerable but receive the fewest resources could then serve as indicators of "high risk-high need" communities for program and policy enhancements.

Some indicators of pre-existing vulnerabilities and risk factors cannot be changed (e.g., age, gender, race, pre-existing health conditions). However, it is critically important to take these characteristics into account during planning; each may indicate the need for a different design or adaptation planning to accommodate pre-existing vulnerabilities. Efforts that truly address climate vulnerabilities must account for susceptibility to climate change and promote equal distribution and access to clean energy. Many of the vulnerabilities are referenced in the state's series of Climate Change reports. Generally, they include sea level rise and coastal flooding, urban heat, increased air and water pollution and changing agricultural

industries. Maryland's Climate Change Impact Areas[98] and the state's Coastal Atlas[99] are a first attempt at developing these vulnerability maps. However, except for sea level rise, they have a relatively coarse resolution. Taking energy equity into account would include factors such as access to renewable energy resources and access to programs to increase energy efficiency.

3. Evaluate existing programs and policies

Once goals are developed and community risks identified, relevant policies and programs can be screened to determine whether they will serve vulnerable communities and promote or detract from climate and energy equity goals. This process could include an assessment of risks, benefits and costs of key existing policies. These evaluation tools could include procedural, distributional or structural strategies.

Procedural strategies ensure that processes are fair and inclusive in developing and implementing any program or policy. *Distributional* strategies ensure that resources, benefits and burdens of a policy or program are distributed fairly and prioritize those with the highest need. *Structural* strategies demonstrate commitment and action to correct past harms and prevent future negative consequences through accountability measures and institutional decision-making structures that support transparency and continual improvement.

Building on the criteria in the Portland plan, objectives of this screening process could include the following steps:

- Identify how the policy intersects with other parts of the GGRA Plan or other key environmental policies.

- Identify potential positive and negative impacts for

Building cultural competence to address unconscious bias

Unconscious bias may influence policy administration and implementation. This is particularly evident in decision-making structures that were developed in a period of racial inequity and not re-examined in modern times. For example, many land-use and zoning decisions in Maryland (beginning in Baltimore City in 1917) were based on racial segregation, and positioned industrial facilities, landfills and other environmentally noxious facilities near African American residences. This practice, known as 'expulsive zoning,' is the historical basis for many modern-day determinations about environmentally noxious facilities. Unconscious bias may create barriers to improving, modifying or restructuring programs and policies in ways that are intended to distribute benefits and burdens equitably. It may also influence the everyday practical interpretation of policy and its implementation. Unconscious bias among agency staff and decision-makers can be addressed via Building Cultural Competence training.
http://www.skeo.com/services/category/collaboration/cultural_competence_training

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[98] Maryland Department of Natural Resources. Climate Change Impact Area Mapper. Available at: http://www.dnr.state.md.us/climatechange/mapper.asp.
[99] Maryland Department of Natural Resources. Coastal Atlas. Available at: http://dnr.maryland.gov/ccp/coastalatlas/ index.asp.

each of the identified communities and options to strengthen the positive impacts and/or mitigate negative impacts in these communities.

- o Include strategies that would build long-term community capacity by building trust, aligning projects with community priorities and engaging and empowering communities in meaningful, authentic and culturally appropriate ways.

- o Provide benefits, including economic benefits, that are accessible to every household and business in the community and prevent disproportionate impacts to reduce past, current or future disparities.

- Include institutional accountability and improve staff diversity at all levels to ensure implementation is equitable and will not harm communities.

- Include a strategy to determine how each option will likely change identified baseline social inequalities in outcomes and indicators.

4. Develop and adopt recommendations

Research shows that environmental justice communities are often saddled with significant environmental and social burdens and have few resources to address these heavy loads. These communities are often not seen or heard by decision-makers. Once programs are evaluated for equity criteria, recommendations could be developed to support progress toward equity goals. These recommendations could be taken to the community at early stages of development to determine how well they fit with local needs. To be effective, agencies should be open to revising recommendations based on community input and should work with communities to prioritize the recommendations.

5. Track progress and adapt

An important step in addressing climate and energy equity is the objective evaluation of progress. The State could develop a mechanism for tracking and updating recommendations as needed and based on both performance and stakeholder and community feedback. Establishing the process before recommendations are adopted, while maintaining transparency with stakeholders and communities will provide for flexibility and reduce the likelihood of dis-satisfaction if programs and policies do not perform as expected. The example below provides an example of tracking equity under a carbon trading program, such as RGGI.

Monitoring climate equity in practice

Equity in a cap-and-trade program such as the Regional Greenhouse Gas Initiative (RGGI) could be monitored as follows:

- After designating environmental justice communities through the approaches described above, the state could closely monitor companies operating facilities in these communities to ensure compliance with regulations and confirm that the company's purchase of allowances are sufficient to match their emissions.
- The State may also seek more public participation by implementing a public accountability process where private citizens can call and report any unusual, suspicious or illegal activity by a facility.
- Funding for this oversight could come from multiple sources, including a realignment of enforcement budgets and utilizing Supplemental Environmental Projects in lieu of fines by using a results-based approach and using a portion of the funds raised through RGGI. In this way, the companies buying allowances would supplement the cost of enforcement.
- Targeting efforts at reducing greenhouse gases and carbon emissions in environmental justice and other areas overburdened with industrial air pollutants. This approach would discourage trading away pollution allowances to other less burdened communities.

Adapted from: Lam, J. 2012. Coupling environmental justice with carbon trading. Sustainable

CHAPTER 4: LOOKING AHEAD

The programs and policies outlined in the 2013 GGRA Plan take several steps toward supporting disadvantaged communities. These steps include a multi-pollutant approach, reducing port and freight diesel emissions and supporting existing low-income energy efficiency funding. Other programs could be revised at the implementation level to provide additional opportunities for disadvantaged communities, such as MDA's Buy Local program and the next update of the State Hazard Mitigation Plan. However, some programs would require either policy changes or the development of new policies. Key actions that could be implemented during the update of the GGRA Plan could include the strategies summarized below.

Develop and Implement a Systematic Approach for Climate and Energy Equity in Maryland

As one of the first systematic evaluations of a state climate plan from an environmental justice perspective, this report provides Maryland with the opportunity to be at the forefront of climate and energy equity policymaking. Using the climate and equity framework provided in this report, the state could establish an equity-in-all-policies approach that would improve quality of life for all people in Maryland. Such an approach could reach vulnerable communities in urban and rural areas, particularly those where climate and social vulnerabilities collide. To move forward with the recommendations provided in this report, a baseline of climate and energy equity in Maryland should be established first. This baseline could be used as a tool to establish and monitor progress towards climate and energy equity in vulnerable communities.

To develop the baseline, the Commission on Environmental Justice and Sustainable Communities should be engaged in a process with the Maryland Commission on Climate Change to:

- Develop a statewide vision for climate equity, based on the process outlined in Chapter 3.

- Develop standards that can be used by the state to define vulnerable and/or disadvantaged communities so that recommendations in this report can be implemented and monitored consistently across agencies.

- Develop and implement a spatial data platform that integrates social, climate and environmental health burdens at the finest scale possible, preferably at the census tract or neighborhood level.

- Develop and implement a framework and allocation monitoring tool for climate and energy resources based on the spatial data platform.

- Develop and implement guidance for meaningful outreach and engagement of communities to include cross-agency program evaluation of existing outreach tools used by state and local agencies.

Key Recommendations to Pursue in 2016

The following recommendations are time sensitive actions that could vastly improve the quality of life for the most vulnerable communities in Maryland by contributing to community resiliency and reducing environmental pollution. Details for each recommendation are described in Chapter 2.

- Pursue actions to address environmental justice in the *RGGI 2016 program update* and in Maryland's use of RGGI funds.

- Develop and provide guidance to state agencies during the development of the State Implementation Plan (SIP) for compliance with the *U.S. EPA's Clean Power Plan*.

- Support and monitor implementation of the *PSC's community solar pilot* using the climate and energy equity framework provided in this report, focusing on distribution of financial and staff resources, availability of green bank funds and barriers to access in vulnerable communities (e.g. housing stock quality).

- Support, implement and monitor *cumulative impacts analysis of permitted projects* in Maryland, with a focus on those communities experiencing the greatest environmental, social and climate burdens.

- Encourage the state to update the *State Hazard Mitigation Plan*, as required and provide guidance to embed social and climate vulnerability into the hazards analysis, recommendations and in the state's funding for pre- and post-disaster mitigation projects.

Formalize Strategies and Prioritize Recommendations in the 2018 GGRA Plan Update

Meeting the state's recent goal of reducing carbon emissions 40 percent by 2030 will require innovative solutions. These solutions should be implemented so that vulnerable communities are better protected and that these communities are able to participate in the benefits from such innovation. One strategy to achieve innovation would include integrating the climate mitigation and adaptation efforts. This separation is in many ways a false distinction. Integrating the two approaches could provide the state with additional opportunities for reducing carbon emissions, while also providing an opportunity for the

state to track progress towards climate adaptation, a process that is not part of the state's current planning efforts. For example, communities with access to a diversity of energy options, such as community solar with backup battery power release fewer carbon emissions, but are also resilient to impacts of climate change, such as power outages and blackouts from more intense storms. Integrating these efforts will not only benefit communities, but will create efficiency within state government.

Develop and Implement Tools for Monitoring Progress

The success of a program is only as good as the outcome it produces. Programs can often produce results that differ from their expected outcomes based on a number of factors including unconscious bias, the type of outreach and inadequate metrics. A number of tools exist that could be used to monitor progress towards climate and equity, but would need to be tailored to ensure applicability to state and local government policy, recurrence in multiple practices and geographic applicability to the mid-Atlantic. The Commission could form a workgroup to develop guidance and indictors to monitor progress towards climate and energy equity in Maryland.

Consideration should be given to indicators that assess transactional and transformational change in the state. Transactional indicators, such as the number of households receiving energy efficiency retrofits, provide an initial basis for change, but do not address the potential for scaling up those retrofits to the community. Transformational indicators measure the contribution of a program to behavioral changes in communities, such as leveraging of additional funds and community cohesion, as demonstrated in the ReGenesis case study.

 If implemented as part of a comprehensive package to address climate and energy equity in Maryland, the recommendations above could substantially improve the quality of life for disadvantaged communities in Maryland. As the strategies and processes highlighted above are considered, the next phase will require a thoughtful process for prioritizing goals, developing and testing metrics and measuring outcomes. The process highlighted in this report will only be the beginning and will require a commitment on behalf of the partners and agencies involved in developing and implementing the strategies above.

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Cross-Plan Activities		
Multi-pollutant Framework Lead Agency: MDE[100]	The framework will reduce carbon emissions, improve water quality in the Chesapeake Bay and reduce air pollution, including fine particles, sulfur dioxide, mercury and nitrogen dioxide. An MDE workgroup is developing recommendations for how the Department could best address the issue of multiple sources of pollution and the resulting public health burden currently borne by communities of color and low-income communities across Maryland.	• Include black carbon (soot), as part of the framework. • Implement and enforce cumulative impact policies that would target communities with high social, environmental and climate burdens.
Opportunities for diverse and satisfying careers	Strategies in the GGRA Plan could create more than 37,000 jobs by 2020, most of these in the energy and transportation sectors. The job growth will require a multi-billion dollar investment in technology to move towards a low-carbon future.	• Support a viable transition for workers in the fossil fuel industry through policies that encourage equitable training, hiring and contracting policies targeted at these displaced employees. • The University System of Maryland, MSDE and the P-20 Leadership Council of Maryland could support clean energy education and incubator programs in disadvantaged communities.
Outreach	This section provides examples of education from kindergarten to college and outreach from state agencies, but no specific environmental justice opportunities.	• Implement a comprehensive community engagement process that reaches disadvantaged communities and supports them in participating fully in decision-making processes for all existing and future climate change programs.

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[100] Maryland Department of the Environment.

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Energy		
General	See specific programs below.	- Implement a comprehensive Affordable Energy Program as suggested by PSC. - Revise the state's Public Benefits Fund to accelerate renewables access in disadvantaged communities. - Support reliable, resilient energy systems such as solar with battery backup. - Provide incentives to landlords to overcome the split-incentive barrier.
EmPOWER Maryland (A.1-5) Lead Agency: MEA[101]	- Energy-efficient retrofits in apartment buildings of low- and moderate-income families reduced energy bills by 20 percent for 3,800 families. - DHCD's [102] weatherization program provides retrofits to limited-income people. - Clean energy communities grants provided funding to local governments and nonprofits to support energy efficiency updates in low- and moderate-income houses. - Utilities include assistance for low-income families that include Limited Income Energy Efficiency programs, no-cost appliance replacement program for low-income homes and the Limited Income Weatherization Program. - Demand response programs provide resilience to medically fragile households and at-risk populations by reducing the risk of power outages. - The energy workforce training program, through MEA and DHCD, engages community colleges to create a comprehensive training program for contractors working in the energy improvement field.	- Update the MEA Home Performance Rebate Program to improve access for disadvantaged communities, particularly for efficient water heaters and HVAC systems. - Improve demand response programs to empower renters and low-income households and to reduce environmental risks from peaking facilities.

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Energy		
Maryland Renewable Energy Portfolio Standard (RPS) Program (B.1,B.3,B.4) Lead Agency: MEA	MEA works with local governments and businesses to facilitate development of community-scale wind projects, suitable for such facilities as wastewater treatment plants, military installations, college campuses and communities. It is not clear if these are located in disadvantaged or otherwise vulnerable communities.	• MEA's Commercial Clean Energy Grant Program could include a percentage of the grants to support woman-owned and disadvantaged businesses. • MEA could support the development of community solar projects just as they do for community wind projects. • MEA could assess the potential negative impacts of allowing poultry litter and black liquor to qualify for renewable energy sources based on their potential impact to communities. Even though they quality for renewable energy credits they do not help reduce carbon dioxide.
Fuel Switching (B.2) Lead Agency: MEA	The GGRA Plan does not address disadvantaged communities in this section.	• Assess environmental justice impacts of using natural gas from hydraulic fracturing, poultry litter, black liquor and solid waste as energy sources. • Remove restrictions from EmPOWER preventing low-income communities from switching from expensive fuel oil to affordable electric HVAC systems. • Provide disadvantaged communities with equitable access to renewables through community choice aggregation and allow for aggregate net metering for residential and commercial multi-tenant buildings.
C: Regional Greenhouse Gas Initiative (RGGI) Lead Agency: MDE	• Most of the $278 million in funds are spent on direct bill assistance, including $100.5 million to help 215,800 low-income households pay their energy bills. • RGGI also supported energy efficiency upgrades for 11,880 low- to moderate-income households. [103]	• Advocate for environmental justice principles in 2016 RGGI Plan update, including an assessment of trends in rate increases in environmental justice communities. • Determine if RGGI funds have contributed to rate increases or hotspots of pollution in environmental justice communities. • Implement RGGI-funded programs to benefit environmental justice communities, such as grants, community renewable energy systems, sustainable planning and green-collar job training.[104]

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[103] Regional Greenhouse Gas Initiative. 2015. Investment of RGGI proceeds through 2013. https://www.rggi.org/docs/ProceedsReport/Investment-RGGI-Proceeds-Through-2013.pdf.
[104] http://www.nrdc.org/energy/rggi.

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Energy		
D.1: GHG Power Plant Emission Reductions from Federal Programs Lead Agency: MDE	The programs in this section – Boiler Maximum Achievable Control Technology (MACT), GHG New Source Performance Standard and GHG Prevention of Significant Deterioration Permitting Program – are based on federal programs.	The State could assess if these programs are contributing to quality of life improvements in disadvantaged communities.
D.2: Main Street Initiatives Lead Agency: DHCD[105]	DHCD's Be SMART program, funded through the U.S. Department of Energy's Better Buildings program, provides increased comfort, safety and affordability for buildings in Maryland through energy efficiency improvements. The program also includes: • Education and outreach on behavior changes that reduce energy consumption. • Green Retrofit Improvement Program, which targets small business owners. • Multifamily "Preservation and Energy Efficiency" program for renters and an Efficient Home Program for homeowners. • Targeted assistance for several communities affected by environmental justice burdens, including Berlin, Cambridge, Chestertown, Cumberland, Denton, Easton, Elkton, Frostburg, Oakland, Princess Anne, Dundalk, Westminster, Havre De Grace, Salisbury and Takoma Park.	The single-family residential program is only available to homeowners with good credit. The multi-family program is only available to owners of multi-family buildings that maintain a certain percentage of affordable housing. By targeting the owner, this program may overcome the split-incentive challenge (e.g., owners do not benefit from energy cost reductions). However, the program could also market to renters to distribute benefits to lower-income residents.

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[105] Department of Housing and Community Development

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Energy		
D.3: Energy Efficiency for Affordable Housing Lead Agency: DHCD	This section focuses entirely on disadvantaged communities: • DHCD operates the federally funded Weatherization Assistance Program (WAP) to assist eligible low-income households with the installation of energy conservation materials. • DHCD created additional energy efficiency programs in support of affordable housing across Maryland. These include the EmPOWER Low-income Energy Efficiency Program and the Multifamily Energy Efficiency and Housing Affordability (MEEHA)-EmPOWER Program. The program provides grants for the purchase and installation of energy efficiency improvements and/or renewable energy improvements in affordable multifamily rental housing developments. • The Green Grant Program is part of DHCD's larger affordable rental housing preservation initiative, known as the Maryland Base Realignment and Closure Preservation Initiative.	No additional recommendations.

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Transportation		
E.1 (A-D): Motor Vehicle Emission and Fuel Standards Lead Agency: MDE (supported by federal policies)	Most of the programs under this section are now regulated at the federal level. These include the Maryland Clean Cars Program, Corporate Average Fuel Economy Standards, National Fuel Efficiency and Emission Standards for Medium and Heavy-Duty Trucks and Federal Renewable Fuels Standards.	• Retrofit diesel trucks and facilities to reduce pollution in disadvantaged communities. • Implement a broader policy on black carbon reductions as part of the multi-pollutant framework.
E.2: On Road, Airport, Port and Freight Rail Technology Initiatives Lead Agency: MDOT[106]	Existing benefits to disadvantaged communities include: • Electrification of truck stops, port and freight facilities, highway upgrades to improve freight movement and traffic signal synchronization to reduce idling and diesel emissions as well as noise and odor. • Green Port strategy to retrofit diesel or switch to alternative fuels, replace Dray trucks and reduce short route trucking. • Real-time public transit could reduce travel time to and from work, especially for low-income households that are less likely to have cars and are more likely to use transit. They could spend more time with their families and/or alert their employers to any delays, reducing stress and improving quality of life.	Adopting a net zero policy at all transport facilities would greatly benefit disadvantaged communities. Other improvements could include: • Shift diesel truck transport to freight. • Implement recommendation in Plan to include Auxillary Power Units (APUs) for all trains and to require them for all new trucks in Maryland. • Develop and enforce comprehensive anti-idling policies. • Promote black carbon reductions primarily produced by diesel, but also other mobile sources. • Improve telework benefits for blue collar employees or provide similar incentives. Equity challenges occur when supervisors can work from home and staff cannot.
F.1 & F.2: Public Transportation and Intercity Initiatives Lead Agency: MDOT	Increased transit such as the previously proposed Red Line, circulator buses and transit-oriented development could improve economies in disadvantaged communities.	The State could improve transit in disadvantaged communities by placing circulator buses and transportation infrastructure to benefit these communities. This could include community surveys to determine accessibility (e.g., how many transfers are needed to get to work, daycare, grocery stores and other community services?)

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[106] Maryland Department of Transportation

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Transportation		
G: Pricing Initiatives Lead Agency: MDOT	The Plan promotes ride-sharing programs and guaranteed ride-home programs that could be beneficial, given that many people living in disadvantaged communities do not have access to cars, especially during emergencies.	The Plan includes pricing disincentives, which could include gas and sales taxes and infrastructure improvements. These disincentives could be coupled with adequate public transit systems and any gas tax could first support public transit upgrades.
H.1: Evaluating the GHG Emissions Impact of Major New Transportation Projects Lead Agency: MDE	The focus is on making sure new transportation projects along the Baltimore-Washington Corridor contribute to minimal greenhouse gases. As new transportation projects replace older ones, this effort will benefit disadvantaged communities along the corridor.	No additional recommendations.
H.2: Bike and Pedestrian Initiatives Lead Agency: MDOT	The Plan includes development and promotion of new bike and pedestrian facilities by SHA, bike racks on public transit and initiatives as part of MDOT's Bicycle and Pedestrian Master Plan. Additional bicycle paths being considered include the Capital Crescent Trail, Patuxent Branch, Rock Creek, B&A, BWI, North Central Rail and Fair Hill trails.	Work with local governments and regional planning organizations to develop a comprehensive approach to bike and pedestrian paths, using the guiding questions below. When considering new or upgraded paths, the state could consider: • Does the path connect disadvantaged communities with community assets like stores, parks and work places? • Does the plan include an educational component for drivers and bikers/pedestrians? • Are proposed paths designed to promote safety?

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Agriculture & Forestry		
I.1, I.2, I.3, I.6: Creating and Managing Urban and Rural Forests, Wetlands and Waterways to Capture Carbon and Planting Forests in Maryland Lead Agency: DNR[107]	• Trees are being planted in urban areas with disadvantaged communities, including Baltimore, Hyattsville and Cumberland. DNR supports policies requiring tree canopies around schools (the Green Schools Program), nursing homes, shelters and public buildings located near at-risk populations. Planting trees around these communities will assist with energy use reductions, provide shade and reduce flooding. • The state is exploring opportunities to compensate landowners for capturing carbon with their forests. This could prove to be beneficial for landowners affected by the loss of fossil fuel jobs.	• Tree planting programs could continue to reach out to disadvantaged communities and focus plantings in areas where they would have the greatest impact. This could include creating linear parks and parks on vacant land and encouraging community groups to adopt trees. • Protect and create wetlands and waterway buffers to ensure these programs are available to disadvantaged communities and target communities at risk of flooding from sea level rise and storms.
I.4: Biomass for Energy Production Lead Agency: DNR[108]	Maryland is promoting the use of locally produced woody biomass for generation of thermal energy and electricity. The targets include public schools, hospitals, municipalities and all rural landowners. While this program seems to support equity, there are some concerns with the contribution of wood burning to air pollution.	• Evaluate the potential health and safety costs of using wood as a fuel. In public facilities where this is planned, there could be a community engagement process to gauge comfort with this fuel type. • A potential model is California's "Check before you burn" program, which does not allow wood burning during days when particulate matter is high.
I.5: Conservation of Agricultural Land for GHG Benefits Lead Agency: MDA[109]	MDA will decrease the conversion and development of agricultural lands through the protection of productive farmland from development. Urban sprawl and suburban development place small family farms at risk of losing their land. This program protects rural disadvantaged communities.	None at this time.
I.7: Geological Opportunities to Store Carbon Lead Agency: DNR[110]	There are no direct positive environmental justice considerations, except that many storage options would occur away from communities.	If injection of carbon into oil and gas wells occurs at the same time as hydraulic fracturing, the state could evaluate potential impacts on these communities.

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[107] Department of Natural Resources.
[108] Department of Natural Resources.
[109] Maryland Department of Agriculture.
[110] Department of Natural Resources.

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Agriculture & Forestry		
J.1, J.2: Ecosystem Markets Lead Agencies: MDA, MDE and DNR	Nutrient trading programs could create substantial disparities in regards to providing access to clean water in communities. Nutrient trading can create hotspots, leaving certain communities with unhealthy streams and wetlands.	• Screen ecosystem services and ecosystem restoration programs for disparities and implement "no harm" policies as relevant. • Support voluntary efforts to develop co-ops or similar mechanisms.
Buildings		
K: Buildings Lead Agency: DHCD	Does not address environmental justice. Renters and low-income households are often do not have resources or are not in control of renovations or the property.	• Screen local building codes for environmental justice concerns. • Encourage or provide financial support for local governments to require a certain percentage of all new buildings to be affordable housing.
Waste		
L: Zero Waste Lead Agency: MDE	• Reducing solid waste can have substantial benefits on the quality of life in disadvantaged communities, reducing noise, odor and truck traffic. • Provides access to recycling in all apartment and condominium buildings with 10 or more units provide access to recycling.	• Improve on zero waste program by including composting as a required action item and by ensuring outreach occurs to households with limited English proficiency. • Proposed waste to energy strategy is controversial. State could improve community trust by considering: 1) life cycle impacts, 2) cumulative pollutant impacts from the facility and from truck traffic, 3) effective engagement strategies and community benefits agreements and 4) a comparison of the facility to other alternatives, including landfills and recycling.

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Innovative Initiatives	
M.1-4: Leadership-by-Example: State of Maryland Initiatives Lead Agencies: DGS[111]/MDE	• Requires that most new and significantly renovated state buildings and all new public schools that receive state construction funds meet the LEED Silver building standard. • Includes energy performance contracts at state buildings to reduce electricity consumption. • Includes green purchasing practices.	• Require state buildings, including universities, to serve as hubs for training at-risk populations in state-of-the-art energy efficiency, measurement and sustainability practices. • Incorporate resiliency elements into buildings to ensure they can serve as community hubs in emergencies. • Assess distribution of new schools classified as high performance buildings to determine alignment with social equity principles. • Evaluate green purchasing and energy contracts allocated to disadvantaged and woman-owned businesses
N.1: Voluntary Stationary Source Reductions Lead Agency: MDE	This program encourages businesses to reduce greenhouse gas emissions ahead of any state requirement.	• Program outreach could target communities where environmental and social burdens are highest. • Evaluate status of voluntary reductions and distribution in disadvantaged communities.
N.2: Buy Local for GHG Benefits Lead Agency: MDA	MDA's "Buy Local" campaign benefits small family farmers and potentially disadvantaged communities, by bringing fresh, local food to these communities.	• Connect food deserts to small family farmers and include urban small farmers. • Support the acceptance of Supplemental Nutrition Assistance Program (SNAP) benefits. • Create food hubs that connect local producers with retail outlets and local institutional buyers, such as school districts, universities and hospitals.
N.3: Pay-As-You-Drive¨ Insurance in Maryland Lead Agency: MIA[112]	Disadvantaged communities tend to drive less. Because of this, customized insurance plans based on mileage driven could provide savings to these groups.	Evaluate whether this program is providing equitable opportunities for disadvantaged communities.

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[111] Department of General Services
[112] Maryland Insurance Agency

Program	How Is Equity Addressed?	How Could Equity Be Better Addressed?
Innovative Initiatives		
N.4: Job Creation and Economic Development Initiatives Related to Climate Change Lead Agency: DBED[113]	The goal of the GGRA Plan is to create 100,000 green jobs by 2015 by: • Improving cross-agency coordination. • Promoting energy efficiency and clean, local energy development. • Supporting ecosystem services. • Increase access to funds for green businesses.	• Assess the distribution and types of jobs and whether disadvantaged community members had an opportunity to participate. • Consider developing a plan to help the current workforce, especially people with lower-income positions, transition to sustainable energy production, as jobs focused on coal extraction, coal-fired power plants operations and petrochemical manufacturing are replaced by renewable electricity from wind, solar and biomass. • Embed training opportunities from kindergarten to college to prepare students for future workforce needs.
Land use		
P.1: Reducing Emissions through Smart Growth and Land Use/Location Efficiency Lead Agency: MDP[114]	• "Plan Maryland seeks to address affordable housing concerns, the job/housing balance and commuting times." and "a priority for more affordable, desirable housing near existing job centers and public transit." • Creates opportunities for renters and low-income communities. • Sustainable Communities Act of 2010 invests in revitalization and promotes affordable housing, expanding energy-efficient housing choices for people of all ages, incomes, races and ethnicities.	Support and provide examples of strategies to prevent gentrification as cities expand and potentially become unaffordable for existing communities.
P.2: Priority Funding Area (Growth Boundary) Related Benefits Lead Agency: MDP	Maryland has established Priority Funding Areas to preserve existing communities, to target state resources to build on past investments and to "reduce development pressure on critical farmland and natural resource areas." This effort could better protect small family farmers.	• Align this program to assist small family farmers in connecting to urban food deserts and help them prepare for the impacts of climate change, particularly for land expected to be lost to sea level rise. • Evaluate opportunities to improve access to open space in disadvantaged communities.

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[113] Department of Business and Economic Development.
[114] Maryland Department of Planning