ITEM 8 – Information
October 18, 2023

Carbon Reduction Program – State Carbon Reduction Strategies

Background: As part of the new federal Carbon Reduction Program, state DOTs are required to consult MPOs as they develop their statewide Carbon Reduction Strategies. MDOT, VDOT, and DDOT will present their draft strategies and request comments.

Carbon Reduction Strategy

DRAFT October 2023

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MARYLAND DEPARTMENT OF TRANSPORTATION

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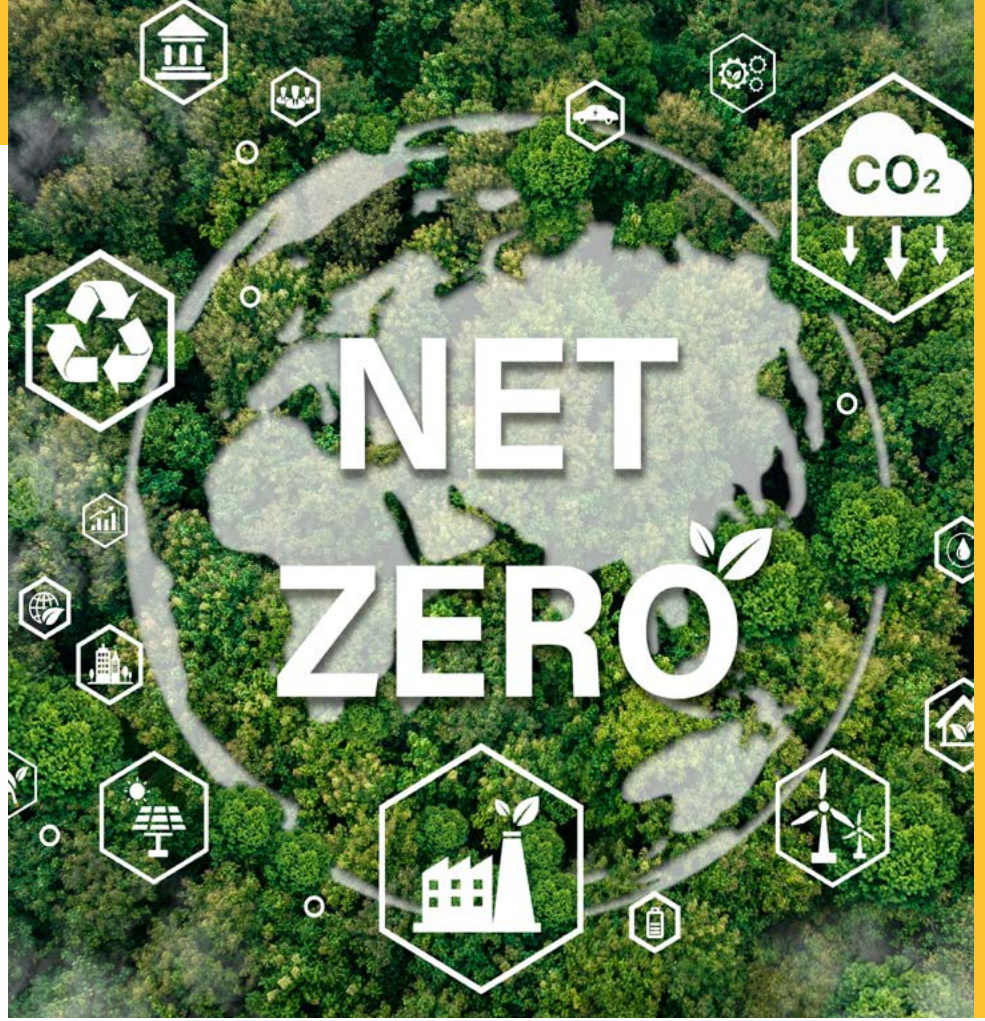
Executive Summary

The past decade (2010-2019) was the warmest in recorded history due in part to the increased concentration of greenhouse gases (GHGs) in the atmosphere leading to a warming planet. The transportation sector generates the largest share of GHG emissions in the United States, accounting for 27% of emissions in 2020, according to the U.S National Blueprint for Transportation Decarbonization. In Maryland, transportation is the leading emitting sector, accounting for 35% of emissions in 2020. The passage of the ***Bipartisan Infrastructure Law***, otherwise known as the ***Infrastructure Investment and Jobs Act (IIJA)*** in November of 2021 and the ***Inflation Reduction Act*** in August of 2022 resulted in historic investments to decarbonize the transportation system. More recently, the ***National Blueprint for Transportation Decarbonization***, spurred by a joint agreement among the U.S. Department of Energy, U.S. Department of Transportation, U.S. Environmental Protection Agency (US EPA), and U.S. Department of Housing and Urban Development, is a landmark strategy for cutting all GHG emissions from the transportation sector by 2050. This joint effort demonstrates the whole-of-government approach required to address the climate crisis.

Maryland has been at the forefront of identifying and deploying a variety of carbon reduction strategies since 2009. The State of Maryland and the Maryland Department of Transportation (MDOT) have sought to reduce carbon through strategic investments in projects, programs, policies, and infrastructure in conjunction with other State agencies, including the Maryland Department of the Environment (MDE). The 2016 reauthorization of the State's ***Greenhouse Gas Reduction Act (GGRA)*** (2016) required Maryland to achieve a minimum of 40% reduction in statewide GHG emissions from 2006 levels by 2030 across all economic sectors, including transportation. To achieve this goal, MDE developed the ***2030 GGRA Plan***. Published in 2021, the GGRA Plan set forth a comprehensive set of strategies to reduce GHGs across sectors, including investments in energy efficiency, clean and renewable energy solutions, clean transportation projects, widespread adoption of electric vehicles, and improved management of forests and farms to sequester carbon.

The ***Climate Solutions Now Act (CSNA)***, adopted in 2022 by the Maryland General Assembly, makes broad changes to the State's approach to reducing statewide GHG emissions and addressing climate change. The CSNA adjusted statewide GHG emission goals to include net-zero carbon emissions by 2045, and reduction of statewide GHG emissions by 60% from 2006 levels by 2031. The CSNA also requires MDE, in conjunction with other State agencies, including MDOT, to deliver a plan by December 2023 describing how the State will achieve the reduction goals.

The ***Carbon Reduction Program (CRP)*** established under IIJA requires the development of a Carbon Reduction Strategy (CRS) in coordination with the metropolitan planning organizations (MPOs) in the State. MDOT's CRS is being developed at an important, yet challenging time. The required submittal date for the CRS of November 15, 2023, means that several of Maryland's anticipated new carbon reduction measures will still be in draft form. Therefore, this CRS is focused on existing carbon reduction strategies that are currently "on-the-books" with the recognition that the CRS will be revised in coordination with the MPOs following the adoption of Maryland's new CSNA plan.

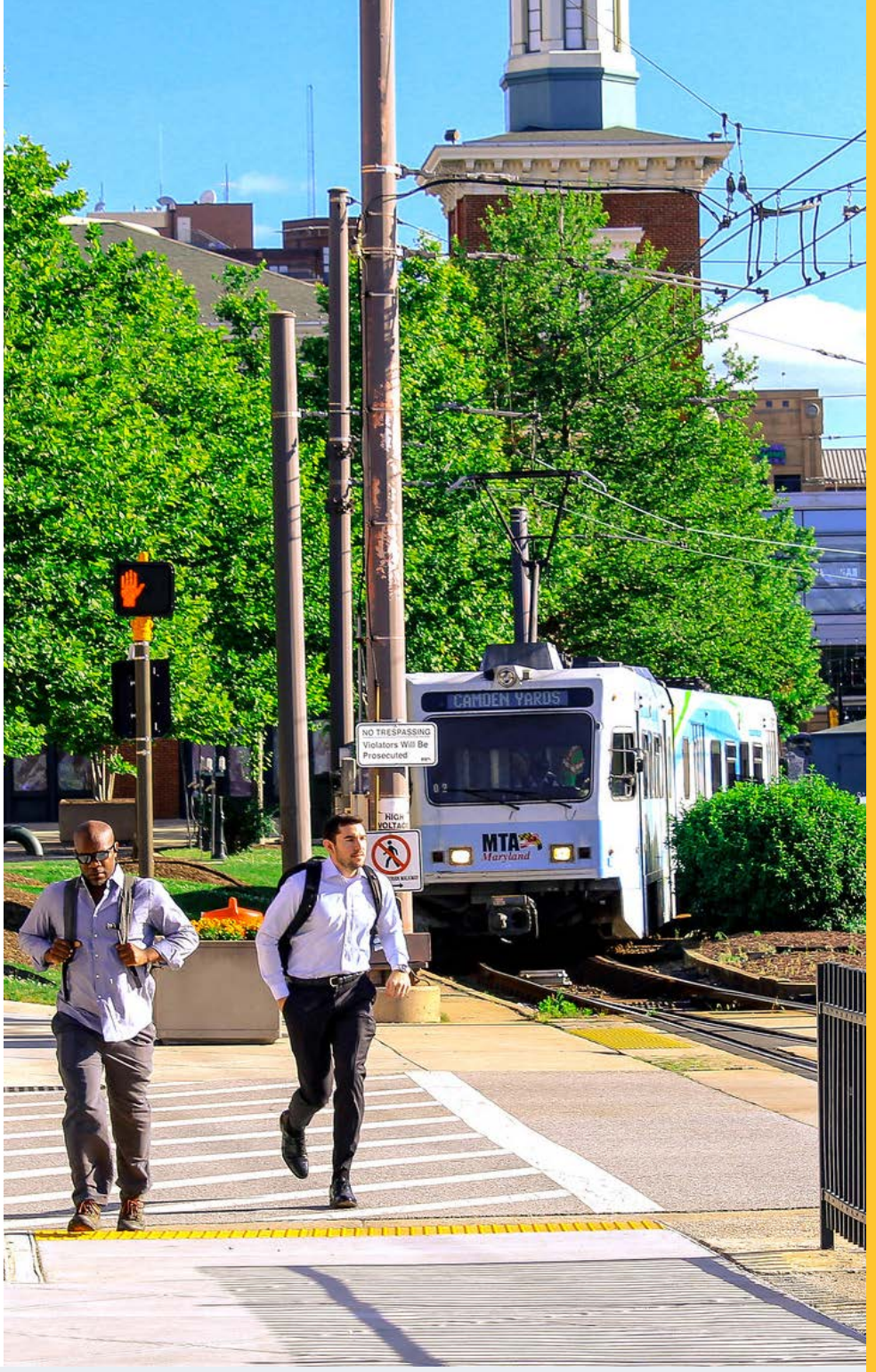


Across MDOT, efforts have been underway to implement existing strategies by identifying and funding investments that will significantly reduce carbon emissions from Maryland's transportation sector. The MDOT Office of Climate Change Resilience and Adaptation, housed within the MDOT Transportation Secretary's Office (TSO), is also working with the MDOT modal administrations and the Maryland Transportation Authority to incorporate climate change mitigation, resilience, adaptation, and risk management into policies, planning, project and program development, asset management, maintenance, design, construction, and operations. Several of Maryland's local governments and MPOs have also developed plans that address the reduction of GHG emissions, with some seeking to exceed State goal timelines. Through this region-wide coordination of transportation investments and land use planning, Maryland can continue to experience new growth that aligns with the carbon emission goals.

MDOT employs five major categories of transportation activities that support carbon reduction: technological advances, reductions in vehicle miles traveled (VMT), congestion mitigation, infrastructure design improvements, and emerging and innovative solutions. MDOT is taking a proactive role in promoting the intentional adoption and availability of technological advancements in several ways, including through chairing the Maryland Zero Emissions Electric Vehicle Infrastructure Council and the Connected and Automated Vehicles Working Group, two publicly available forums convening stakeholders to guide efforts. MDOT is also a member of the Maryland Commission on Climate Change and a participant in several of its Working Groups, including the Adaption and Resilience Working Group (ARWG) and the Mitigation Working Group (MWG). The programs and initiatives to help reduce VMT include investing in and supporting transit, cycling and walking, carpooling, vanpooling, telework, and transportation demand management strategies through programs such as the Statewide Commuter Choice Maryland Program, and locally through commuter programs administered by counties and municipalities receiving Congestion Mitigation and Air Quality (CMAQ) and Locally Operated Transit System (LOTS) grants. Programs that address congestion mitigation include the Transportation Systems Management and Operations suite and Coordinated Highways Action Response Team. MDOT also takes steps—through programs such as Complete Streets—to ensure that its infrastructure and roadways are designed to safely promote low-impact forms of travel. MDOT seeks innovative solutions to reduce carbon emissions, including public involvement strategies for projects using social media and text message surveys to expand outreach and engagement.

In alignment with these actions at the federal and state levels, MDOT's CRS summarizes Department-wide activities to reduce carbon emissions. The CRS also reflects existing federal, state, and regional policies pertaining to GHG emissions reductions from on-road transportation systems. Multiple measures currently deployed and under consideration are described, along with a strategy for identifying projects that will help MDOT advance its GHG reduction goals in coordination with the MPOs while meeting the requirements of IIJA and the Carbon Reduction Program.

MDOT is coordinating with the MPOs and modal administrations to identify projects eligible for CRP funds and develop a candidate list of carbon reduction activities and projects from the existing statewide and regional plans and programs. MDOT will continue this coordination with its partners to maintain an up-to-date list of eligible projects on an annual basis to effectively optimize and prioritize CRP funding. Specifically, for funds available from federal fiscal year (FFY) 2022 and 2023, focus is being placed on eligible projects that are implementation-ready or can deliver immediate carbon reduction benefits. MDOT, in close coordination with the MPOs, will continue to strategically obligate the funding available for future years to advance projects that benefit local communities and all Marylanders. MDOT will also monitor and report several performance metrics, including the equitable distribution of program benefits, to provide insight to future project development in later CRP funding years and help evaluate the success of CRP investments in Maryland. MDOT will also update this CRS document in coordination with the MPOs as new information becomes available.

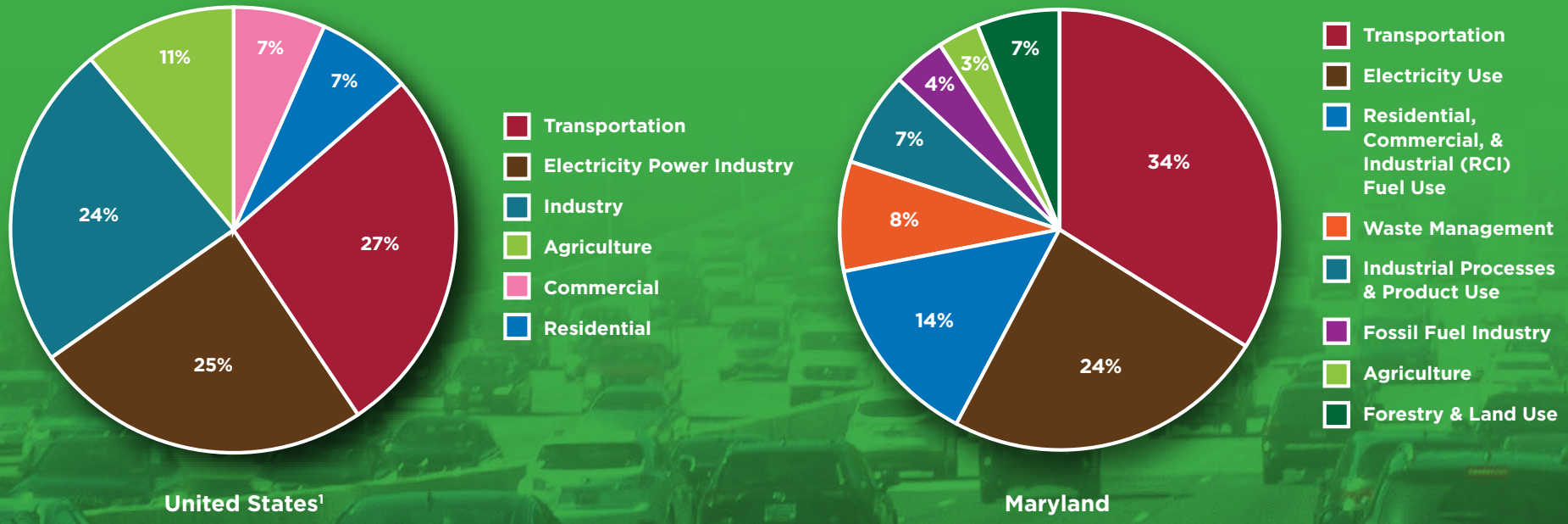


1. Introduction

The Maryland Department of Transportation (MDOT) is an organization comprised of the Transportation Secretary's Office (TSO), the Maryland Transportation Authority (MDTA), and five modal administrations including the State Highway Administration (SHA), Maryland Transit Administration (MTA), Motor Vehicle Administration (MVA), Maryland Port Administration (MPA), and Maryland Aviation Administration (MAA). This unique structure provides the State's leadership with the ability to develop a coordinated and balanced approach to transportation system investments.

As of 2020, the transportation sector generates the largest share of greenhouse gas (GHG) emissions in the United States accounting for 27% of emissions, whereas in Maryland, transportation accounts for approximately 34% of emissions (**Figure 1.1**). Among the fuel types available to power the transportation sector, gasoline far outweighs the other emissions sources, accounting for 66% in the U.S. and nearly 80% in Maryland in 2020 (**Figure 1.2**).

Figure 1.1 2020 Greenhouse Gas Emissions by Sector (million metric tons of CO2e)[1]



1. Totals may not add up to 100% due to rounding.
Source: www.epa.gov/ghgemissinos-greenhouse-gas-emissions
www.mde.maryland.gov/programs/air/climatechange/pages/greenhousegasinventory.aspx

Maryland's enacted GHG emissions reduction goals are among the most progressive in the nation, and agencies like MDOT have developed and implemented significant carbon reduction programs. In total, GHG emissions from Maryland's transportation sector decreased by approximately 31% from 2006 to 2020 (**Figure 1.3**). The GHG on-road emissions have decreased every year between 2006 and 2019, with significant reduction in 2020 related to the COVID-19 pandemic. Subsequently, both 2021 and 2022 are below 2019 levels as post-pandemic travel recovers. After achieving its 2020 GHG reduction goal to reduce statewide GHG emissions by 25% from 2006, Maryland established a new goal in 2022 through the ***Climate Solutions Now Act (CSNA)*** of achieving a 60% reduction from 2006 levels by 2031. The CSNA includes provisions to improve air quality and reduce climate pollution including transitioning vehicles, transit buses, and school buses to zero-emission technologies.

Figure 1.2 2020 Transportation Sector Emissions by Fuel Type[1]

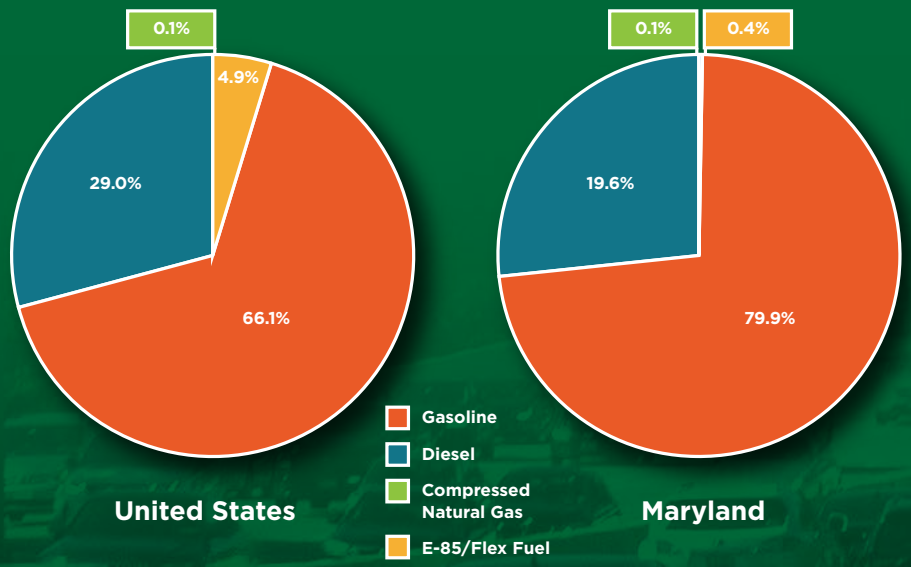
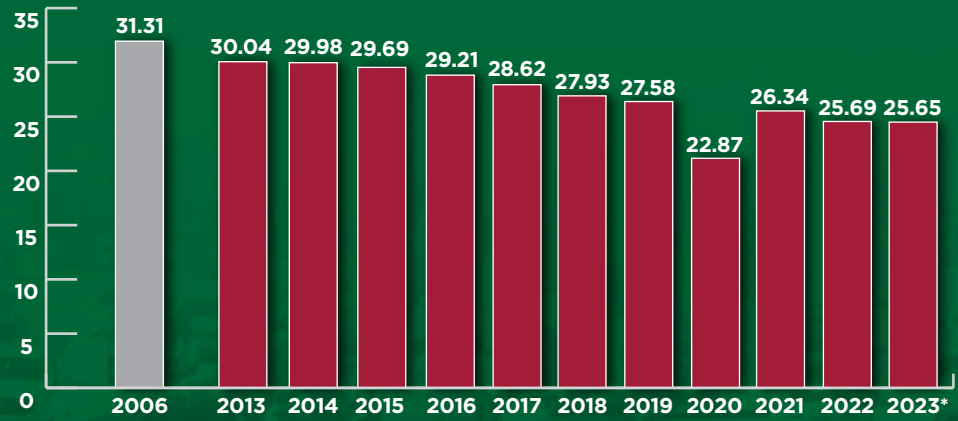


Figure 1.3 Maryland On-Road Transportation Sector Emissions from 2006 to 2022



*2023 data is estimated.
**Recent adjustments for EVs updated the 2020-2023 totals.

1. Totals may not add up to 100% due to rounding.
Source: www.nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P10153PC
www.mdot.maryland.gov/OPCP/Appendix A_MDOTGGRA_Plan.pdf

This ***Carbon Reduction Strategy (CRS)*** documents strategies, programs, and projects to further address transportation sector emissions. The CRS is in accordance with federal requirements and guidance for the ***Carbon Reduction Program (CRP)*** created by the ***Infrastructure Investment and Jobs Act (IIJA)*** and codified in 23 United States Code (U.S.C.) 175 and was developed in consultation with the metropolitan planning organizations (MPOs) in Maryland.

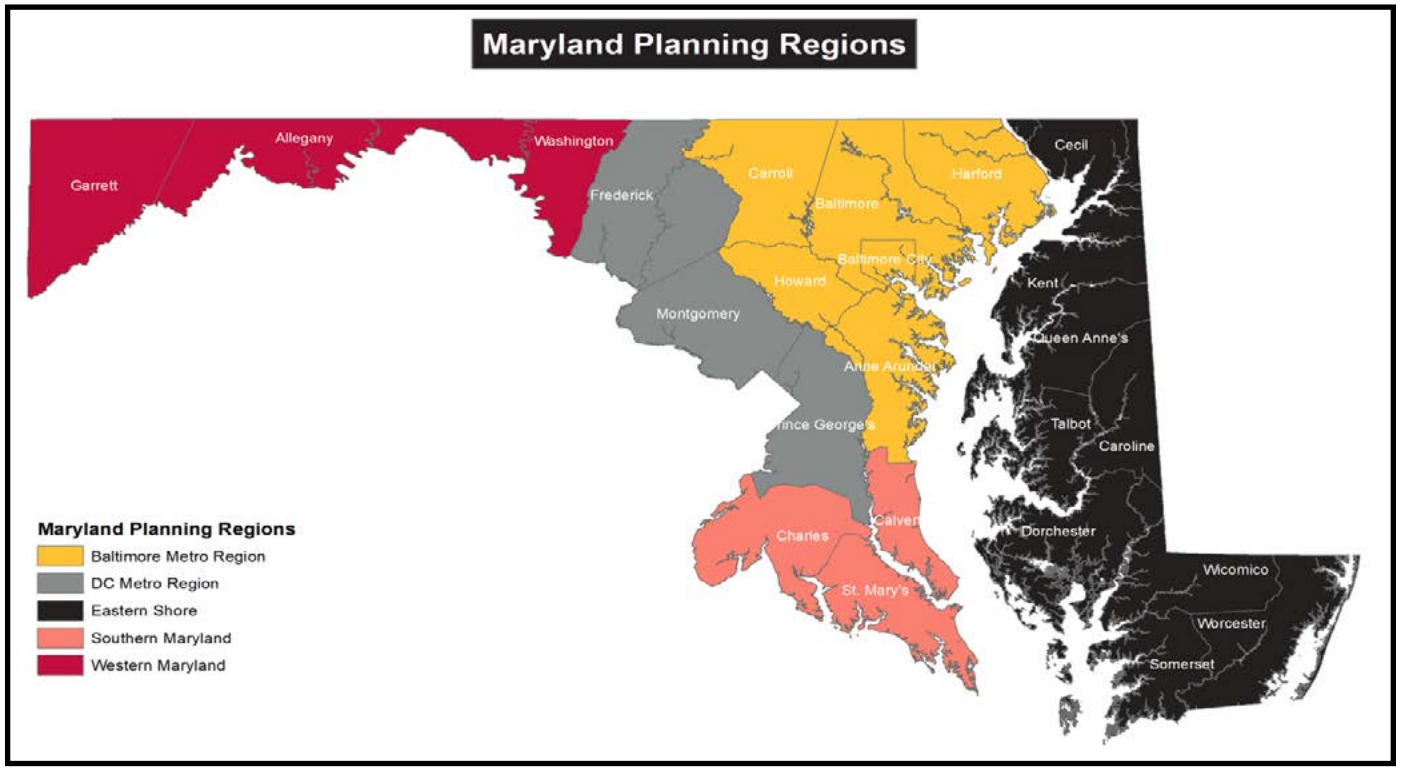
The CRP requires each state to identify projects and strategies that support efforts to reduce transportation emissions through safe, reliable, and cost-effective-options including:

- Reducing traffic congestion and vehicle miles traveled (VMT) by facilitating the use of alternatives to single-occupant vehicle trips, including public transportation facilities, pedestrian facilities, bicycle facilities, and shared or carpooled trips within the State.
- Facilitating the use of vehicles or modes of travel that result in lower transportation emissions per person-mile traveled as compared to existing vehicles and modes.
- Facilitating approaches to the material use and construction of transportation assets that result in lower transportation emissions compared to existing approaches.

The CRS builds upon the ongoing work at MDOT's modal administrations, MPOs and local governments, and outlines projects and strategies that will reduce transportation emissions to meet the State's overall emissions reduction targets. Carbon reduction is an inter-departmental government responsibility since no one entity has complete authority for implementing all the strategies that are necessary to accomplish the State's goals. This is why Maryland implements a collaborative, transformative, and comprehensive approach to carbon reduction for surface transportation.

Despite its small size, Maryland is incredibly rich in its geography, character, and transportation systems. The 2040 Maryland Transportation Plan (MTP), adopted in 2019, characterizes the State into five regions (**Figure 1.4**). This characterization includes

Figure 1.4 Maryland Planning Regions



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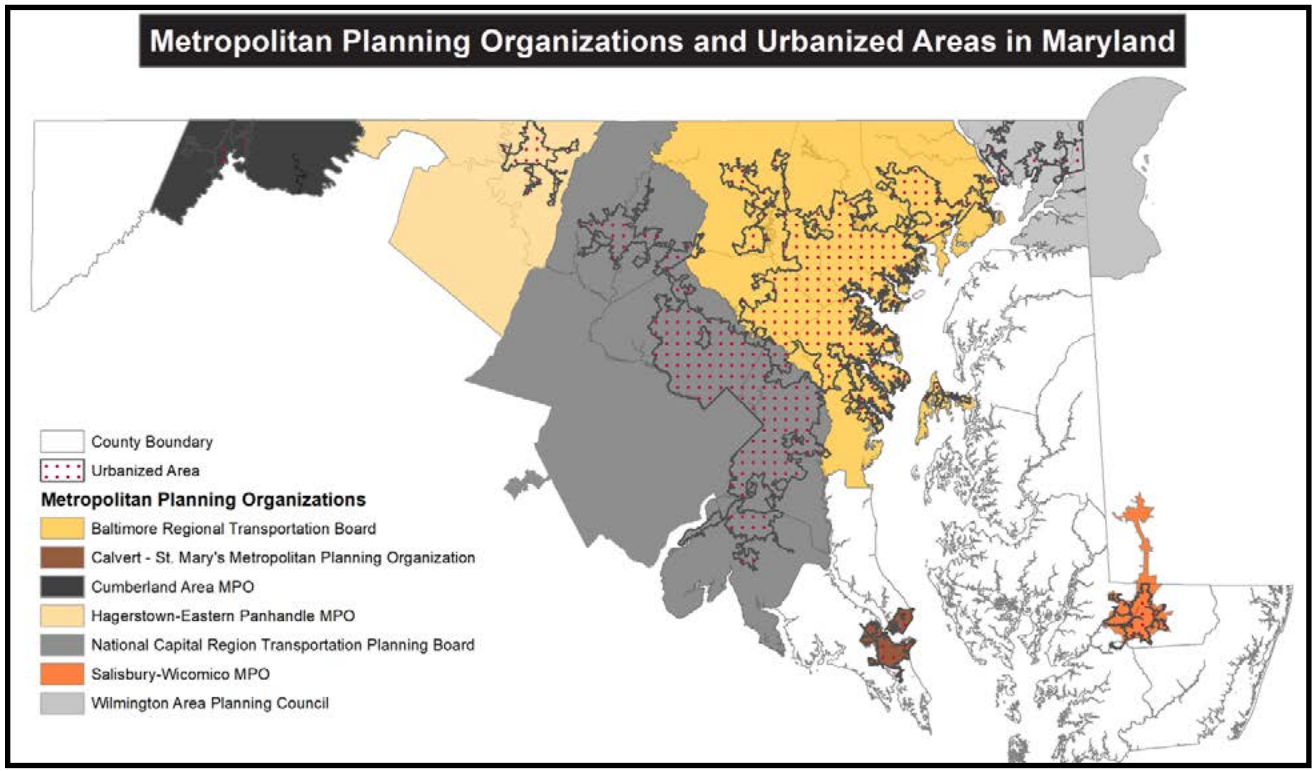
Maryland's 23 counties and the City of Baltimore to reflect shared trends in population density, topography, and development. Within these regions are seven MPOs, responsible for regional short- and long-range planning and programming (**Figure 1.5**). While there is overlap between the Maryland Planning Regions and MPO boundaries, they do not fully coincide.

This is a crucial time for developing the CRS to document Maryland's carbon reduction implementation approach for surface transportation. The CSNA establishes significantly stronger emission reduction goals that require major analysis of the State's carbon reduction strategies and a significant investment of capital and staff resources. The analysis portion of the CSNA is underway with a final document due after the deadline for submitting the CRS. The update to the State's long-range transportation plan, the 2050 MTP, is also underway and will establish the State's 20-year transportation plan to guide transportation policies and investment priorities. The MTP guiding principles, goals, and objectives inform– and are informed by– all transportation reports and plans in Maryland, creating a family of plans. These updated plans will still be in draft form by the time that the CRS is to be submitted. Therefore, this CRS highlights the numerous existing carbon reduction measures identified in the various existing plans and aligns with relevant policies and programs. Future updates of the CRS will incorporate any additional measures identified as part of these and other statewide planning initiatives. Given the unprecedented array of Maryland climate-related planning activities in 2023 and beyond, MDOT anticipates that this CRS document will also be updated in coordination with the MPOs more frequently than the required four-year cycle.

Figure 1.5 Maryland MPOs and Planning Boundaries



2. Relevant Policies and Programs

Maryland has been at the forefront of actively identifying and deploying a variety of carbon reduction strategies since 2009 driven by federal, state, and local policies and programs. The State of Maryland and MDOT have sought to reduce carbon through strategic investments in projects, programs, and infrastructure in conjunction with other State and regional transportation planning agencies.

2.1 Federal

The CRS reflects existing federal, state, and regional plans, programs, and funding opportunities pertaining to GHG emissions reductions from on-road transportation systems and seeks to capitalize on opportunities presented in each. The following presents an overview of these initiatives.

The Biden-Harris Administration has made a concerted effort to jump-start federal initiatives aimed at reducing climate impacts to infrastructure and the country. The ***IIJA***, also known as the Bipartisan Infrastructure Law, provides vital federal funding for highway, transit, and other multimodal projects. President Biden signed the IIJA on November 15, 2021, authorizing funding for Federal Fiscal Years (FFY) 2022 through 2026. This historic federal investment emphasizes a commitment to equity and addressing climate change. The ***Justice40 Initiative*** pairs with IIJA to confront and address decades of underinvestment in disadvantaged communities by bringing resources to communities most impacted by climate change, pollution, and environmental hazards. Justice40 is an opportunity to address gaps in transportation infrastructure and public services by working toward the goal that at least 40% of the benefits from many federal grants, programs, and initiatives flow to disadvantaged communities.

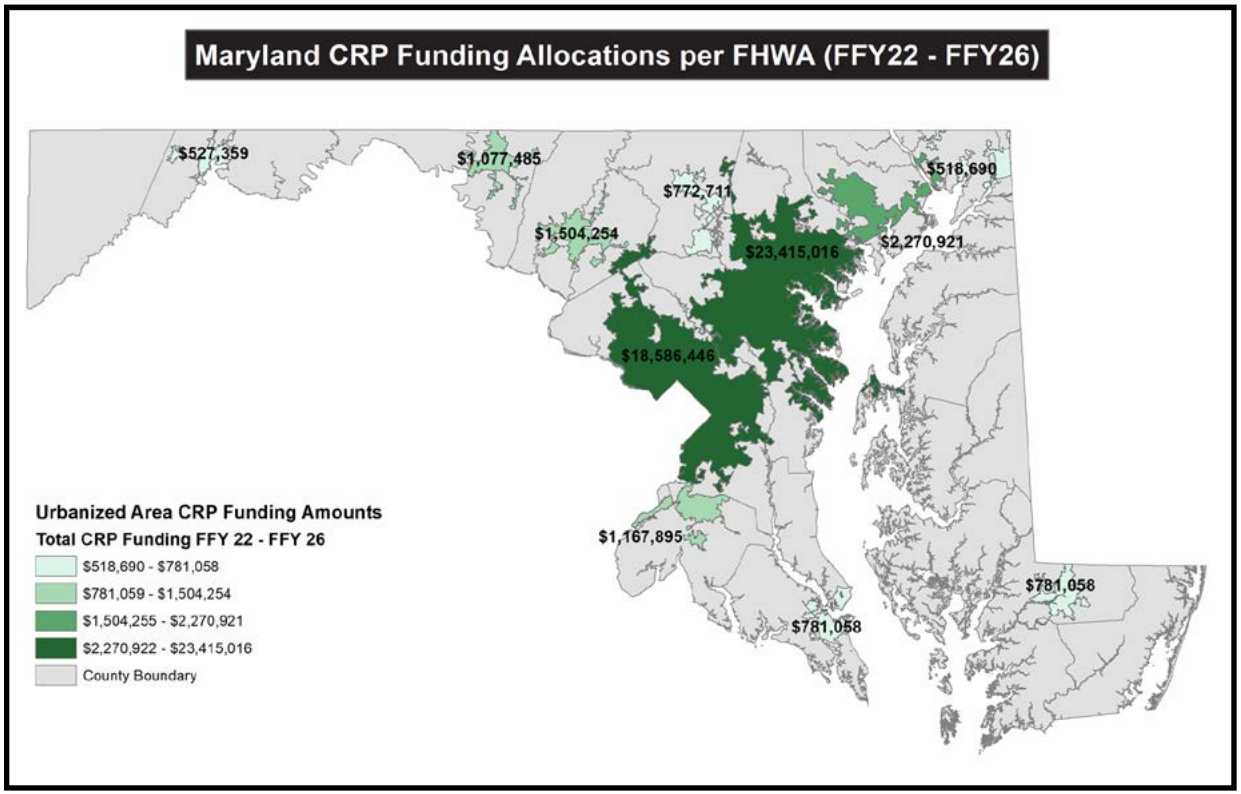
A landmark program in IIJA is the ***CRP*** administered by the Federal Highway Administration (FHWA). The CRP includes a total of over $94 million allocated to MDOT in formula funds for eligible transportation projects from FFY 2022 through 2026. The apportionment of these funds (65%) must be distributed among urbanized areas relative to population size, as outlined in **Table 2.1** and **Figure 2.1**.

Table 2.1 Maryland CRP Formula Funding Allocations per FHWA, Estimated Total for FFY 22 through FFY 26

Location	Suballocation (%)[1]	Suballocation ($)
Statewide	100	94,377,768
Distributed to areas in proportion to share of State's population[2]	**65**	**61,345,549**
Population greater than 200,000	**47**	**44,788,333**
Aberdeen--Bel Air South--Bel Air North	2	2,270,921
Baltimore	25	23,415,016
Philadelphia	1	518,690
Washington, DC	20	18,586,446
Population between 50,000 and 199,999	**7**	**6,455,940**
Cumberland	1	527,359
Frederick	2	1,504,254
Hagerstown	1	1,077,485
Lexington Park--California--Chesapeake Ranch Estates	1	625,574
Salisbury	1	781,058
Waldorf	1	1,167,895
Westminster—Eldersburg	1	772,711
Population between 5,000 and 49,999	**2**	**1,710,739**
Population below 5,000	**9**	**8,390,536**
Available for any area of the State	**35**	**33,032,219**

1. Totals may not add to 100% due to rounding.
2. Population estimates are currently based on the 2010 census, following FHWA computational tables (https://www.fhwa.dot.gov/bipartisan-infrastructure-law/funding.cfm).

Figure 2.1 Maryland CRP Formula Funding Allocations per FHWA, Total for FFY 22 through FFY 26



The *Carbon Reduction Program Implementation Guidance* prepared by FHWA outlines federal priorities on funding, eligible activities, and requirements of the CRP. References to federally supported priorities include equity and climate change, which ensures that the CRP advances a transportation network that effectively serves all community members while aligning with GHG reduction, climate resilience, and environmental justice commitments. Additional priorities include the safety and accessibility of a multimodal transportation network under the guidance of Complete Streets, the Americans with Disabilities Act, and Transit Flex. The CRP aims to also support national performance goals for improving infrastructure condition, safety, congestion reduction, system reliability, and freight movement on the National Highway System. Another outlined priority is to create labor and workforce opportunities to advance high-quality job creation, all while improving the transportation system. Opportunities exist to couple or stack CRP and other federal funds to maximize carbon reduction benefits.

Federal agencies are implementing multiple additional pieces of legislation, policy, and programs to spur a reduction in GHGs, including the following:

- The ***National Blueprint for Transportation Decarbonization*** is a landmark whole-of-government approach to addressing the climate crisis for cutting all GHG emissions from the transportation sector by 2050.
- The FHWA ***National Electric Vehicle Infrastructure (NEVI)*** Formula Program provides funding to states to strategically deploy electric vehicle (EV) charging stations and to establish an interconnected network to facilitate data collection, access, and reliability.
- FHWA has established a national network of alternative fueling and charging infrastructure along National Highway System corridors called ***Alternative Fuel Corridors (AFCs)*** as part of the Fixing America's Surface Transportation Act of 2015.
- The new ***Congestion Relief Program*** established under IIJA provides grants to advance innovative, integrated, and multimodal solutions to reduce road congestion and the related economic and environmental costs in the most congested metropolitan regions with an urbanized area having a population of at least 1 million.
- Competitive grant funding is available through the ***Reduction of Truck Emissions at Port Facilities Program*** for projects that reduce idling at port facilities, including port electrification and efficiency improvements particularly for heavy-duty vehicles.
- The ***Transportation Alternatives*** set-aside from the Surface Transportation Block Grant (STBG) Program seeks to reduce emissions and energy use by providing and encouraging nonmotorized travel.
- The ***Congestion Mitigation and Air Quality Improvement (CMAQ)*** Program, continues under IIJA after beginning in 1991 with the main goal of funding transportation projects that reduce regulated emissions associated with carbon monoxide, ozone, and particulate matter pollution in nonattainment and maintenance areas, often through congestion mitigation techniques.
- The ***Buses and Bus Facilities Program***, administered by the Federal Transit Administration, provides federal resources to states and direct recipients to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities, including technological changes or innovations to modify low- or no-emission vehicles or facilities.
- The ***Low- or No-Emission Vehicle Program*** provides funding to state and local governmental authorities for the purchase or lease of zero-emission and low emission-transit buses as well as acquisition, construction, and leasing of required supporting facilities.
- The ***Energy Efficiency and Conservation Block Grant Program*** administered by the U.S. Department of Energy creates a $550 million program for financing energy efficiency, renewable energy, and zero-emission transportation capital investments, projects, and programs.
- The ***Inflation Reduction Act*** provides $5 billion in grants administered by the U.S. Environmental Protection Agency (US EPA) to support states, municipalities, air pollution control agencies, tribes, and territories to develop and implement GHG reduction strategies through the ***Climate Pollution Reduction Grants Program***.

2.2 State Policies and Initiatives

Maryland has been at the forefront of actively identifying and deploying multiple methods to reduce GHG emissions including carbon for more than a decade. A summary of statewide GHG emissions reduction goals and associated policies, programs, and funding opportunities pertaining to transportation systems follows.

The ***Greenhouse Gas Reduction Act (GGRA)*** originally adopted in 2009, required the State to achieve a minimum of a 25% reduction in statewide GHG emissions from 2006 levels by 2020. The ***GGRA*** was reauthorized in 2016, and established expanded reduction goals, requiring Maryland to achieve a minimum of 40% reduction in statewide GHG emissions from 2006 levels by 2030 ("40 by 30") across all economic sectors, including transportation. To help achieve this goal, MDE developed the 2030 GGRA Plan, a statewide GHG reduction plan.

Published on February 19, 2021, the 2030 GGRA Plan set forth a comprehensive set of measures to reduce and sequester GHGs across sectors, including investments in energy efficiency and clean and renewable energy solutions, clean transportation projects, widespread adoption of EVs, and improved management of forests and farms to sequester more carbon in trees and soils. Progress made through implementation of the plan is projected to achieve a 50% reduction in GHG emissions from 2006 levels by 2030.

The 2020 MDOT GGRA Plan which comprises Appendix J of the overall Maryland 2030 GGRA Plan presents the MDOT strategies and approach to advance the goals of the GGRA. The overall purpose of this plan is to identify specific actions, including costs and benefits, for implementation through 2030 and assess the transportation sector's contribution to the "40 by 30" goal. MDOT developed two policy scenarios built from the 2040 MTP, the Consolidated Transportation Program (CTP) and/or the six-year capital budget, and Maryland's two major MPO plans and programs (for the Baltimore and Washington, DC, regions):

- **Policy Scenario 1**, "On the Books," evaluates the emission reductions over business-as-usual from funded projects and programs. This includes projects and programs in the CTP, land development assumptions consistent with local plans and Maryland Department of Planning goals, and GHG reducing projects included in fiscally constrained MPO metropolitan transportation plans.
- **Policy Scenario 2**, "Emerging and Innovative," acknowledges that attaining the 2030 goal will require additional investments to expand or accelerate deployment of previously planned strategies, deployment of new best-practice strategies, and capitalizing on the opportunities created by new transportation technologies. The 22 strategies in this scenario (16 emerging and 6 innovative) represent a combination of approaches to reduce GHG emissions with varying levels of confidence and MDOT responsibility.

In 2022, the Maryland General Assembly enacted the CSNA (Senate Bill 528 – Chapter 38 of the Laws of 2022). The Act replaces the goals and provisions of the GGRA, broadly changing the State's approach to reducing statewide GHG emissions and addressing climate change. Specifically, the CSNA adjusted statewide GHG emissions goals to include a net-zero carbon emissions goal by 2045 and a reduction of statewide GHG emissions by 60% from 2006 levels by 2031 (**Table 2.2**). The Maryland Department of the Environment (MDE) and MDOT are currently preparing the required plans to achieve these CSNA goals, which may include additional GHG reduction strategies not included in this CRS due to the deadline of November 15, 2023 for submittal to FHWA prior to finalization of CSNA plans.

Table 2.2 History of Maryland Statewide Greenhouse Gas Emissions Reduction Targets

Year Established	Legislation	Baseline Emissions Year	Target Reduction	Target Date
2009	Greenhouse Gas Reduction Act	2006	25%	2020*
2016	Greenhouse Gas Reduction Act Reauthorization	2006	40%	2030
2022	Climate Solutions Now Act	2006	60%	2031
		N/A	Net-zero	2045

*Achieved

The ***Maryland Commission on Climate Change (MCCC)*** was codified in 2015 alongside the GGRA reauthorization (Maryland Code, Environment, §2 1305) to advise the Governor and the Maryland General Assembly on strategies for reducing GHG emissions and deliberating science-based, equitable recommendations to combat the impacts of climate change on the State. The MCCC has played a fundamental role in Maryland's efforts to fight climate change, serving in an advisory capacity to the Maryland Department of the Environment (MDE) and other State entities. Additionally, it comprises a diverse set of stakeholders, policymakers, business representatives, advocates, and citizens who recommend programs and policies aimed at mitigation, adaptation, and resiliency in response to climate change. MDOT is an active member of the MCCC and its Working Groups and is required to submit an annual report that reflects progress toward meeting the goals of the GGRA. The MCCC and identified agencies have prepared Annual Agency Reports since 2015 detailing progress and performance. The MCCC Annual Report also includes a suite of policy recommendations, with the most recent status report published in 2022.

The MCCC 2022 Annual Report includes policy recommendations reflective of the newly adjusted statewide goal by the CSNA include the following:

- Rapid acceleration of the transition to zero-emission vehicles.
- Increased support for transportation alternatives to reduce VMT.
- Development of a cohesive plan by the MDE, Maryland Department of Natural Resources (DNR), MDOT, and University of Maryland Center for Environmental Science that defines the suite of models to be used by the State in addressing climate change mitigation and adaptation.

In accordance with requirements of the GGRA and CSNA, MDOT prepares an annual Climate Change Status Report sharing MDOT's progress towards achieving emission reduction targets and highlights recent and planned actions to continue to mitigate the impacts of climate change and reduce transportation sector GHG emissions.

On November 19, 2007, the Maryland General Assembly passed the Clean Cars Act, which adopted California's stricter vehicle emission standards. It represented the first program that directly regulates carbon dioxide (CO2) emissions. In addition to regulating GHG from passenger vehicles, the Clean Cars Program includes a Zero Emissions Vehicle mandate that car manufacturers must meet. The Clean Cars Act of 2022 (House Bill 1391) re-establishes a program within MDOT funded by the Maryland Energy Administration (MEA) to incentivize the purchase of new, zero emission passenger vehicles. MVA conducts vehicle emissions inspections through the Vehicle Emissions Inspection Program (VEIP) in partnership with MDE. VEIP plays an important part in Maryland's successful and ongoing efforts to create a healthier Maryland. Along with cleaner fuels and vehicles, VEIP has significantly reduced Maryland's air pollution problems.

Maryland has established a robust network of AFCs, successfully designating corridors for all five alternative fuels since FHWA's initial solicitation for corridor nominations in 2016. Currently, there are 23 EV AFCs, one compressed natural gas (CNG) AFC, one liquid natural gas (LNG) AFC, two liquefied petroleum gas (LPG) AFCs, and three hydrogen AFCs (pending) designated in Maryland. MDOT will continue to work with the Maryland Zero Emission Electric Vehicle Infrastructure Council (ZEEVIC) and key planning partners to explore and identify future infrastructure opportunities.

The **Maryland NEVI Plan** serves as Maryland's first State EV Infrastructure Deployment Plan as required under the FHWA NEVI Formula Program. This Plan acts as the foundation of Maryland's Zero Emission Vehicle Infrastructure Plan (ZEVIP). The ZEVIP vision is to continue leading the nation and strengthening our communities by providing equitable, reliable, and safe transportation electrification solutions. NEVI goals include the following in **Figure 2.2**.

Figure 2.2 Maryland NEVI Goals

2.3 Regional

At the regional scale, Maryland's seven MPOs are working toward plans that address the reduction of GHG emissions. The National Capital Region Transportation Planning Board (NCRTPB), for example, adopted regional, voluntary, on-road transportation-sector-specific goals to reduce GHG emissions 50% below 2005 levels by 2030 and 80% below 2005 levels by 2050. This goal is outlined in the Approved June 2022 *Visualize 2045 Long-Range Transportation Plan for the National Capital Region*. In the Baltimore region, US EPA awarded the Baltimore Metropolitan Council a $1M Climate Pollution Reduction Grant for planning. Seven local jurisdictions of the Baltimore-Columbia-Towson Metropolitan Statistical Area and the Baltimore Metropolitan Council are coming together in an effort to develop a shared plan for moving the region forward in addressing harmful greenhouse gas emissions. This shared effort will consist of a Priority Climate Action Plan, due March 31, 2024; a Comprehensive Climate Action Plan, due two years from the date of the award; and, a Status Report, due at the close of the four-year grant period.

Local governments within Maryland are also continuing to make strides to reduce contributions to GHG emissions. Six jurisdictions have developed specific climate action plans that address climate threats, identify goals, and provide key steps to mitigate GHG emissions.

Together the policies and programs outlined at the federal, state, and local levels depict the commitments by the State of Maryland to reduce emissions, GHGs, and carbon through a range of strategies and measures.

3. Transportation Planning and Programming Alignment

The CRS aims to leverage and build upon ongoing planning processes outlined in existing statewide and regional plans and programming documents. These documents support projects that reduce transportation emissions in the State of Maryland. Relevant transportation planning and programming documents are described herein. Every agency, ranging from counties and municipalities, MPOs, to MDOT has a role in identifying and supporting the development of projects that reduce transportation carbon emissions.

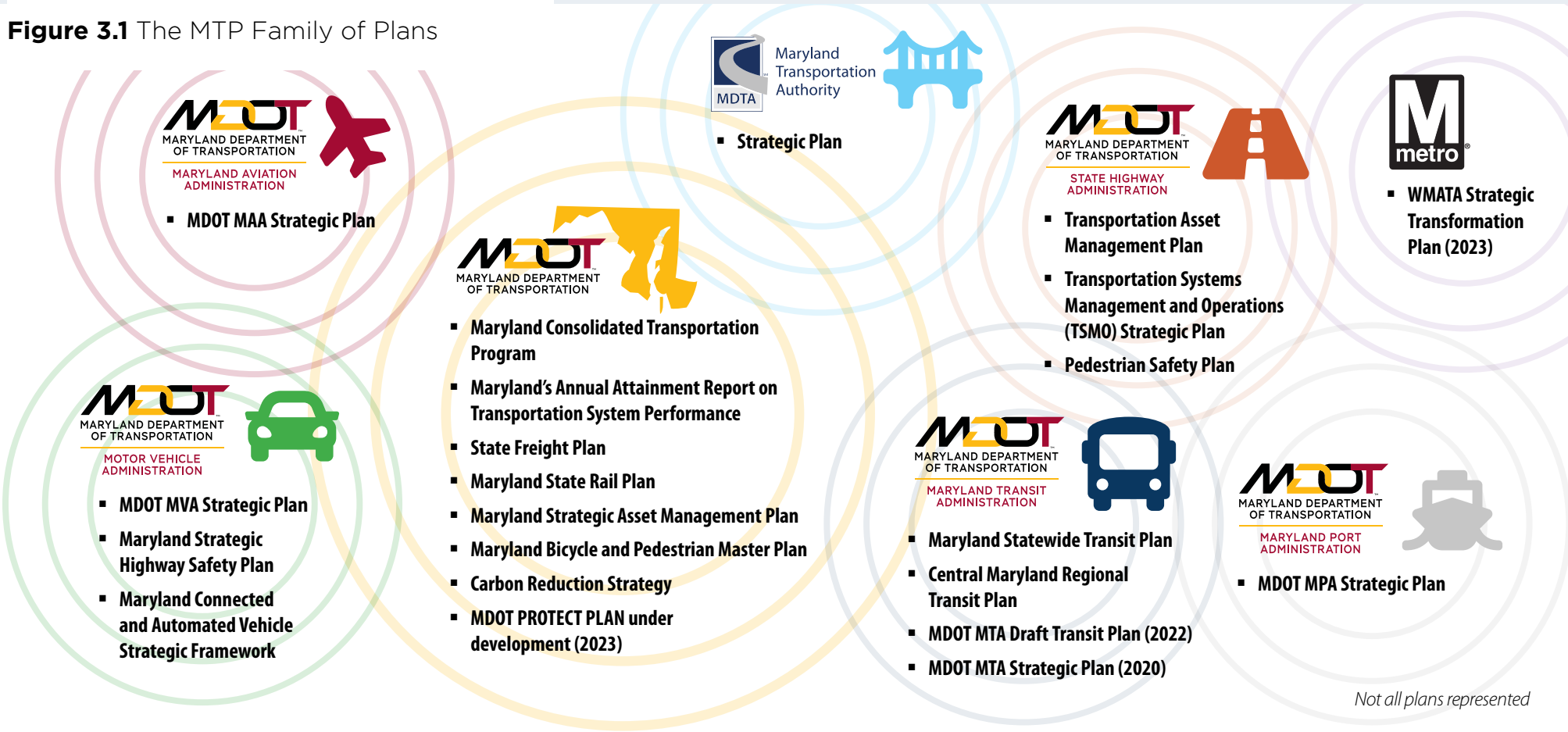
3.1 Statewide

All statewide documents work together to guide MDOT's priorities and future investments. Integrated long-range and strategic plans, such as the MTP, the Statewide Freight Plan, Statewide Rail Plan, Strategic Highway Safety Plan, Bicycle & Pedestrian Master Plan and GGRA Plan create an opportunity for MDOT to connect statewide goals with its overall mission.

The ***Maryland Transportation Plan or the 2050 MTP***, is currently under development and will be completed by January 2024. The 2050 MTP will be the new 20-year long-range statewide transportation plan guiding transportation policies and investment priorities. The MTP's guiding principles, goals, and objectives inform, and are informed by, all the transportation reports and plans in Maryland, creating a family of plans. As mentioned above, MDOT intends to update this CRS more frequently than required by federal law given the pivotal planning activities currently underway, including updating and upgrading the MTP. In short, MDOT is poised to develop an updated family of plans better suited to a future governed by new State law and policy priorities for 2023 and beyond.

Meanwhile, the current 2040 MTP highlights MDOT's commitment to deliver sustainable transportation infrastructure improvements that protect and reduce impacts to Maryland's natural, historic, and cultural resources. MDOT identifies many approaches to strategically modernize infrastructure through new and innovative technology, such as the clean development of infrastructure to support alternative fuels and plug-in locations for EVs. The current MTP provides much of the strategic direction that informed the development of the CRS, as its scope covers all five MDOT Modal Administrations and the MDTA (**Figure 3.1**).

Figure 3.1 The MTP Family of Plans



Goals outlined in the current 2040 MTP related to the reduction of GHG emissions include the following:

- Facilitate Economic Opportunity and Reduce Congestion in Maryland through Strategic System Expansion[2].
- Maintain a High Standard and Modernize Maryland's Multimodal Transportation System.
- Improve the Quality and Efficiency of the Transportation System to Enhance the Customer Experience.
- Ensure Environmental Protection and Sensitivity.
- Provide Better Transportation Choices and Connections.

[2] Per the CRP Guidance, "Consistent with the goal of reducing transportation emissions, projects to add general-purpose lane capacity for single occupant vehicle use will not be eligible [for CRP funding] absent analyses demonstrating emissions reductions over the project's lifecycle"

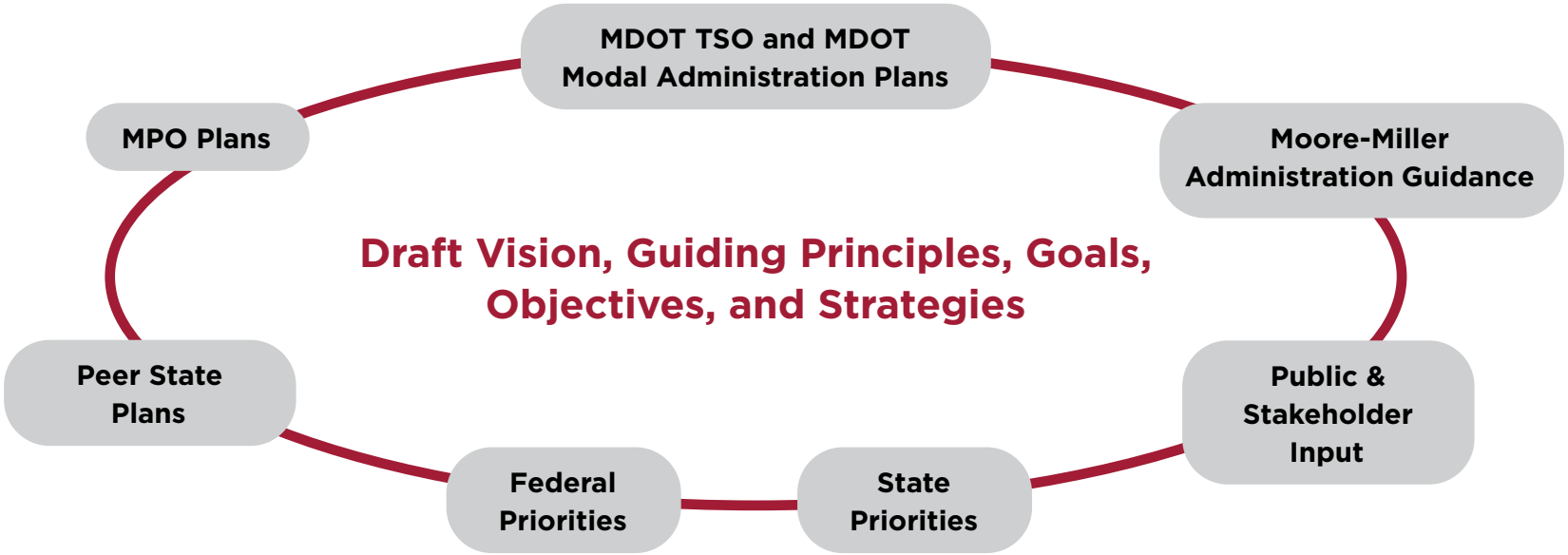
Objectives outlined in the MTP related to the reduction of GHG emissions include the following:

- Strategically modernize infrastructure through new and innovative technology, enhanced partnerships, design standards, and practices to facilitate the movement of people and goods.
- Implement initiatives to reduce fossil fuel consumption, mitigate GHGs, and improve air quality.
- Enhance transportation networks, through statewide, regional, and local coordination, to improve mobility and accessibility.
- Increase and enhance multimodal connections to improve movement of people and goods within and between activity centers.
- Inform and educate customers on transportation options and benefits.
- Strategically invest in expansion and operational improvements to reduce congestion along the multimodal transportation system.

As described above, while operating under this current set of goals and objectives MDOT is preparing an improved and updated 2050 MTP in coordination and collaboration with Maryland stakeholders and partners as required by federal and state policies. The 2050 MTP will be consistent with the CSNA Plan, due per statute by December 31, 2023, and the CRS document as well as other members of the Maryland family of plans.

The draft 2050 MTP Guiding Principles already align the mission, values, and capabilities and serve as overarching, cross cutting ideas that MDOT strives for through each of the goals (**Figure 3.2**).

Figure 3.2 MTP Draft Vision, Guiding Principles, and Goals



The ***Maryland Consolidated Transportation Program or CTP*** is Maryland's 6-year capital budget for transportation projects and programs across the Department that is updated annually. A main theme within the CTP is MDOT's effort to improve air quality, reduce congestion, and lower GHG emissions. Each year, the ***Attainment Report on Transportation System Performance (AR)*** evaluates the performance of the State's transportation system and reports on progress toward reaching the seven key goals listed in the existing MTP, including Ensure Environmental Protection and Sensitivity. The CTP, AR, and MTP form the ***State Report on Transportation*** also published annually.

Projects within the CTP work to expand or significantly improve facilities or services that may involve planning, environmental studies, design, right-of-way acquisitions, construction, or the purchase of essential equipment related to the facility or service. The Maryland ***Statewide Transportation Improvement Program (STIP)*** is a 4-year, fiscally constrained, prioritized set of transportation projects that are compiled from statewide, local, and regional plans. The STIP comprises the Annual Consultation Process, known as the Fall Tour, in which the CTP is presented to each of the local jurisdictions.

As noted earlier, MDOT also produces the annual Climate Change Status Report that illustrates the progress made toward reducing transportation sector GHGs, which is submitted to the MCCC and the Maryland General Assembly.

MTA published the ***Central Maryland Regional Transit Plan (RTP)***, a 25-year plan for improving public transportation in Central Maryland (Anne Arundel County, Baltimore City, Baltimore County, Harford County, and Howard County) by addressing traditional transit service, such as buses and trains, and exploring new mobility options and technologies.

Table 3.1 MDOT Statewide Planning Timeframes for Documents related to CRS Initiatives

Document	Published	Planning Timeframe
Maryland Transportation Plan	2019	2020-2040 (20 years)
Maryland Consolidated Transportation Program	2022	FY 23 – FY 28 (6year capital budget)
Maryland Statewide Transportation Improvement Program	2021	FY 22 FY 25 (4year, fiscally constrained prioritized projects)
State Report on Transportation	2023	2023 (AR, CTP, and MTP)
Attainment Report on Transportation System Performance	2023	2023
Bicycle & Pedestrian Master Plan	2019	2020-2040 (20 years)
Transportation Systems Management & Operations Plan	2018	2018
Pedestrian Safety Action Plan	2023	2023

MTA published Maryland's first draft ***Statewide Transit Plan (STP)*** in January 2022, with the expectation for the final plan to be published in 2023. The STP provides a 50-year vision of coordinated local, regional, and intercity transit across the State with goals and strategies targeted toward increasingly coordinated, equitable, and innovative mobility. Within the plan, MTA encourages Maryland transit agencies to continue to prepare and implement a transition to a low- or zero-emission fleet. This transition includes the retrofitting of existing transit facilities and corridors to charge and maintain new types of electric or zero-emission vehicles and associated systems. These projects are among several public transit projects that are currently being considered for CRP funds.

The 2019 ***Bicycle and Pedestrian Master Plan***, sets short- and long-term policy and implementation objectives to improve safety, access, and mobility for people walking, biking and using micromobility, such as e-scooters. The Plan also identifies Short Trip Opportunity Areas (STOAs) where mode shift is more likely for short distance trips. Currently being updated, the Plan will build on recent State and federal vulnerable road user plans and suggest strategies to advance e-bike incentives. The updated 2050 Bicycle and Pedestrian Master Plan will be published in January 2024.

The 2022 ***Maryland State Rail Plan*** is a 25-year plan outlining investment needs for public and private passenger and freight rail in Maryland. According to the U.S. Bureau of Transportation Statistics, intercity passenger rail uses 47% less energy to carry a person one mile compared to automobile transportation. This figure represents average energy usage for all Amtrak services nationally, and since the energy footprint in the electrified Northeast Corridor can be expected to be significantly smaller, mode shift here would result in even more efficient energy consumption and less GHG emissions.

The 2022 ***Maryland Freight Plan*** assesses Maryland freight movements and multimodal network. An assessment of freight performance data related to quality of service, efficiency, and customer experience demonstrates the ongoing challenges in freight performance data. These challenges included wasted fuel, emissions, and other aspects of freight-related congestion, particularly in critical urban corridors and the Port of Baltimore. The Plan highlights ongoing strategies and new opportunities that work to improve efficiency and reduce emissions related to freight movement. For instance, MPA offers up to $30,000 toward the replacement of older model dray trucks to help reduce air pollution and GHG as part of its "Dollars for Drays" Program.

The Maryland ***Statewide Truck Parking Study***, published in 2020, assesses the truck parking needs statewide and develops opportunities and actions to improve truck parking in Maryland. Nearly 60% of freight-related emissions can be traced back to heavy-duty truck activity. In efforts to meet the fuel economy standards and mitigate the health and air quality impacts of trucking activities, vehicle makers have targeted innovation in truck powertrain systems. Current powertrain technologies have reduced the emissions of trucks, but electric motors provide an opportunity to substantially reduce the emissions associated with freight transportation. Opportunities also exist to enhance existing facilities with advanced truck stop electrification systems, a CRP eligible activity.

MDOT's 2019 ***Strategic Asset Management Plan*** focuses on the 2040 MTP long-term goals of ensuring a safe, secure, and resilient transportation system, maintaining a high standard and modernizing the multimodal system, improving the quality and reliability of the system to enhance the user experience, and promoting fiscal responsibility. Each modal administration and the MDTA collaborates and shares knowledge and best practices relative to asset management. These ***Transportation Asset Management Plans*** work to strategically manage assets through asset inventory, condition assessment, determining criticality of each asset, and developing minimum data standards for assets.

Table 3.2 MDOT Modal Administration Planning Timeframes

Document	Agency	Published
2024 Regional Central Maryland Transit Plan	MTA	2020
Statewide Transit Plan	MTA	2022 (Draft)
State Freight Plan	MDOT	2022
State Rail Plan	MDOT	2022
Statewide Truck Parking Study	MDOT	2020
Strategic Asset Management Plans	MDOT	2019

3.2 Regional

In addition to statewide planning and programming, there are also significant regional planning activities led by the MPOs. The planning process varies for each region, some occurring on a regular cycle and others as required. MDOT and each of the MPOs are aligned in making the investments required to reduce GHG. Each MPO has its own mission, vision, and goals for how to accomplish its priorities. These goals are unique and were developed independent of one another – however, there are certainly commonalities and areas of overlap to create a sustainable transportation system.

Long-Range Transportation Plans (LRTPs) provide information on the region's transportation goals and policies as well as socioeconomic, environmental, and other factors that affect the operation of the transportation system over 20- to 30-year periods. LRTPs include a list of planned major federally funded capital projects, their estimated costs, and the revenues reasonably expected to be available to fund these projects. LRTPs are generally updated every 4 years by their respective MPOs. **Table 3.3** highlights the current LRTP for each of Maryland's MPOs.

Table 3.3 MPO LRTP Planning Timeframes

MPOs	Current Planning Period	Adopted
CAMPO	2050 Plan	March 2021
HEPMPO	Direction 2050	May 2022
NCRTPB	Visualize 2045	June 2022
BRTB	Maximize 2045; Resilience 2050	July 2019; July 2023
WILMAPCO	2050 Regional Transportation Plan	March 2023
S/WMPO	Connect 2050	December 2019
C-SMMPO	Moving Forward 2045	March 2020

Transportation Improvement Programs (TIPs), which are generally updated every year, provide a 4-year listing of federally funded transportation projects. The TIP is the programming element of the LRTP, listing projects with committed funds and schedules. **Table 3.4** highlights the current TIP for each of Maryland's MPOs.

Table 3.4 MPO TIP Planning Timeframes

MPO	Current Planning Period	Adopted	Update Planning Period
CAMPO	FY 2022-2025	March 2021	FY 2023-2026
HEPMPO	FY 2023-2026	May 2022	FY 2025-2028
NCRTPB	FY 2023-2026	June 2022	FY 2024-2027
BRTB	FY2024-2027	July 2023	FY 2025-2028
WILMAPCO	FY 2023-2026	May 2022	FY 2024-2027
S/WMPO	FY 2023-2026	December 2022	FY 2024-2027
C-SMMPO	FY 2021-2024	June 2020	FY 2024-2027

Coordination is ongoing between MDOT and the MPOs to identify preferred CRP-eligible projects to prioritize for funding. Ultimately, a project must be included in the STIP and/or an MPO TIP for CRP funding to be obligated. Together, the LRTP and TIP provide an overview of each MPO's transportation planning and programming efforts.

Annually, each county in Maryland and Baltimore City submits a letter of their Transportation Priorities to MDOT, highlighting transportation needs and opportunities for their jurisdiction. MDOT reviews these priority letters and kicks off an annual tour in the fall to meet with each county and Baltimore City and share the Draft CTP. The CTP is revised based on the priority letters, State needs, State goals, and funding availability. These priority letters represent an important opportunity for the Counties to identify potentially eligible carbon reduction projects in the future.

Maryland's two largest transit operators, MTA and Washington Metropolitan Area Transit Authority (WMATA), and several local and intercity transit providers serve the Baltimore and Washington metropolitan regions. For the purposes of the CRS, the MDOT Office of Climate Change Resilience and Adaptation (OCCRA) reviewed relevant WMATA plans to ensure that the CRS considers regional providers that provide service within Maryland. For the first time ever, WMATA is implementing an Energy Action Plan to reduce the Authority's energy use, contain operating costs, and help the region move forward sustainably by avoiding regional CO2 emissions. As one of the single largest energy users in the region, Metro is an important partner for meeting regional energy goals. By implementing this Plan, Metro continues to incorporate energy-efficient design standards in major facilities under development as well as throughout its system service delivery.

The 2020-2021 Metro Sustainability Report highlights achievements in sustainability from the reporting period of January 2020 to December 2021. One of these achievements is the adoption of a Sustainability Vision and its eight Sustainability Principles. Naming sustainability as a core value of Metro supports efforts to improve cost-effectiveness, achieve climate and environmental goals, and contribute to livable and equitable communities. In June 2021, Metro was awarded a new District of Columbia electric supply contract that requires the supplier to provide 50% of the electricity from renewables. This movement to decarbonize transit aids the improvement of regional air quality and has supported healthy communities, particularly those that have been disproportionately impacted by poor air quality.

4. Ongoing Carbon Reduction Strategies

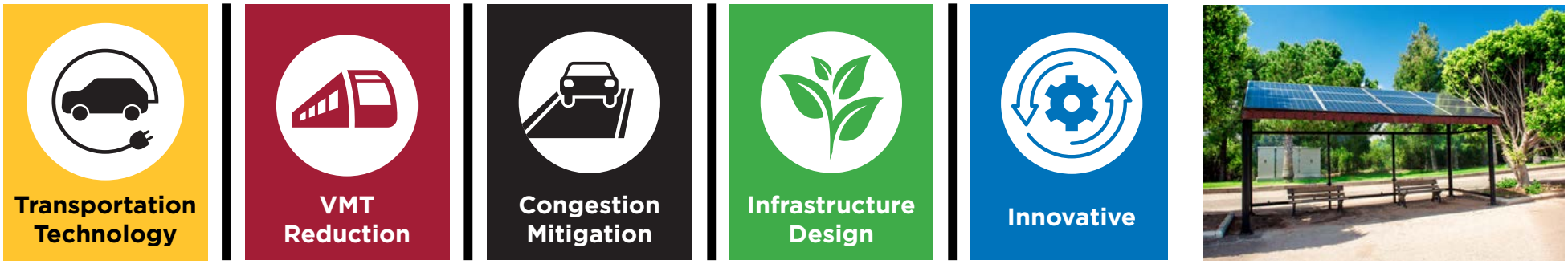
*Maryland currently employs a variety of carbon reduction strategies that are referenced in the existing MTP and the GGRA Plan. As outlined in the 2022 MDOT Climate Change Status Report, there are four major categories of transportation activities used by MDOT to support carbon reduction (**Figure 4.1**). MDOT is also considering additional opportunities to expand carbon reduction efforts as explored in the fifth category. Each category involves specific strategies detailed in the following sections. The strategies outlined in **sections 4.1 – 4.4** are all eligible for CRP funding (23 U.S.C. § 175(c)), whereas some strategies identified in **section 4.5** may not be directly eligible and further analysis is required to demonstrate reductions in transportation emissions over the project's lifecycle for CRP funding approval.*

In addition to MDOT, the MPOs also employ numerous carbon reduction measures, which are included in their respective LRTPs and policies. For example, the NCRTPB established the Resolution on the Adoption of On-Road Transportation Greenhouse Gas Reduction Goals and Strategies (Resolution 18–2022), which adopts seven GHG reduction strategies to reduce on-road transportation GHG emissions and identifies seven other GHG reduction strategies for further coordinated discussions.

The potential carbon reduction benefit is identified for each of the carbon reduction strategies that are outlined in **sections 4.1 – 4.5**.

Strategies are categorized as having the potential for high (H), medium (M), or low (L) carbon reduction benefits if implemented. The expected time period for implementation of each strategy is also included. The time period for implementation is near-term (N), meaning expected to significantly underway within the next 2-5 years, mid-term (M), meaning expected to occur within 5-10 years, or long-term (L) meaning expected to occur within 10 years or more. For each strategy, the source of reference, such as the MTP, MDOT GGRA Plan, Statewide Transit Plan, or the State Freight Plan, is also noted.

Figure 4.1 Greenhouse Gas Mitigation Activities



4.1 Transportation Technology

Advancements in vehicle, infrastructure, and fuel technologies lower fossil fuel consumption and the level of carbon emitted per mile traveled, in addition to improving system efficiencies and safety. As vehicle technology evolves and becomes more reliable and less costly, market share is growing. Multiple opportunities in technological advances have been identified and described in the GGRA Plan and provided here. MDOT is taking a proactive role in promoting intentional adoption and availability of these technological advancements through chairing the Maryland ZEEVIC and the Connected and Automated Vehicles (CAV) Working Group, two publicly available forums convening stakeholders to guide efforts. **Table 4.1** shows a variety of Maryland's strategies for transportation technology carbon reduction measures.

Table 4.1 Transportation Technology Carbon Reduction Measures

Strategy	Potential Carbon Reduction Benefit	Time Period
Ramp up EV Market Share (GGRA)	**H**	**M**
Promote electric vehicle infrastructure around the State (MTP)		
Install electric vehicle charging devices at parking lots along the Metro Subway Link, Light Rail Link, MARC, and Commuter Bus systems (MTP)		
Incentivize the demand for clean low carbon fuels and the development of infrastructure to provide for increased availability/accessibility of alternative fuels and plug-in locations for electric vehicles (MTP)		
Transform the MDOT Vehicle Fleet Innovation Plan (GGRA)	**M**	**M – L**
Reduce emissions by transitioning to zero-emission transit vehicles as technology becomes available, proven, and cost-effective (Transit)		
Replace BWI Airport parking shuttle buses (GGRA)		
Promote and/or incentivize fuel-efficient technologies for medium and heavy-duty trucks (MTP)	**M – H**	**M – L**
Deploy other Commercial Vehicle Technologies (Idle Reduction, Low-Carbon Fleet, Dynamic Routing) (GGRA)		
Encourage and incentivize retrofits and/ or replacements of old, diesel-powered non-highway engines, such as switchyard locomotives, with new hybrid locomotives (MTP)		
Continue the Port of Baltimore Drayage Truck Replacement Program (MTP)		

Table 4.1 Transportation Technology Carbon Reduction Measures (Continued)

Strategy	Potential Carbon Reduction Benefit	Time Period
Implement current state-of-the-practice in truck parking availability technology systems where appropriate and feasible (MTP)	**M**	**L**
Increase truck parking facilities in key locations through innovative project delivery solutions and partnerships with private travel service providers (MTP)		
Implement Connected and Automated Vehicle (CAV) pilots and support CAV testing through partnerships to build experience and attract partner investment in Maryland (MTP)	**L – M**	**M – L**
Support CAV technology to build experience and attract partners, integrate the technology and investments, and explore/expand deployment opportunities in Maryland (MTP)		
Implement robust telecommunications infrastructure, and enhanced road markings and signage to provide foundational needs of a CAV program (MTP)		
Implement an internal and external outreach program related to CAV and continue involvement in national CAV activities and through the MDOT CAV Working Group (MTP)		

4.2 VMT Reduction

Reducing VMT, particularly relative to population growth, is crucial to reducing GHG emissions by offering alternatives to carbon-intensive modes of travel, like single occupancy vehicles. The strategies to change travel behavior vary widely, often include a combination of disincentives to driving alone and incentives to choosing alternative options, and are influenced by multiple factors including land use, access and reliability of alternative options, and housing. Strategies also depend on consumer knowledge of alternatives to driving alone, confidence in and ease of using transportation technologies and systems, and perception of value and time that influence how and why individuals travel. Strategies that encourage VMT reduction are important for ensuring equitable access and to sustain reduced GHG emissions, especially as vehicles become more energy efficient.

MDOT programs and initiatives help reduce VMT and single-occupant vehicle travel by investing in and supporting transportation demand management (TDM) strategies that encourage transit, cycling and walking, carpooling, vanpooling, and trip avoidance through options like telework and alternative work schedules. For transit, there is an emphasis on improving service quality and reliability, better aligning transit service to demand, and improving transit information dissemination to customers. MTA launched CharmFlex, a new discounted fare option to accommodate Marylanders returning to onsite work in a more flexible or hybrid work schedule.

MDOT Modal Administrations work together to advance bicycle - and pedestrian-supportive designs and policies to encourage

non-motorized travel options. For example, the MDOT Kim Lamphier Bikeways Network Program identifies and funds projects which maximize bicycle access, fill missing gaps in the State's bicycle network, and enhance last-mile connections to work, school, shopping and transit. Other strategies to address last-mile connection include shared and micromobility including bicycles, scooters, electric-assist bicycles (e-bikes), electric scooters (e-scooters). MDOT also administers the Statewide TDM program Commuter Choice Maryland, which works collaboratively with 12 local government agencies that implement localized TDM programs and promotes TDM programs and benefits with employers across the State.

Collectively, these TDM programs promote travel options that reduce VMT to individuals and support the employer community in their efforts to implement workplace commuter benefits programs to reduce drive-alone commuting. New strategies that Commuter Choice Maryland plans to employ include implementing a statewide vanpool incentive, implementing incenTrip, and supporting the Maryland Jobs Access Reverse Commute (MD-JARC) program. MDOT actively promotes Transit Oriented Development (TOD) as another approach to help increase transit ridership, support economic development, and maximize the efficient use of transportation infrastructure. **Table 4.2** shows various strategies for VMT reductions related to carbon reduction measures.

Table 4.2 VMT Reduction Carbon Reduction Measures

Strategy	Potential Carbon Reduction Benefit	Time Period
Transit Capacity/ Service Expansion (GGRA)	**M – H**	**L**
Support public transportation improvements and improve access to service in accordance with Maryland public transportation plans (MTP)		
MARC Growth and Investment Plan/Cornerstone Plan (GGRA)		
Intercity Transportation Initiatives (Amtrak NE Corridor, Intercity bus) (GGRA)		
Continue to support investments and partnerships with intercity bus providers to promote use of intercity bus as a commute option to reduce congestion and improve air quality (MTP)		
Invest in improvements to transit to provide better access to BWI Marshall Airport (MTP)		
Improve and expand regional connections to major urban areas and significant job centers (Transit)		
Provide intercity connections between rural communities and city centers offering medical, civic, and educational opportunities (Transit)		
Create and improve transfer hubs so riders can transfer with ease between multiple routes and service providers (Transit)		

Table 4.2 VMT Reduction Carbon Reduction Measures (Continued)

Strategy	Potential Carbon Reduction Benefit	Time Period
MPO Plans and Programs (GGRA)	**H**	**L**
Modeled vehicle miles traveled and emissions outcomes from implementation of most recent MPO fiscally constrained long-range transportation plans and cooperative land use forecasts (GGRA)		
Transportation Demand Management (GGRA)	**M**	**N – M**
Provide reliable and accessible real-time modal choice information to travelers and stakeholders (MTP)		
Coordinate activities across MDOT and with regional and local agencies to incentivize changing travel behavior (MTP)		
Provide outreach on Commuter Choice Maryland travel options through targeted media campaigns, brochures, and websites to promote bicycling, walking, carpooling, teleworking, and transit (MTP)		
Strengthen employer commuter incentive programs by increasing marketing and financial/and or tax-based incentives for employers, schools, and universities to encourage walking, biking, public transportation usage, carpooling, and teleworking (MTP)		
Expanded Telework (GGRA)		
Expand commuter transportation options, including commuter bus, car/vanpooling, park-and-ride facilities, cycling, walking, and transit, as well as promoting opportunities for teleworking, and alternative or flexible work hours to help reduce congestion along key routes (MTP)		
Bicycle and Pedestrian Strategies (GGRA)	**M**	**N – L**
Update State guidelines for bicycle and pedestrian infrastructure and establish a multimodal process to ensure innovative treatments and techniques are regularly vetted for inclusion (MTP)		
Develop tools and guidance to ensure effective and efficient enhancement and maintenance of bicycle and pedestrian infrastructure (MTP)		
Leverage local funding contributions and incorporate bicycle and pedestrian improvements by private developers through transportation impact mitigation process where feasible (MTP)		
Strategically invest to improve connectivity and comfort of pedestrian and bicycle networks within and between jurisdictions and for both on and off-road facilities to increase use and improve public health (MTP)		
Work with the University Systems to improve walk and bike access to and within their campuses (MTP)		
Transit-Oriented Development (TOD) Build-Out (GGRA)	**M – H**	**L**
Leverage TOD to generate economic growth as well as sustainable and accessible communities (Transit)		

4.3 Congestion Mitigation

Traffic congestion and idling, or operating vehicles at low speed, can increase GHG emissions because of additional fuel use and reduced engine efficiency at low speeds. For example, a car operating at 25 miles per hour emits 25% more CO2 per mile than a car operating at 50 miles per hour. Enhancing travel efficiency through congestion mitigation strategies lowers GHG emissions by reducing inefficient travel. Reducing congestion not only reduces emissions, but also helps improve air quality, travel reliability, and quality of life for Marylanders.

Programs that address congestion administered by MDOT through SHA include the Transportation Systems Management and Operations (TSMO) suite and Coordinated Highways Action Response Team (CHART). TSMO reduces emissions by decreasing delay to improve mobility, reliability, and safety for transportation system users. SHA's TSMO strategies leverage technology to optimize capacity that is limited by congestion. The CHART program utilizes Intelligent Transportation Systems technologies to identify and resolve incidents including crashes, weather-related delays, and roadside disruptions through live traffic cameras, sensor data, and weather stations and keeps travelers informed via highway message signs to reduce congestion and GHG emissions. **Table 4.3** presents several strategies for congestion mitigation carbon reduction measures.

Table 4.3 Congestion Mitigation Carbon Reduction Measures

Strategy	Potential Carbon Reduction Benefit	Time Period
Freight and Freight Rail Programs (GGRA)	**M – H**	**M – L**
Address congestion and bottlenecks on nationally and regionally significant corridors to facilitate access to major employment, freight, and activity centers (MTP)		
Promote strategies to modernize rail infrastructure identified in the Maryland State Rail Plan (Freight)		
Implement Freight and Freight Rail Programs (National Gateway, Howard Street Tunnel, MTA rail projects) (GGRA)		
Improve landside and freight rail access to the Port of Baltimore, including implementation of an Intermodal Container Transfer Facility in the vicinity of the Port (MTP)		
Identify locations where projected volume may exceed capacity on key freight rail corridors (MTP)		

Table 4.3 Congestion Mitigation Carbon Reduction Measures (Continued)

Strategy	Potential Carbon Reduction Benefit	Time Period
On-Road Technology (TSMO and other Traffic Management Strategies) (GGRA)	**M – H**	**M – L**
Implement TSMO improvements to reduce congestion on highway systems, focusing on integrated freeway and arterial management and operations (MTP)		
Continue to perform Traffic Signal Synchronization and installation of "smart signals" to provide an efficient flow or prioritization of traffic, increasing the efficient operations of a corridor and reducing unwarranted idling at intersections (MTP)		
Develop a data supported system and modeling tools to evaluate benefits and tradeoffs for TSMO strategies (MTP)		
Coordinate TSMO activities across MDOT, with regional and local agencies with clear, common objectives (MTP)		
Provide real-time variable-control of speed, lane movement, and traveler information (for drivers and transit users) and conduct centralized data collection and analysis of the transportation system (MTP)		
Invest in technology to facilitate 24/7 roadway clearance and public information of incidents through CHART (MTP)		
Expand CHART and other intelligent transportation systems and operations tools to better manage peak hour congestion on Interstate and regionally significant corridors (MTP)		
Manage peak hour congestion on regionally significant corridors through targeted operational strategies (MTP)		
Freight and Freight Rail Programs (GGRA)	**M**	**M – L**
Develop pricing strategies to encourage smarter commuting options (MTP)		
Evaluate managed lanes, including high occupancy vehicle (HOV) lanes, congestion pricing, and related strategies for future transportation investment and integrate transit as part of the strategies as appropriate (MTP)		
Electronic Tolling Pricing Initiatives (GGRA)		

4.4 Infrastructure Design

Carbon emissions reductions can also be realized through infrastructure design and construction, including opportunities for deployment of clean energy technologies. Infrastructure materials used during construction and maintenance activities, as well as throughout their total lifecycle, are associated with a certain level of GHG emissions, known as embodied carbon. MDOT Modal Administrations and the Authority have been embracing Federal Buy Clean initiatives as well as developing and implementing design changes to agency business processes to help mitigate emissions and ensure that the infrastructure is resilient to climate change impacts. In some cases, these changes have had additional positive impacts on the environment, including nature-based design solutions. MDOT, through its asset management programs, continues to take steps to ensure that its assets and facilities are designed and operated to minimize their environmental impact. A large part of this is keeping MDOT assets in a state of good repair and updating and retrofitting facilities when necessary to optimize energy efficiency. Additionally, MDOT takes steps—through programs such as Complete Streets—to ensure its infrastructure and roadways are designed to safely promote low impact forms of travel. **Table 4.4** presents several infrastructure design strategies for carbon reduction measures.

Table 4.4 Infrastructure Design Carbon Reduction Measures

Strategy	Potential Carbon Reduction Benefit	Time Period
Continue to improve our transportation infrastructure using the most current design guidelines and applicable technology enhancements (MTP)	**M – H**	**M – L**
Prioritize investing in state of good repair (SGR) needs to maintain service quality and safety needed for world-class customer service (Transit)		
Coordinate infrastructure improvements to facilitate multimodal connectivity and access (MTP)		
Incorporate new American Association of State Highway and Transportation Officials (AASHTO) design standards and framework including an explicit purpose and need for projects, implementation of new context classification system, multimodal considerations, design flexibility, and performance-based design (MTP)		
Update state guidelines for bicycle and pedestrian infrastructure and establish a multimodal process to ensure innovative treatments and techniques are regularly vetted for inclusion (MTP)		
Develop tools and guidance to ensure effective and efficient enhancement and maintenance of bicycle and pedestrian infrastructure (MTP)		

Table 4.4 Infrastructure Design Carbon Reduction Measures (Continued)

Strategy	Potential Carbon Reduction Benefit	Time Period
Infrastructure Planning and Coordination	**M – H**	**M – L**
Coordinate with State and local government agencies to ensure that planned projects, new technologies, and incident training consider all customers to ensure equal access to Maryland's transportation system (MTP)		
Work in partnership with local jurisdictions and other state agencies to focus transportation corridor improvements to support development and revitalization in urban, town, and suburban centers (MTP)		
Invest in improvements to provide choices and connections between rural and urban areas (MTP)		
Develop new tools and use new technologies to facilitate multimodal planning, policy, and project level decision-making at the State, regional, and local levels (MTP)		
Develop new tools to facilitate project development, prioritization, and implementation, and to ensure effective use of State and federal discretionary programs (MTP)		

4.5 Emerging Carbon Reduction Innovations

Other carbon reduction strategies and projects, including emerging innovations, may also be eligible for CRP funding if they can demonstrate reductions in transportation emissions over the project's lifecycle. MDOT continues to explore emerging opportunities that support transportation carbon reduction with the intent to develop and implement strategies, projects, programs, and policies as innovations arise. For example, MDOT has committed to reduce conventional energy use through efficiency measures and is seeking expansion of renewable energy sources like solar and wind within MDOT facilities and rights-of-way. MPA received a grant from the MEA's Resilient Maryland Program to investigate microgrid options, looking at wind, solar, batteries, and fuel cells at the Dundalk Marine Terminal to help mitigate severe weather, sea level rise, and other potential climate change impacts. MDOT was awarded a FHWA Climate Challenge grant to explore the carbon reduction potential of innovative pavement projects. Other types of carbon reducing activity under consideration include carbon capture, the use of project lifecycle assessments to identify a strategy for incorporating lower carbon construction materials, and innovative use of tire pressure gauges. In addition to specific projects, MDOT is considering expanding educational opportunities both in communications with the public and in workforce development to further incorporate carbon reduction planning in project design and decision-making. Because these strategies are still emerging, the potential carbon reduction benefit and time period are currently to be determined. **Table 4.5** shows several emerging carbon reduction innovations. These are longer-term strategies for which the potential carbon reduction benefit will be calculated in the future, and additional strategies are expected to be incorporated into upcoming versions of the CRS.

Table 4.5 Emerging Carbon Reduction Innovations

Strategy
Deploying Renewable Energy Options
Continue to increase the renewable energy portfolio installations on MDOT facilities and rights-of-way (MTP)
Explore and expand the use of alternative energy sources (e.g., electric, solar) for freight applications, including freight commercial vehicles, multimodal support equipment, or related applications (Freight)
Pricing and Financing Options
Provide incentives to increase purchase of fuel-efficient vehicles/fleets (MTP)
Pay-As-You-Drive Insurance (GGRA)
Outreach and Education
Develop education and outreach tools, including web-based and social media applications, targeted to the traveling public (MTP)
Promote innovative public involvement strategies for projects such as use of social media and text message surveys to expand outreach and engagement (MTP)
Freight and Port Options
Develop and implement a “Green Port Strategy” consistent with industry trends and initiatives including US EPA’s Strategy for Sustainable seaports (MTP)
Intermodal Freight Centers Access Improvements (GGRA)
Partner with MPOs and municipalities to establish localized truck routing and mapping (Freight)
Freight Villages/Urban Freight Consolidation Centers (GGRA)
Release an updated truck route map and establish a process for periodic review and updates utilizing stakeholder outreach, asset conditions, and motor carrier safety data collection (Freight)
Designate Zero-Emission Truck Corridors (GGRA)
Develop and implement a “Green Port Strategy” consistent with industry trends and initiatives including US EPA’s Strategy for Sustainable seaports (MTP)
Consider emerging last mile logistics trends in planning, project development, and design processes (Freight)
Innovative Pavement Pilot Projects (reduced embodied carbon) (FHWA Climate Challenge Grant)

5. Framework for Optimizing CRP Investments

Implementing the CRS in terms of identifying, prioritizing, and funding projects will require a two-pronged approach. The approach for FFY 22 and FFY 23 CRP funds focuses on obligating funds quickly by drawing on eligible projects from state and local entities. MDOT performed an analysis of potential projects that are eligible for CRP funding by drawing from existing projects identified in a range of planning documents. For FFY 24 to FFY 26 funds, efforts will be made to further diversify the types of projects funded through the CRP program by focusing on the ongoing carbon reduction measures as listed in the tables in ***sections 4.1 – 4.5****. The following is a description of the types of projects eligible for CRP funding that align with Maryland's own requirements.*

5.1 Prioritizing Projects

Projects eligible for CRP funds are those that support the reduction of transportation emissions as outlined in **section 3** of the implementation guidance. To identify these projects, MDOT has coordinated with MPOs and modal administrations and is developing a candidate list of carbon reduction activities and projects from the following sources: the CTP, STIP, LRTPs, TIPs, modal- administration-specific Asset Management Plans, and county priority letters. MDOT will continue this coordination to maintain an up-to-date list of eligible projects on an annual basis. This list will be used to optimize and prioritize the use of CRP funds in FFY 24-26. FFY 22 and FFY 23 funds will be focused on eligible projects that are construction-ready or can deliver immediate carbon reduction benefits in coordination with the MPOs.

Several factors then will be considered when prioritizing eligible projects described as follows:

- Consistency with the MTP goals and guiding principles.
- Project is in CTP and STIP/TIP.
- Increasing connectivity of the pedestrian and bicycle transportation network.
- Eligibility under CRP Flex funding.
- Anticipated carbon reduction benefit.

Drawing on these factors and from a range of planning documents, several types of projects are being considered

including bicycle and pedestrian improvements, public transportation, intelligent transportation systems (ITS), engine retrofits, lighting upgrades, signal upgrades, and EV charging infrastructure and vehicle deployment.

For future funding years beyond FFY 23, MDOT will incorporate several additional factors that will help optimize investments in sub-allocation areas, align with State and regional equity goals, and enable the transportation network to effectively serve all community members. In the next round of project selection, MDOT will review projects considering the following additional factors:

- Estimated carbon reduction benefit and return on investment.
- Advances Justice40 Initiative and regional equity considerations.
- Project advances the goals of the Climate Solutions Now Act of 2022.
- Status of project funding for obligation and inclusion in the STIP/TIP.
- Readiness for implementation.
- Expected asset life cycle.
- Priority project for MDOT, MPO, or local government.
- Project adds or completes alternative transportation connections.
- Project enhances the health or safety of Maryland's urban or rural communities.
- Project has community support.
- Project aligns with future land uses and provides co-benefits.

Further refinement of the prioritization process, including consideration of weighting the factors above, will continue for future funding years in coordination with the MPOs. The intention of further refinement is to move toward quantifiable metrics, including the anticipated emissions reduction and project cost that will allow for the development of quantitative metrics such as the expected project cost per metric ton of carbon reduced. Existing tools can be applied to develop carbon reduction estimates at the project level. In addition to tracking funding distribution, efforts are being made to visually display investments made with CRP funds within a GIS-based tool. This tool will assist in easily quantifying distributions to urbanized areas per FHWA requirements and the development of other metrics such as progress made toward Justice40 goals. This tool will also help support internal efforts to visualize project distributions, in addition to official reporting mechanisms, and support continued coordination with MPOs and local jurisdictions.

5.2 Tracking Funding Allocations

MDOT will provide a summary of projects and efforts funded by CRP per fiscal year in future CRS updates to demonstrate funding allocation requirements are being met as outlined in ***Appendix A: CRS Alignment with Federal Requirements***. In addition, the CTP now includes Project Information Sheets (PIF) for CRP projects. Additional sources of federal funding utilized per project will also be outlined to aid in future funding strategies. SHA will maintain a consistent funding allocation tracking methodology as part of routine fiscal recordkeeping processes.

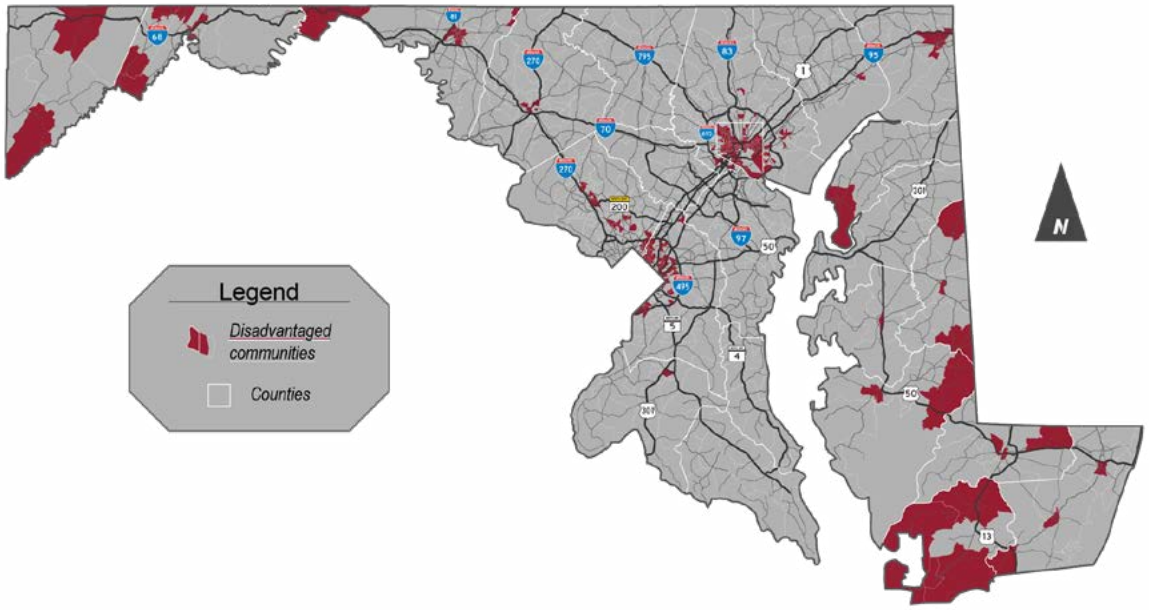
5.3 Incorporating Equity

MDOT is committed to advancing an equitable transportation system for Maryland and strives to integrate equity considerations in all aspects of transportation planning, programming, and operational processes. Additionally, MDOT intends to meet the federal Justice40 provisions which state that "40 percent of the overall benefits" of federal investments from covered programs, including CRP, should flow to disadvantaged communities. The disadvantaged communities in Maryland are shown in **Figure 5.1**. USDOT has developed a definition for highly disadvantaged communities using existing, publicly available data sets. The disadvantaged Maryland Census Tracts, identified in their Transportation Disadvantaged Census Tracts Dashboard, exceed the 50th percentile (75th for resilience) across at least four of the following six transportation disadvantaged indicators.

1. ***Transportation Access disadvantage*** identifies communities and places that spend more, and longer, to get where they need to go.
2. ***Health disadvantage*** identifies communities based on variables associated with adverse health outcomes, disability, as well as environmental exposures.

3. ***Environmental disadvantage*** identifies communities with disproportionate pollution burden and inferior environmental quality.
4. ***Economic disadvantage*** identifies areas and populations with high poverty, low wealth, lack of local jobs, low homeownership, low educational attainment, and high inequality.
5. ***Resilience disadvantage*** identifies communities vulnerable to hazards caused by climate change.
6. ***Equity disadvantage*** identifies communities with a high percentile of persons (age 5+) who speak English "less than well."

Figure 5.1 Disadvantaged Communities in Maryland[1]



1. Disadvantaged communities data sourced from USDOT Equitable Transportation Community (ETC) Explorer

In addition to the USDOT dashboard, MDOT will use the following interactive mapping tools to identify communities:

- Climate and Economic Justice Screening Tool (CEJST)
- MDE EJ Screen Tool

Carbon reduction projects and strategies are intended to proactively address racial equity, workforce development, economic development, and remove barriers to opportunity in both rural and urban communities. Ensuring that carbon reduction projects are sensitive to the context and needs of each community is a critical equity consideration during project selection and development. Distributing CRP funds consistent with the Justice40 initiative to benefit disadvantaged communities is an integral component of the project prioritization strategy. This includes working with the MPOs and local governments to involve the public, including traditionally underserved and underrepresented populations in transportation planning. Additionally, MDOT recognizes the recent State action in House Bill 009, of the 2023 Maryland General Assembly Chapter 583, Equity in Transportation Sector – Guidelines and Analyses, as well as updated definitions of overburdened and underserved communities in the CSNA, and is working to ensure consistency with these initiatives. MDOT will continue to leverage existing public engagement programs implemented at the MDOT modal administrations, the MPOs, and the local governments to engage with communities. This includes the annual CTP tour, the MTP and LRTP public outreach processes, and the development of an internet-based CRS portal.

5.4 Continuing Program Evaluation

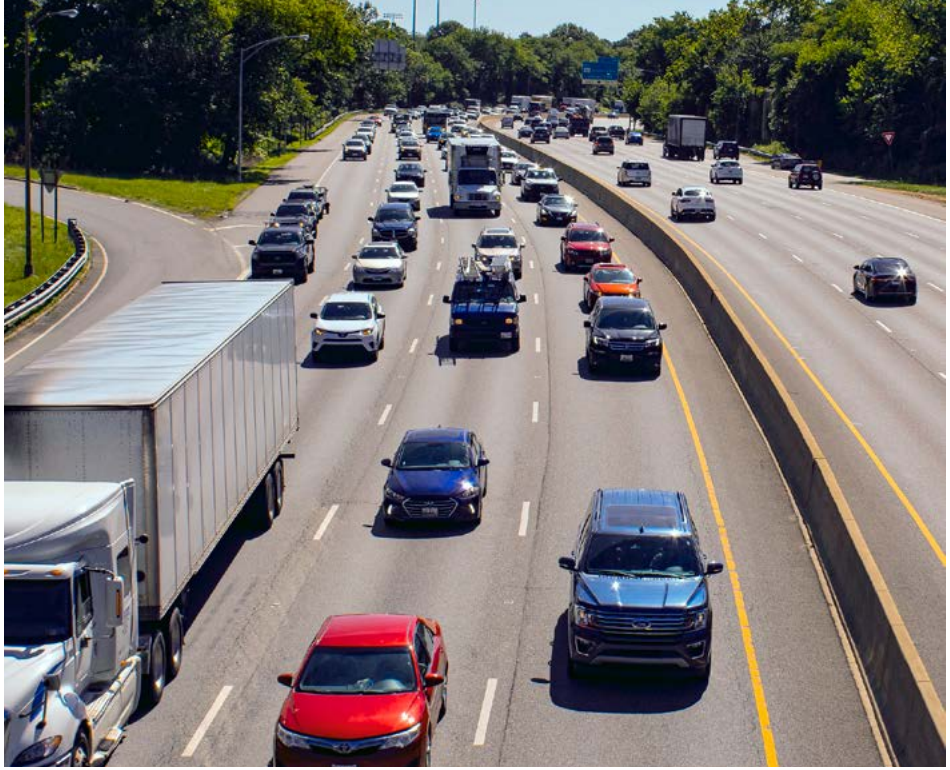
As noted in CRS guidance from FHWA, evaluation costs are allowable unless prohibited by statute or regulation. MDOT evaluates several programs by using systematic data collection and analysis to assess their effectiveness and efficiency. MDOT is working toward tracking a range of mechanisms to assess performance related to carbon reduction and emissions. For example, the AR tracks numerous performance measures such as transportation related emissions, registered EVs, transit ridership and access, and estimated regional VMT reductions. MDOT will continue to monitor and report these and other performance measures, including equitable distribution of program benefits, to help determine the success of CRP investments in Maryland. **Figure 5.2** presents a roadmap for embedding CRS into Maryland's long-term planning processes and documents.

5.5 Embedding CRS in Long-term Planning and Climate Action Plan

MDOT and MPO coordination is ongoing regarding the CRS and the strategies outlined. MDOT will incorporate the CRS into the upcoming CSNA, MTP, CTP, AR and plans and will work with the MPOs for CRS inclusion in their LRTPs (**Figure 5.2**).

In addition, an overall MDOT Climate Action Plan is under development to incorporate both carbon reduction efforts and resilience improvement efforts in one plan. As the industry has come to recognize the effects of increased carbon and emissions on extreme weather and climate stressors that reduce system resilience, our goal is to collectively understand the tools and opportunities available to MDOT to address both challenges in one cohesive plan of action. The Climate Action Plan will incorporate relevant statewide programs and activities (Clean Cars Act of 2022, Clean Trucks Act of 2023, 5 Million Trees Initiative, Clean Fuels Incentive, Coast Smart Construction Guidelines, Community Resilience, and Green Infrastructure Resilience, etc.) and federal programs (NEVI, CMAQ, PROTECT, Justice40, CRP, FTA Low/No Emission, FTA Rail Car, MARAD Port Infrastructure Development Program, EPA/MARAD Healthy Ports, and FAA Airport Improvement Program Zero Emissions Vehicle and Infrastructure Pilot opportunities). Synergies between ongoing MDOT climate resilience efforts in existing programs and plans will be noted. The Climate Action Plan will serve as a central repository for policy, guidance, information, forums, and documenting achievements by MDOT to reduce carbon emissions and improve transportation system resilience.

Figure 5.2 Roadmap for Embedding CRS in Long-Term Planning



5.6 Updating the CRS and Next Steps

MDOT will update the CRS at least once every four years and intends to develop an earlier update as Maryland implements the CSNA to ensure consistency with statewide directives. MDOT is also working with its partners at the local level to help identify carbon-producing hot spots around the State that may be targeted for specific project development and investments. Utilizing data sources such as Traffic Incident Management data and statewide operational performance maps, MDOT will work with our local partners in future years to identify and analyze such locations for improvement in operational conditions to reduce carbon emissions. MDOT is also conducting assessments of connectivity of alternative transportation systems such as bicycle and pedestrian facilities that may benefit from investments to help complete the "last mile" to connect origin-destination pairs with high commuter trips or school-based trips utilizing non-motorized means of transportation. MDOT is also working with its facilities staff to identify means to reduce carbon emissions from the installation of low-energy use lighting equipment, improved energy efficiency windows and doors, electric fleet purchases, and use of non-carbon fuel tools such as lawnmowers, blowers, chainsaws, and trimming equipment. Finally, MDOT is seeking methods to reduce carbon emissions generated from construction materials. Efforts are being made to identify sources of lower carbon-emitting products such as alternative planting materials, low-carbon or carbon-negative concrete, and warm-mix asphalt.

Recognizing that this CRS will evolve over time, MDOT is proposing to develop an interactive GIS-based CRS portal to centrally locate and geographically track investments by

MDOT to address carbon reduction. MDOT staff, local and state partners, and the community at large will better understand what is being done to reduce the impacts of the transportation sector on the environment by MDOT and what they themselves may be able to do to reduce their individual contributions to carbon emissions.

Ultimately, the first CRS and future editions of the CRS will be housed in the overall forthcoming MDOT Climate Action Plan. The Climate Action Plan and Portal is intended to house information for our staff and partners that provide services to MDOT including our policies pertaining to identified strategies, design and material standards, and best practices for reducing carbon and improving system resilience from planning and design requirements, construction practices, and maintenance and operations activities. The Climate Action Plan and Portal will highlight innovative case studies and projects from across all MDOT Modal Administrations and our local partners to help foster a community of practice within transportation that seeks better solutions to reduce carbon emissions, improve system resilience, and protect our environment for future generations. The proposed portal will be public-facing and include items such as the CRS, the MDOT Transportation Resilience Improvement Plan, NEVI plan, and relevant statewide policies and initiatives to the transportation sector in a highly interactive, visually appealing, and easy-to-navigate website to draw in the reader and help them see how they too can contribute to improve and protect the great State of Maryland.

Appendix A:
CRS Alignment with Federal Requirements

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Table A.1 CRS Alignment with Federal Requirements

CRS Requirement	MDOT Progress	CRS Reference
Support efforts to reduce transportation emissions	CRS outlines a framework for optimizing MDOT CRP investments	Section 5 – Framework for Optimizing CRP Investments
Identify projects and strategies to reduce transportation emissions, which may include projects and strategies for safe, reliable, and cost-effective options- (i) to reduce traffic congestion by facilitating the use of alternatives to single-occupant vehicle trips, including public transportation facilities, pedestrian facilities, bicycle facilities, and shared or pooled vehicle trips within the State or an area served by the applicable metropolitan planning organization, if any; (ii) to facilitate the use of vehicles or modes of travel that result in lower transportation emissions per person-mile traveled as compared to existing vehicles and modes; and (iii) to facilitate approaches to the construction of transportation assets that result in lower transportation emissions as compared to existing approaches	CRS outlines ongoing strategies and example projects to reduce transportation emissions including those which: (i) reduce traffic congestion by facilitating the use of alternatives to single-occupant vehicle trips (ii) facilitate the use of vehicles or modes of travel that result in lower transportation emissions per person-mile traveled as compared to existing vehicles and modes (iii) facilitate approaches to the construction of transportation assets that result in lower transportation emissions as compared to existing approaches CRS outlines an approach to prioritizing projects to receive funding	Section 4 – Ongoing Carbon Reduction Strategies i – 4.2 Congestion Mitigation, 4.3 VMT Reduction ii – 4.1 Transportation Technology iii – 4.4 Infrastructure Design
Support the reduction of transportation emissions of the State	CRS outlines planned funding allocations across geographic regions of the state	Section 5.2—Track Funding Allocations
At the discretion of the State, quantify the total carbon emissions from the production, transport, and use of materials used in the construction of transportation facilities within the State	Because the development of the CSNA plan may result in new modeling information, MDOT has decided not to include quantification of emissions reduction in this version of the CRS to avoid presenting historic or potentially inconsistent data that could confuse readers.	
Be appropriate to the population density and context of the State, including any metropolitan planning organization designated within the State	CRS outlines planned funding allocations to urbanized areas consistent with CRP requirements	Section 5.1—Develop Project Prioritization Approach Section 5.2—Track Funding Allocations
Prepare CRS in consultation with MPOs	Initial MPO meetings held Fall 2022 MPO coordination ongoing MPOs invited to review draft CRS outline and provide feedback	Appendix B
Develop CRS no later than 2 years after enactment of IIJA	Draft CRS under development, to be submitted to FHWA by November 15, 2023	N/A
Update CRS a minimum of once every 4 years	Next proposed update is no later than November 15, 2027	Section 6—Updating the CRS

Table A.2 Actual and Estimated Maryland CRP Funding Allocations

Location	Actual FFY 22 ($)	Actual FFY 23 ($)	Estimated FFY 24 ($)	Estimated FFY 25 ($)	Estimated FFY 26 ($)	Estimated TOTAL FFY 22 to FFY 26 ($)
Statewide	18,135,480	18,498,190	18,868,154	19,245,517	19,630,427	94,377,768
65% to areas in proportion to share of State's population	11,788,062	12,023,823	12,264,300	12,509,586	12,759,778	61,345,549
Population greater than 200,000	8,606,457	8,778,586	8,954,153	9,133,236	9,315,901	44,788,333
Aberdeen--Bel Air South--Bel Air North	436,423	445,151	453,976	463,055	472,316	2,270,921
Baltimore	4,499,295	4,589,281	4,681,231	4,774,856	4,870,353	23,415,016
Philadelphia	99,412	101,400	103,868	105,946	108,064	518,690
Washington, DC	3,571,327	3,642,754	3,715,974	3,790,293	3,866,099	18,586,446
Population between 50,000 and 199,999	1,240,562	1,265,373	1,290,683	1,316,496	1,342,826	6,455,940
Cumberland*	101,309	103,335	105,449	107,558	109,709	527,359
Frederick	289,061	294,842	300,729	306,744	312,879	1,504,254
Hagerstown	207,044	211,185	215,415	219,723	224,118	1,077,485
Lexington Park--California--Chesapeake Ranch Estates	120,207	122,611	125,067	127,568	130,120	625,574
Salisbury	150,053	153,054	156,173	159,296	162,482	781,058
Waldorf	224,425	228,914	233,484	238,154	242,917	1,167,895
Westminster--Eldersburg	148,463	151,432	154,495	157,585	160,736	772,711
Population between 5,000 and 49,999	328,732	335,306	342,015	348,855	355,832	1,710,739
Population below 5,000	1,612,311	1,644,558	1,677,450	1,710,999	1,745,219	8,390,536
35% to any area of the State	6,347,418	6,474,367	6,603,854	6,735,931	6,870,649	33,032,219

Notes:

FFY 22 and FFY 23 data come directly from FHWA calculations, whereas FFY 24, FFY 25, and FFY 26 data were estimated based on FHWA suballocation percentages as outlined in FHWA computational tables (https://www.fhwa.dot.gov/bipartisan-infrastructure-law/comptables/table10p1-1.cfm).

*Calculations in this table are based on 2010 census data. Due to population changes in 2020 census data, sub-allocations are anticipated to be adjusted when FHWA publishes the actual FFY 24, FFY 25, and FFY 26 investments. With these adjustments, there is potential Cumberland may no longer be considered an urbanized area with specific apportionments.

Appendix B:
MPO Coordination Summary

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Table B.1 MPO Coordination Summary

Coordination Activity	Date	MPOs Represented	Description
MDOT MPO Roundtable	9/24/2022	BRTB, WILMAPCO, HEPMPO, SWMPO, C-SMMPO, CAMPO, NCRTPB	Provided initial description of the Carbon Reduction Program to the MPOs.
Meeting	11/3/2022	TPB, BRTB, WILMAPCO	Discussed the CRP Program Overview and proposed CRS timeline.
Meeting	12/1/2022	HEPMPO, SWMPO, C-SMMPO, CAMPO	Discussed the CRP Program Overview and proposed CRS timeline.
MDOT MPO Roundtable	1/27/2023	BRTB, WILMAPCO, HEPMPO, SWMPO, C-SMMPO, CAMPO, NCRTPB	Provided update on CRP and CRS status.
Email Submission	2/22/2023	BRTB, WILMAPCO, HEPMPO, SWMPO, C-SMMPO, CAMPO, NCRTPB	Sent draft Annotated Outline for CRS with request for comments by 3/13/23.
Meeting	2/24/2023	NCRTPB	Discussed status of CRS and project identification with TPB staff, Virginia DOT, and DC DOT.
Meeting	3/2/23	NCRTPB	Presented and received feedback on draft CRS Annotated Outline.
Meeting	3/9/2023	BRTB, WILMAPCO, HEPMPO, SWMPO, C-SMMPO, CAMPO	Presented and received feedback on draft CRS Annotated Outline.
MDOT MPO Roundtable	3/24/2023	BRTB, WILMAPCO, HEPMPO, SWMPO, C-SMMPO, CAMPO, NCRTPB	Provided update on CRP and CRS status.
MDOT MPO Roundtable	6/23/2023	BRTB, WILMAPCO, SWMPO, C-SMMPO, HEPMPO, NCRTPB	Provided update on CRP and CRS status.
Email Submission	6/30/2023	BRTB, WILMAPCO, HEPMPO, SWMPO, C-SMMPO, CAMPO, NCRTPB	Sent draft CRS for MPO review with request for comments by 7/28/23.
Meeting	8/24/23	NCRTPB	Discussed status of CRS and CRP project identification.

Summary of Comments Received on Draft CRS dated June 30, 2023

MDOT received a total of 99 individual comments on the draft CRS document from MPOs, the Maryland Department of Planning, Maryland Department of Environment, and Maryland Department of Transportation staff. Comments received primarily included suggested text revisions that recommended clarification of language used in the draft CRS document or to provide additional information. Examples include adding reference to the 2018 TSMO Strategic Plan and the 2023 MDOT SHA Pedestrian Safety Action Plan / Context Driven Guide (comments from HEPMPO). Each of these comments were addressed in the revised CRS document.

HEPMPO noted that utilizing the 2020 Census may result in Cumberland no longer being included as an urbanized area. This was revised in the notes in Appendix A. HEPMPO also recommended that a summary of CRP project funding should be provided annually. MDOT revised the CRS document to indicate that future versions of the Consolidated Transportation Program will include a Carbon Reduction Program Project Information Form (PIF), which will provide annual updates on project funding. HEPMPO asked if there would be consideration for strategic investments in areas Maryland has designated as Bicycle & Pedestrian Priority Areas. The CRS document already refers to the bicycle and pedestrian master plan and pedestrian safety action plan. While there is potential that CRP funds may correspond with these areas, they will not be specifically prioritized. HEPMPO also noted limited discussion in the CRS document about the mechanics and processes for MPOs to provide their projects for CRP suballocated funds. MDOT is currently considering several options, including a "Call for Projects" approach to identify eligible projects, incorporation into the CTP process, and MPO and local government priority letters. The final process for future funding years will be included in future CRS documents.

BRTB provided additional information to include regarding initiatives underway in the Baltimore Region. These were added to section 2.3 of the CRS document. BRTB also provided recommended edits regarding the "Resilience 2050" plan and the FY2024-2027 TIP, both adopted in July 2023. These edits were incorporated into the CRS document.

NCRTPB provided comments on recommended text changes and to suggest additional information. NCRTPB asked about the measure under MPO Plans and Programs, and if there were recommendations in the draft CRS document that Maryland start requiring MPOs to report VMT and GHG emissions for LRTPs. Specific measures of the MPO Plans and Programs were not included in the CRS document, and there is not a current requirement for MPOs to report VMT or GHG emissions. No change was made to the CRS. NCRTPB included a comment indicating that they would like to see that CRP funding be used for a net addition to efforts to reduce GHG emissions, as in above and beyond what has traditionally been programmed towards GHG emissions. The CRP funds are available for use for eligible projects, including new or existing projects. MDOT is committed to reducing GHG emissions and is taking actions to do so. However, the CRS is not meant to change policy at the state level in terms of GHG reduction goals. No change was made to the draft document.

MDP requested clarification of the 35% of CRP funds that may be obligated in any area of the State. Text in the CRS document was revised to indicate that those funds are "available for any areas of the State". MDP also suggested adding a new strategy, "Strategic Transportation Investment" in section 4.3. The CRS is designed to reference existing GHG emission reduction strategies, and not to establish new strategies or policies. No change was made to the document. MDP also recommended adding additional factors to help prioritize eligible projects for CRP funding in section 5.1. The CRS is not intended to create new policies or factors, and the proposed optimization approach is consistent with existing prioritization and funding strategies. No change was made to the CRS document, however, MDOT will be updating the prioritization checklists to include alignment with MPO and local priorities (in addition to modal administration priorities) for CRP and PROTECT funds. These changes will be reflected in future updates to the CRS document.

MDE provided comments noting the "Climate Pollution Reduction Grant" (CPRG) that is currently underway. This information was added to the CRS document in section 2.1. Through CPRG, participating MPOs also have a deadline of March 2024 to develop a Priority Climate Action Plan and 2025 deadline for a Comprehensive Climate Action Plan. MDE also provided a comment suggesting highlighting coordination with other state agencies and with the Maryland Commission on Climate Change and its Working Groups. Background information regarding the MCCC is included in section 2.2.

MDE also requested continued collaboration on developing funding priorities, especially since MDE will be responsible for developing similar priorities as part of the CPRG. MDOT intends to continue collaboration with all stakeholders as CRP projects are identified and implemented. MDE also inquired if there would be a benefit of referencing the recently completed modeling analysis provided in the Maryland Climate Pathway Report, prepared as part of the CSNA report due in December 2023. The CSNA is discussed in section 1 of the CRS document, however the modeling is not an MDOT product, and future updates of the CRS document will include the relevant MDOT policies and strategies that are currently being developed in support of CSNA targets.

Appendix C: Acronyms

Table C.1 Acronyms

Acronym	Definition
AFC	Alternative Fuel Corridor
AR	Attainment Report on Transportation System Performance
BRTB	Baltimore Regional Transportation Board
BWI Marshall	Baltimore/Washington International Thurgood Marshall
C-SMMPO	Calvert–St. Mary's Metropolitan Planning Organization
CAMPO	Cumberland Area Metropolitan Planning Organization
CAV	Connected and Automated Vehicles
CHART	Coordinated Highways Action Response Team
CMAQ	Congestion Mitigation and Air Quality
CO2	Carbon Dioxide
CRP	Carbon Reduction Program
CRS	Carbon Reduction Strategy
CSNA	Climate Solutions Now Act
CTP	Consolidated Transportation Program
EV	Electric Vehicle
FFY	Federal Fiscal Year
FHWA	Federal Highway Administration
FY	Fiscal Year (State)
GGRA	Greenhouse Gas Reduction Act
GHG	Greenhouse Gas
HEPMPO	Hagerstown/Eastern Panhandle Metropolitan Planning Organization
I-	Interstate
IIJA	Infrastructure Investment and Jobs Act
LRTP	Long-Range Transportation Plan
MAA	Maryland Aviation Administration
MARC	Maryland Area Regional Commuter

Acronym	Definition
MCCC	Maryland Commission on Climate Change
MDE	Maryland Department of the Environment
MDOT	Maryland Department of Transportation
MEA	Maryland Energy Administration
MPA	Maryland Port Administration
MPO	Metropolitan Planning Organization
MTP	Maryland Transportation Plan
NCRTPB	National Capital Region Transportation Planning Board
NEVI	National Electric Vehicle Infrastructure
NGO	Non-Government Organization
OCCRA	Office of Climate Change Resilience and Adaptation
S/WMPO	Salisbury/Wicomico Metropolitan Planning Organization
SHA	State Highway Administration
STBG	Surface Transportation Block Grant
STIP	Statewide Transportation Improvement Program
TDM	Travel Demand Management
TIP	Transportation Improvement Program
TSO	The Secretary's Office
TSMO	Transportation Systems Management and Operations
VEIP	Vehicle Emissions Inspection Program
VMT	Vehicle Miles Traveled
WILMAPCO	Wilmington Area Planning Council
WMATA	Washington Metropolitan Area Transit Authority
ZEEVIC	Zero Emission Electric Vehicle Infrastructure Council
ZEVIP	Zero Emission Vehicle Infrastructure Plan