MARYLAND DEPARTMENT OF TRANSPORTATION

Climate Action Status Report 2024
MSAR #14367
December 6, 2024

I. OVERVIEW

Climate change constitutes a significant risk to the safety, equity, and sustainability of Maryland's transportation system and the people and businesses it serves. The Maryland Department of Transportation (MDOT) is a member of the Maryland Commission on Climate Change (MCCC) and works with other state agencies, elected officials, and experts who advise the Governor and General Assembly "on ways to mitigate the causes of, prepare for, and adapt to the consequences of climate change."

This Climate Action Status Report is MDOT's annual review and analysis of strategies and actions toward climate change, resilience, and adaptation, as well as reduction and mitigation of greenhouse gas (GHG) emissions from the transportation sector over the past fiscal year (FY). Under the Climate Solutions Now Act of 2022 (CSNA), certain state agencies, including MDOT, are required to report annually on the status of programs that support the State's greenhouse gas reduction efforts or address climate change.

MDOT's annual Status Reports provide a review of recent, ongoing, and planned activities that support GHG reduction efforts across three different tiers of implementation—policy, programs, and data. This is the first to report on activity that supports the implementation of MDOT's Climate Pollution Reduction Plan (CPRP), developed to help meet the goal to reduce GHG emissions statewide by 60% from 2006 levels by 2031 and achieve a net-zero carbon emissions goal by 2045 established under the CSNA.

This Climate Action Status Report draws from five main sources of planning, performance, and budgetary/financial reporting systems:

(1) The 2050 Maryland Transportation Plan (MTP);

(2) The Consolidated Transportation Program (CTP);

(3) The Annual Attainment Report on Transportation System Performance (AR);

(4) The 2023 MDOT Climate Pollution Reduction Plan (MDOT CPRP); and

(5) The Moore-Miller Administration 2024 State Plan.

MDOT is made up of six transportation modal administrations – the Maryland Aviation Administration (MAA); the Maryland Port Administration (MPA); the Motor Vehicle Administration (MVA); the State Highway Administration (SHA); the Maryland Transit Administration (MTA); the Secretary's Office (TSO); - and two authorities that are part of

MDOT, including, the Maryland Transportation Authority (MDTA) and the Washington Area Transit Authority (WMATA). Direct input from staff across MDOT's modal administrations and authorities informs the insights from these planning, performance, and budgetary reporting systems. This report provides a comprehensive overview of projects, programs, and initiatives from FY 2024, along with updates on progress toward strategies, policies, and potential new initiatives outlined in the 2023 MDOT CPRP.

The MDOT CPRP Plan lays out strategies, both funded and unfunded, aimed at reducing emissions. These strategies are categorized by key approaches, including adopting transportation technologies, reducing vehicle miles traveled (VMT), improving system efficiency, mitigating congestion, implementing opportunities for clean energy use, and ensuring that transportation infrastructure is resilient to impacts of climate change.

II. INTRODUCTION

Fiscal year 2024 saw MDOT complete several important actions to support comprehensive planning for the reduction of greenhouse gas emissions from the transportation sector. MDOT published the 2050 Maryland Transportation Plan (MTP), also known as "The Playbook." The MTP guides transportation policies and investment strategies to provide safe, reliable, accessible, equitable and sustainable transportation options for Maryland with goals, guiding principles and key performance measures. The MTP informs, and is informed by, various multimodal plans across MDOT, brought together as MDOT's Family of Plans.

The MTP includes goals and guiding principles to mitigate and reduce greenhouse gas emissions from transportation. Goals and outcomes in the MTP are intended to minimize and mitigate the environmental effects of transportation and support a 20% reduction in VMT per capita from 2019 levels by 2050, and a 40% reduction in on-road transportation sector GHG emissions by 2031 (from 2006 levels) and move towards net-zero emission by 2045.

The Climate Solutions Now Act of 2022 required the Maryland Department of the Environment (MDE) to develop an economy-wide plan for the State to meet the goal of 60% reduction in GHG emissions by 2031 (from 2006 levels) and net-zero emissions by 2045. To support the State's economy-wide Climate Pollution Reduction Plan (CPRP), MDOT prepared a complementary plan (MDOT CPRP) that focuses on strategies that are and or can be taken to reduce transportation emissions. Implementation of the MDOT CPRP will be reported annually through this Climate Action Status Report.

Governor Moore released the Maryland 2024 State Plan which lays out how the State agencies will deliver results for Marylanders on its mission to Leave No One Behind, including making Maryland the greenest state in the country. MDOT plays a significant role in policy 7, advancing infrastructure to better connect all Marylanders to opportunities and each other. The Governor's priorities call on MDOT to ensure that Maryland leads on transit, reduces emissions from transportation, and builds a strong and equitable infrastructure that benefits all Marylanders. Delivering inclusive and reliable public transit and transportation systems, leveraging infrastructure to bolster inclusive economic growth, decarbonizing Maryland's transportation

sector by expanding infrastructure for electric vehicles (EVs), and working to reduce VMT through travel demand management (TDM) are key objectives that MDOT helps to implement. The State Plan also defines the importance of promoting transit-oriented development (TOD) to leverage infrastructure to bolster including economic growth.

The Governor also announced an award to the State for a series of Climate Pollution Reduction Grants (CPRG) funding from the Environmental Protection Agency. Funding includes $78 million to MDOT to support the Clean Corridor Coalition, a multi-state effort to strategically plan for and deploy zero-emission infrastructure for medium-and heavy-duty vehicles along Interstate 95. The Clean Corridor Coalition funding will also support workforce development to build up a skilled workforce to support deployment of electric vehicle charging infrastructure. A second award will support the Atlantic Conservation Coalition, and an additional $1 million to MPA for carbon sequestration activities like urban tree plantings in historically disadvantaged areas around the port.

MDOT also met the requirements of the federal Carbon Reduction Program (CRP), a federal formula funding program established under the Bipartisan Infrastructure Law (BIL) to reduce carbon emissions from surface transportation by publishing the Carbon Reduction Strategy. The document, which was developed in cooperation with the State's Metropolitan Planning Organization (MPOs) and accepted by the Federal Highway Administration (FHWA), summarizes MDOT-wide strategies to reduce carbon emissions. In Spring of 2024, MDOT solicited applications from local governments, MPOs and MDOT Modal Administrations for projects eligible for funding under CRP.

Several MDOT Modal Administrations, including MPA and MAA, have developed sustainability plans to support decisions and investments to make the organization sustainable while protecting the environment, conserving resources, maintaining stable levels of economic growth, and achieving social progress in the local community. MDTA is currently developing an Environmental, Social Governance (ESG) plan that includes climate risk management. WMATA and the Metropolitan Washington Council of Governments launched DMV*Moves* to develop a regional Vision for the future of transit that will identify necessary actions and secure long-term, predictable, sustainable, dedicated funding to achieve the Vision.

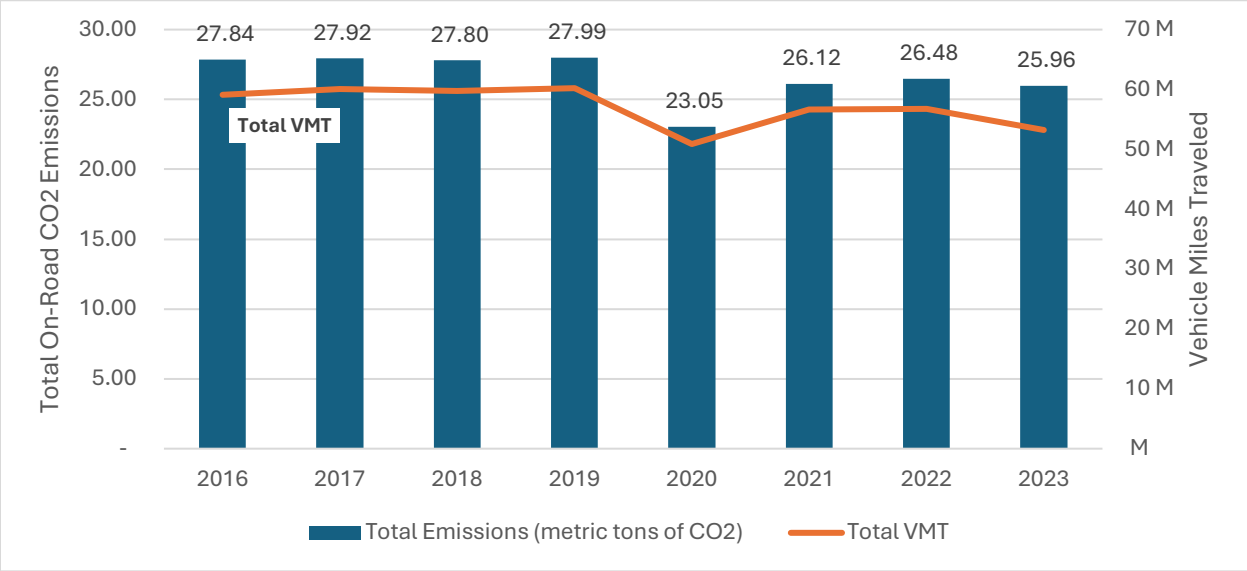
MDOT made significant progress in FY 2024 advancing projects that will provide greater transportation options, and help make Maryland's transportation sector cleaner, more reliable, and more accessible.

III. STATE OF GHG EMISSIONS

In December 2023, the United States Department of Transportation (USDOT) issued a Final Rule requiring state departments of transportation to measure and report CO2 emissions from on-road vehicles on the National Highway System (NHS) and to set targets for reducing these emissions over time. Although a United States District Court vacated the Final Rule in March 2024, the Maryland Department of Transportation (MDOT) independently set its own target. This target supports Maryland's broader greenhouse gas (GHG) reduction objectives while

accounting for the feasibility of planned initiatives. MDOT aims to achieve a 4% reduction in on-road CO2 emissions by 2025 compared to 2022 levels. As illustrated in Figure 1, Maryland achieved a 2.33% reduction in CO2 emissions between 2022 and 2023, based on documented gasoline and special fuels sales reported by the Motor Fuel & Highway Trust Fund.

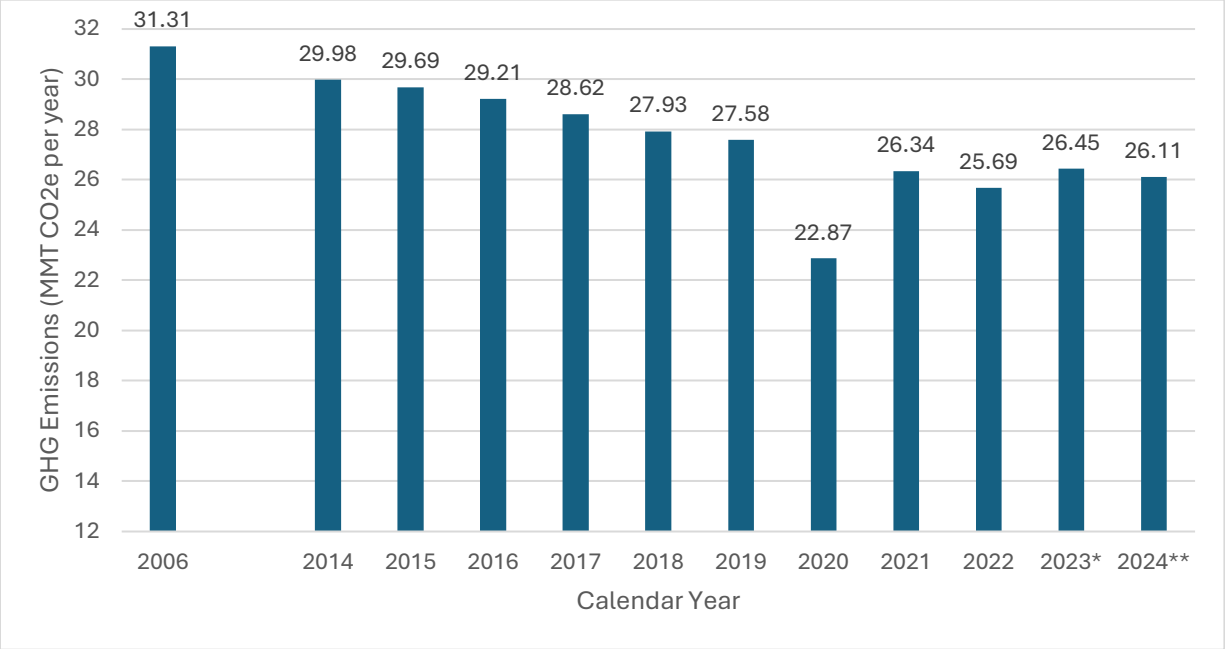
Figure 1: Maryland's On-Road CO2 Emissions



Source: https://www.fhwa.dot.gov/policyinformation/motorfuelhwy_trustfund.cfm

In addition to federal performance tracking, MDOT produces an annual GHG inventory for on-road vehicles in conjunction with the Attainment Report. Unlike the chart shown in Figure 1, the inventory analysis for GHG emissions from on-road transportation are primarily a product of three trends: VMT, the efficiency of the fleet, and the GHG intensity of energy used in vehicles. On-road GHG emissions have decreased every year between 2006 and 2019, with significant reduction in 2020 related to the COVID pandemic. 2021, 2022, 2023, and the 2024 estimate remain below 2019 levels as post-pandemic travel recovers as shown in Figure 2. The slight increase in emissions shown in 2023 is predominately the result of a change in the model used to calculate total emissions.

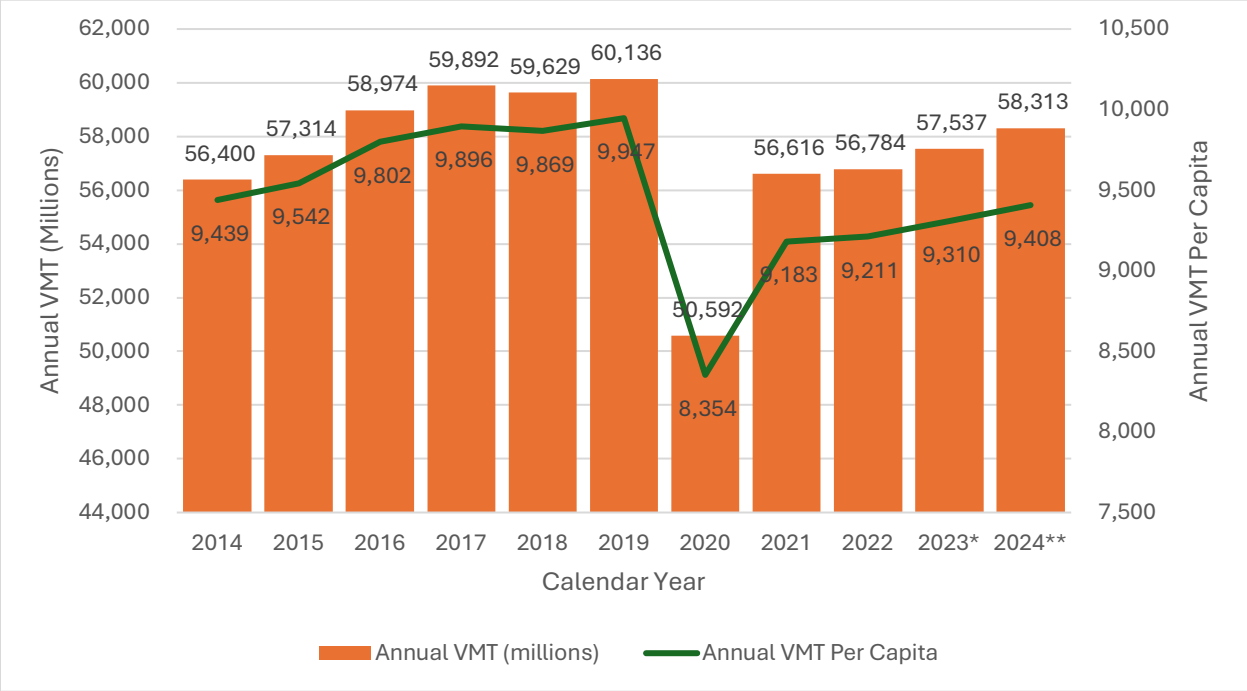
Figure 2: Total GHG Emissions from On-Road Sources



**2023 data has been revised from estimate to actual*
***2024 data is estimated*

Figure 3 shows the total and per capita VMT trends. Since 2013, VMT rose and then stabilized from 2017-2019. Pandemic restrictions and return-to-work outcomes spurred a sharp drop, with historic lows in 2020 (16% decrease in VMT compared to 2019); and then a 12% increase in VMT in 2021 compared to 2020. VMT and VMT per capita have been increasing since 2021, however both remain below pre-pandemic levels. VMT per capita is still 5.4% less compared to 2019. Efficiency of the on-road vehicle fleet continues to improve, as older vehicles are replaced with newer vehicles that meet more stringent federal GHG emission standards. 32,723 new EVs have been registered over the past year as of June 30, 2024, bringing the total number of EVs registered in Maryland to 108,584, an increase of 43% from June 30, 2023. EVs now make up approximately 2.2% of all vehicles registered in the State as shown in Figure 4.

Figure 3: Annual Total VMT and VMT Per Capita



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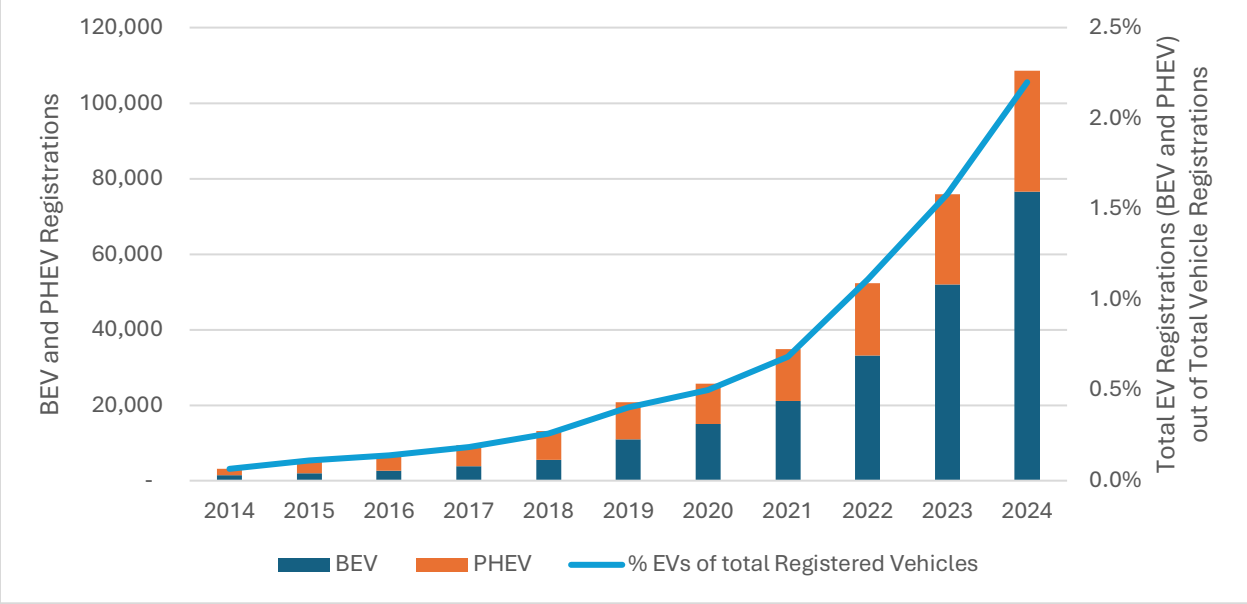
***2024 data is estimated*

Figure 4: BEV and PHEV Registered Vehicles



Source: MVA Vehicle Registrations as of June 30, 2024

MDOT'S CLIMATE CHANGE COMMITMENT

To understand and demonstrate the overall commitment to reducing GHG emissions and minimizing climate change impacts, MDOT continues to track the total share of CTP funding dedicated to projects that will help Maryland meet its climate change goals. Within the FY 2024–2029 CTP, 70% (approximately $9.5 billion) of Maryland's major capital program are investments that will potentially reduce GHG emissions through 2030 and beyond as shown in Figure 5. This share excludes spending on minor capital programs, such as system preservation and maintenance activities, which are essential to maintain the state's transportation system to meet its performance goals. This analysis also includes funding towards Washington Metropolitan Area Transit Authority (WMATA). The 70% of projects that are considered GHG-beneficial are broken down into the four pillars of GHG-emissions reductions in the transportation sector in Figure 4, with the most funding towards projects that reduce emissions via VMT reduction. This is due to the investment in transit and pedestrian and bicycle infrastructure, followed by congestion mitigation strategies, which improve travel reliability and increased efficiency.

Figure 5: MDOT Capital Program Emissions-Reducing Projects by Type ($B)

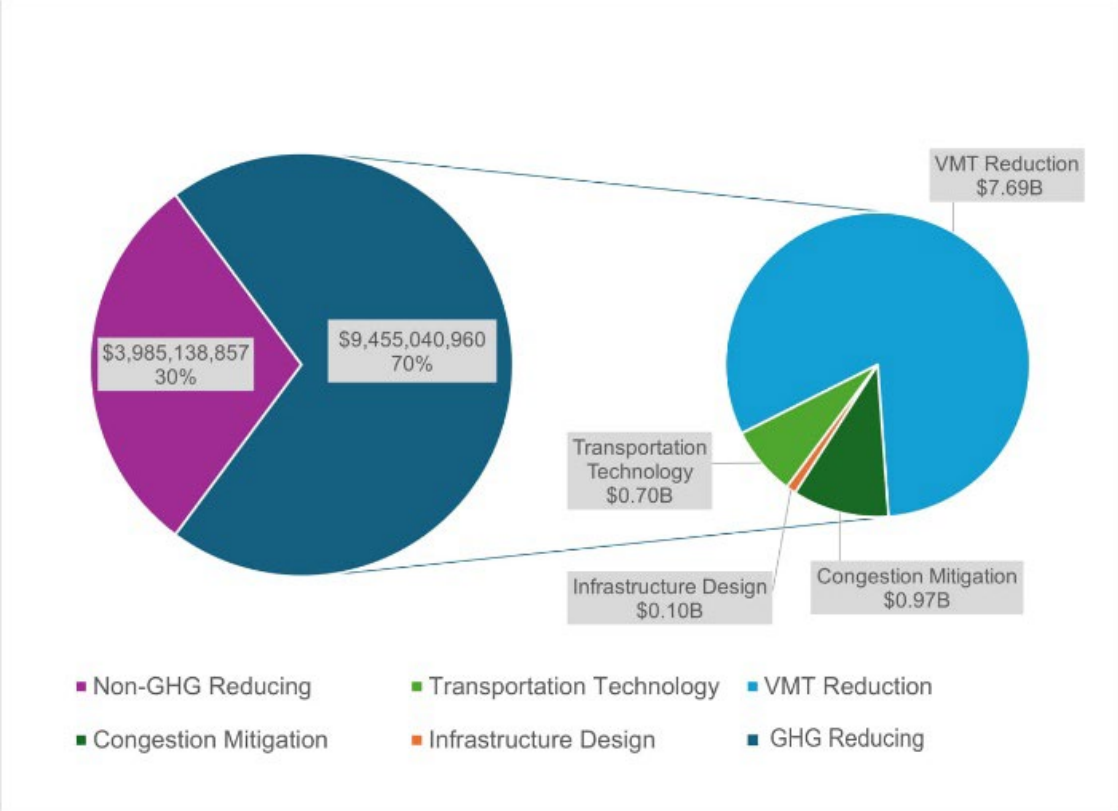
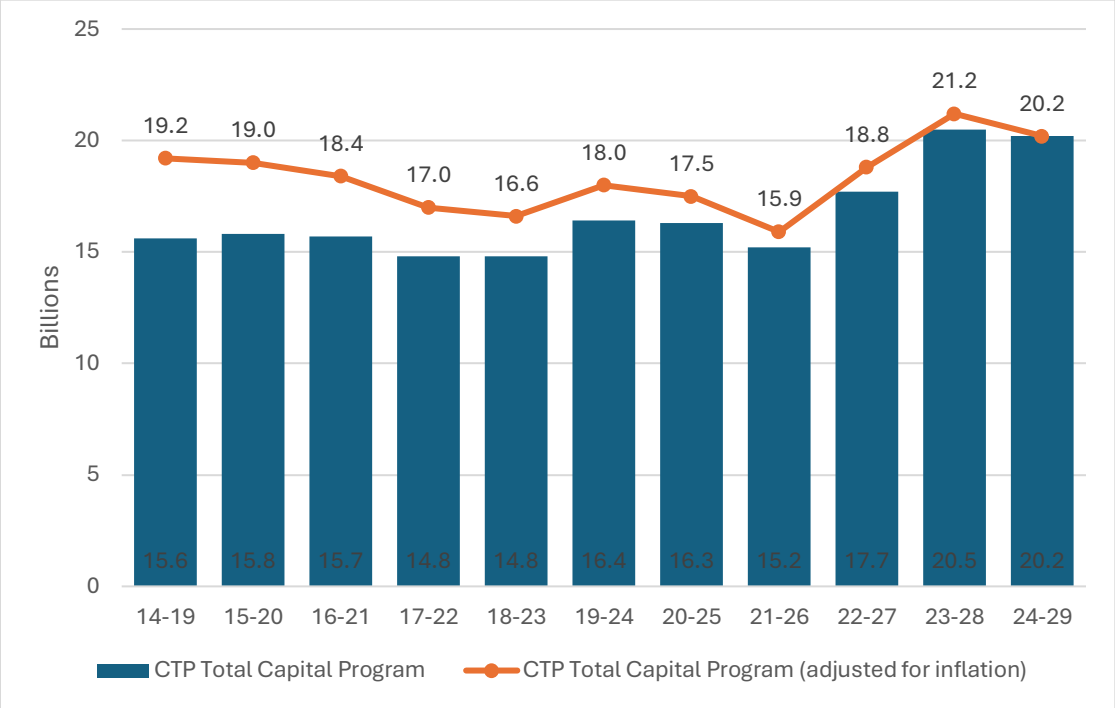


Figure 6 illustrates CTP funding trends since 2011, showing that funding has remained relatively stable from the 2014-2019 CTP period when adjusted for inflation.

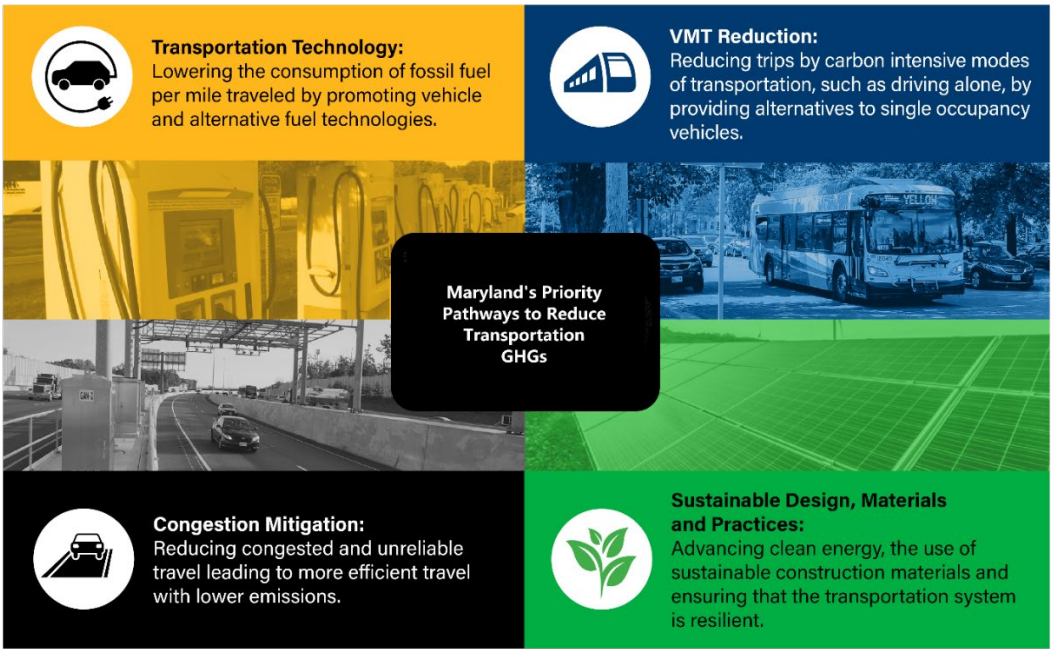
Figure 6: MDOT Total Capital Program Level ($B)



IV. WHERE DO GHG EMISSION REDUCTIONS IN THE TRANSPORTATION SECTOR COME FROM?

GHG emission reductions in the transportation sector come from four main sources: transportation technology; VMT reduction; congestion mitigation; and sustainable design, materials, and practices.

Figure 6: GHG Emissions Reductions Pathways



V. TRANSPORTATION TECHNOLOGY

MDOT has facilitated the development of strategies to accelerate the adoption of low-carbon and emission reduction technologies for vehicle infrastructure. MDOT is leading various initiatives including the Maryland Zero Emission Electric Vehicle Infrastructure Council (ZEEVIC), implementing the Connected and Automated Vehicle (CAV) Strategic Framework, and providing regulatory and policy support to facilitate the adoption of these low-carbon and emission reduction technologies to help achieve the CSNA targets. This includes leveraging National Electric Vehicle Infrastructure (NEVI) Formula Funds and CRP funds. MDOT continues to invest in State fleet electrification and the deployment of reliable charging infrastructure for use by fleets and the public. In addition, MDOT supports strategies, policies, and incentives that accelerate the adoption of zero emission vehicles (ZEV) and other infrastructure technologies throughout Maryland.

Accomplishments

GHG Reduction Strategies	MDOT Accomplishments
Electric Vehicles and Charging Infrastructure	MDOT released its Request for Proposals for the first Round of the Maryland NEVI Program, which made up to $30 million available for projects that are slated to begin late 2024. MDOT also submitted its annual NEVI Plan Update to the Joint Office of Energy and Transportation.
	MDOT was awarded $4.4 million from FHWA to repair or replace approximately 25 broken charging sites, and $78 million from the Environmental Protection Agency (EPA) to deploy approximately eight charging depots for medium- and heavy-duty EVs traveling along I-95 as part of a multi-state coalition project led by New Jersey Department of Environmental Protection and with MDE, Delaware Department of Transportation, and Connecticut Department of Energy and Environment.
	MDOT engages in outreach through the MarylandEV.org communications platform to increase public awareness about EVs, EV charging, and vehicle electrification efforts in the State and to share information about State funding opportunities.
	MDTA provides electric vehicle charging stations for public use at both the Baltimore Harbor Tunnel and Fort McHenry Tunnel, and at the Nice/Middleton Bridge campus facilities.
Public Transportation (EV Transit Bus Fleet)	MTA began the transition to zero emission buses with seven Battery Electric Buses (BEB) placed into service in February 2024. A contract for 20 additional BEBs was approved by the BPW in July 2024 and charging infrastructure is being added to Kirk and Northwest Divisions.
	WMATA currently has two 60' and two 40' BEBs in service operating out of the Shepard Parkway Bus Division Eight additional BEBs are expected to be delivered in 2024-25. Three additional Metro bus garages are being designed and constructed to accommodate the zero-emission bus fleet.
BWI Airport Parking Shuttle Replacements	MAA received eight electric buses in early 2023 funded under the Volkswagen Zero Emission Vehicle Fund that were placed into service at the Baltimore/Washington International Thurgood Marshall Airport (BWI Marshall) in February 2024. Eight new charging dispensers are in the final stages of construction.

MDOT Fleet Electrification	MDTA developed a fleet electrification strategy to support the transition of fleet vehicles to ZEVs and the installation of required charging infrastructure. MDTA has partnered with the Department of General Services (DGS) to install fleet charging infrastructure at several facilities.
	Since the fall of 2023, SHA has partnered with DGS to install fleet charging infrastructure at SHA's Hanover and Headquarters Complexes, as well as all seven district offices.
	MPA will receive a $642,000 award from FHWA's "Reduction of Truck Emissions at Port Facilities" Grant Program to replace an existing diesel-powered street sweeper with a zero-emission unit.
	MPA purchased two Ford Lighting EV Pickup trucks in 2023 for use by MES at the Cox Creek Dredged Material Containment Facility and Hawkins Point Marine Terminal as a pilot to test the durability and range of electric passenger trucks.
Port of Baltimore Drayage Truck Replacements	The Port's "Dollars for Drays" program provides up to $30,000 per vehicle to replace older, diesel-powered drayage trucks with newer, less polluting models. To date, this program has replaced 307 trucks with 14 trucks upgraded in FY 2024.
Connected and Automated Vehicle (CAV) Technologies	In February 2024, the Maryland CAV Strategic Framework was updated. As part of the Maryland CAV Working Group, MVA continues to work with other stakeholders to deliver collaborative and leading-edge research and solutions.

Challenges and Opportunities

To accelerate adoption and ensure Maryland continues to be a national leader in EV deployment, MDOT will continue to support incentives for EVs, support charging infrastructure deployment, and address barriers to EV adoption, which includes ensuring charging is available to those who live in rural and disadvantaged communities, as well as those in urban environments, multi-unit dwellings, or in homes governed by homeowner's associations.

In September of 2024, MDOT in partnership with the Pennsylvania Department of Transportation, New Jersey Department of Environmental Protection and the West Virginia Department of Transportation, submitted a round 2 proposal titled "MD-NJ-PA-WV Charging Ahead Partnership, and at time of this report is awaiting funding determination.

Maryland is positioned to use FHWA's Charging and Fueling Infrastructure (CFI) grant program, NEVI, and other eligible funds in partnership with private companies as well as regional and local government to deploy EV charging stations along designated corridors and within communities. MDOT will continue to work with the utilities, the Public Service Commission, and state, local, and federal partners through ZEEVIC to ensure the strategic, sustainable, and reliable installation of EV charging infrastructure in Maryland.

Strategies for FY 2025

- MDOT will continue to seek out and apply for federal discretionary grants to advance electric vehicle charging infrastructure, as well as opportunities for electric vehicle and charging infrastructure deployment.

- In September 2024, MDOT submitted a CFI Round 2 Multi-State application, MD-NJ-PA-WV Charging Ahead Partnership: I-81 and I-78 Freight Corridor'. If awarded, the partner States will complete a multi-state Visioning Plan and Charging Infrastructure deployments.
- MDOT will continue to develop and implement its Light Duty Fleet Electrification Strategy in concert with the Fleet Electrification Working Group. MDOT will leverage DGS and DBM fleet electrification assistance and resources.
- Pursuant to Governor Moore's Climate Executive Order, MDOT is developing a Zero Emission Vehicle Infrastructure Plan (ZEVIP) that builds upon Maryland's NEVI Plan for a comprehensive MDOT-led, multi-agency strategy to prepare charging infrastructure for the growth of light-, medium-, and heavy-duty EVs in Maryland under Advanced Clean Cars II and Advanced Clean Trucks.
- MAA is preparing an EV Fleet Roadmap in partnership with Baltimore Gas and Electric (BGE) for MAA's state vehicles that will schedule EV replacements in the future and will include an energy demand and greenhouse gas emission reduction analysis. 90% of the cost of this study was funded by BGE.
- MPA will research and develop the adoption of electric Power Take Off (ePTO) devices on carrier trucks which average two hours of engine idling per trip while loading or unloading. Wider adoption of ePTOs will significantly reduce truck idling and emissions at ports.

VI. VMT REDUCTION

These are policies and strategies that support a shift to less carbon intensive modes or that promote trip consolidation, carpooling, and reduced single occupancy trips and vehicle use. The Motor Vehicle Administration has implemented alternative service delivery mechanisms, including web-based transactions to reduce the number of in-person visits required at their locations. Other strategies include transit-oriented development (TOD) and transportation demand management (TDM) programs, such as Commuter Connections and Commuter Choice Maryland, that reduce trips through telework and compressed schedules; promote transit, ridesharing, and active commuting; and connect employers and commuters to transportation options and incentives

Accomplishments

GHG Reduction Strategies	MDOT Accomplishments
Public Transportation (New Rail or Bus Capacity of Frequency & Improved Operations)	MTA ridership increased 14% from the previous year in 2023, and the agency provided more than 60 million rides.
	MTA received a $213 million Federal grant to replace all 52 aging Light Rail vehicles in its fleet with new, modern light rail vehicles.
	The Purple line project achieved several milestones including the reopening of the Talbot Avenue bridge and the delivery of several of the 28 Light Rail Vehicles. Major construction was completed on the University of Maryland

	campus core, and the Static Test Track to begin local testing and operator training was completed.
	MTA is conducting the BMORE BUS study, a transit plan for the Baltimore region to identify bus service improvements that could be possible over the next five to ten years with additional resources. The study area includes all of MTA's core bus networks including Baltimore City, Baltimore County, Howard County, and Anne Arundel County.
	The North-South Corridor Feasibility Study, part of the Central Maryland Regional Transit Plan, was published in December 2023 evaluating viable preliminary alignments and modes to be advanced to identify the range of options to best serve existing and future transit demand between Towson and Baltimore.
	MTA began work on the MARC Growth and Transformation Plan, an update to the 2019 MARC Cornerstone Plan, seeking public feedback on the future vision for MARC service and engaging railroads and other stakeholders.
	MDOT and MTA along with Prince Georges and Charles Counties executed a Framework agreement establishing the structure and processes for advancing the Southern Maryland Rapid Transit Project and has commenced a Planning and Environment Linkages (PEL) study.
	WMATA has seen 40 consecutive months of ridership growth year-over-year, with Metrobus leading the nation in ridership recovery. Metro continues to focus on service reliability, with rail automation and bus priority efforts underway. In April 2024, WMATA began auto door functions on select trains, allowing doors to open faster and trains to service stations more quickly. Rail service increases implemented in September also mean that now 65% of Metrorail customer trips have max wait times of 6 min or less. In January 2024, the District of Columbia began ticketing violators in bus lanes through the Clear Lanes partnership to speed up bus service and enhance reliability.
	In June 2023, WMATA launched the Metro Lift program, an income-qualified reduced fare program for SNAP eligible customers to receive a 50% discount on rail and bus trips. Metro Lift now has over 7,400 participants who take almost 2,000 trips a day and have used the pass at all 98 rail stations and on over 135 bus lines, resulting in combined savings of over $450,000 for participants.
Red Line Transit	Governor Moore announced Light Rail as the mode for the Red Line, and a community advisory team was selected to bring a full range of perspectives` from groups and neighborhoods living, working, and investing along the Red Line Transit corridor. Detailed analysis is currently being completed to evaluate the remaining alternatives, and a supplemental environmental impact assessment is being prepared building on previous work.
Expanded Rail Regional Transit	MTA Signed framework agreements with Delaware and Virginia to expand MARC Train Service north and south and improve regional connectivity.
Transportation Demand Management (TDM)	MDOT has been focusing on commuter program engagement and promotion within Maryland State agencies, which are some of the largest employers in the state. These efforts to promote commuting options coincided with other initiatives including relocation of several Baltimore agencies, the Governor's Climate Executive Order, and MDOT's response to the Key Bridge collapse.
	MDOT has been working on the development and promotion of several new commuter programs to help relieve congestion and travel time for the

	Baltimore region. In response to the Key Bridge collapse, Commuter Choice Maryland has been working with its many partners to support a robust TDM response. MDOT also developed a new website for Baltimore-area commuters, to register for free ridematching, incenTrip, and Guaranteed Ride Home.
	MDOT has also been supporting the public meeting process and TDM-related planning regarding the American Legion Bridge (I-270/495).
	In 2023, for the third holiday season MVA's Highway Safety Office received a $20,000 grant from the Governors Highway Safety Association to offer $20 rideshare credits and encourage Marylanders to "Be the Make A Plan Driver" by choosing an alternative to driving while impaired.
Bicycle and Pedestrian Strategies	MDOT is implementing Complete Streets statewide to ensure that a range of safe options for multimodal transportation, including active transportation, are prioritized throughout all phases of project development. The Model Complete Streets Initiative is an opportunity to apply a multi-pronged approach to delivering safe and accessible travel options for every roadway user.
	MDOT's Walk Maryland Program and Pedestrian Safety Action Plan (PSAP) are striving to make Maryland more connected by sidewalks and safe for people walking as a means of transportation. PSAP, managed by SHA, is a data driven approach to redesigning Maryland's most dangerous state highways to be safer for people walking. Currently five projects are undergoing public comment and eight more are in the design phase, representing a $100 million investment.
	Walk Maryland also launched the Sidewalk Data Collaboration to establish a statewide sidewalk dataset in the "One Maryland One Centerline" database. The purpose of this effort is to identify sidewalk gaps and allow MDOT, as well as local jurisdictions, to prioritize sidewalk projects.
	Walk Maryland also manages the "Walktober" initiative to bring awareness to walking, safety, equity, and infrastructure issues. During Walktober 2023, MDOT and over 50 community partners celebrate "Walk Maryland Day" and MDOT hosts weekly walkinar webinars. MDOT hosted four walkinar webinars highlighting a variety of speakers, and Walktober generated more than 51 partnerships.
	The Governor's Maryland Bicycle and Pedestrian Safety Advisory Committee (MBPAC) meets quarterly with state agency representatives and citizen appointed members. The Committee advises State government agencies on issues directly related to bicycling and pedestrian activity including funding, public awareness, safety and education. In 2023 a Pedestrian Subcommittee was added and now has over 147 members.
Transit Oriented Development (TOD)	Significant efforts occurred in FY 2024 to advance Transit Oriented Development statewide, including completing the Reisterstown Plaza Metro TOD Vision Plan.
	MDOT is receiving an approximately $4.7 million Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant for multi-modal/connectivity improvements to the Reisterstown Plaza Metro site.
	Over 2,000 housing units and 422,000 square feet of office space near Metrorail stations were delivered or under construction in FY 2024 as part of Metro's joint developments. WMATA is partnering with MDOT on pursuing Joint Development Studies at eight Metrorail stations in the State.

Other Strategies	MVA's Alternative Services Delivery, a landmark IT system modernization, has made the lives of Marylanders easier and business more efficient. MVA continues to improve and expand the functionalities of Customer Connect and MyMVA to provide reliable and convenient services to customers without requiring an in-person trip, helping MVA customers reduce VMT across the State.
	SHA worked with TSO and counterparts at the District of Columbia's Department of Transportation (DDOT) to set MDOT's carbon emissions reduction goal for 2025 as part of FHWA's required transportation performance measures. The target was set by considering the goals outlined in the CSNA and subsequent analysis for transportation GHG emissions, and a 4% decline from 2022 levels by the 2025 performance year was selected.

Challenges and Opportunities

Reducing vehicle miles traveled (VMT), especially in relation to population growth, is essential for lowering greenhouse gas (GHG) emissions by providing alternatives to carbon-intensive travel modes, such as single-occupancy vehicle (SOV) trips. A significant challenge to reducing VMT is that MDOT does not have direct control over individual travel choices. To address this, MDOT actively engages in outreach and education to promote available alternatives to SOV use. Efforts to expand transit ridership include the development of the Red and Purple Lines, as well as enhancements and expansions to existing transit systems. Additionally, MDOT collaborates closely with communities and partners through the Commuter Choice program to educate the public on travel options that reduce reliance on SOVs and offers incentives to encourage more efficient commuting choices.

Strategies for FY 2025

- Commuter Choice Maryland will continue to focus heavily on congestion mitigation for the Baltimore region in response to the Key Bridge collapse, implementing and promoting new incentives that will help employers and commuters more easily choose transit, ridesharing, and other non-SOV options. As part of this effort, we will also continue to build strong connections with the employer community.
- The incenTrip app is expected to be rebranded and relaunched, and Commuter Choice Maryland will support the logistics to help migrate current users to the new app, continue promoting the features that incentivize behavior change towards non-SOV options, and help with the launch of new functions within the app, with the goals of increasing participation statewide and around particularly congested corridors.
- MDOT's TDM program will continue to work with State agencies to demonstrate leadership as employers promote and encourage non-SOV commuting options by employees.
- MTA will continue to advance the development of the Red Line, including a focused period of workshops and open houses to be held in Fall 2024.
- MDOT is developing the Maryland State Transportation Trails Strategic Plan, which will build upon and update the 2009 Maryland Trails Plan and create an updated resource for

shared-use path/trail projects that will contribute to the statewide bicycle and pedestrian transportation network.

- By the end of 2025, all 21 stations of the Purple Line will be under construction and all 28 light rail vehicles delivered. Milestones expected in 2026 include the completion of the Capital Crescent Trail, Dynamic Track Testing, and the installation of all overhead power catenaries.
- Several major milestones for Maryland TOD strategies are expected in FY 2025 including the completion of several major site and development studies. In addition, selection of Joint Development partner for the Odenton site and the execution of two TOD Master Developer Agreement are expected, and several TOD partnerships, including MOUs on development partnerships, and the establishment of TOD Capitol Grant Fund with first project awards.
- In Fall 2024, MTA will release the draft BMORE improvements for public and stakeholder input. The Final plan will lay out a vision for bus service improvements for the Baltimore region, along with the associated resources required. The final version will be released in early 2025.
- In FY 2025, MVA will be assessing ways to promote increased ride sharing among its staff.
- MDOT will advance the planning and design projects from the first and second rounds of the Pedestrian Safety Action Plan corridor projects.
- MDOT will continue to expand the highly successful Walktober initiative to encourage active transportation as a safe and healthy commuting option year-round.

VII. CONGESTION MITIGATION

Congestion mitigation programs and projects that improve passenger and freight reliability, efficiency, air quality, and enhance the quality of life for Marylanders. MDOT's commitment to reducing congestion through various initiatives, including the deployment of State Highway Administration's (SHA) Transportation Systems Management and Operations (TSMO) strategies, improve the safety, security, and reliability of MDOT's transportation network. Other initiatives, such as the Coordinated Highways Action Response Team (CHART), focus on optimizing the transportation system by improving incident response times and providing traveler information (Maryland 511) and 24/7 traffic monitoring and management to improve efficiency. TDM programs that encourage alternatives to single occupant vehicle (SOV) use also reduce congestion on roadways.

Accomplishments

GHG Reduction Strategies	MDOT Accomplishments
On-Road Technology	During 2023, CHART provided a total of 70,533 incident responses and disabled vehicle assists, with an average incident response time of 11.97 minutes. The results of these efforts include more than 8 million gallons of fuel and over 2 million hours of truck delay, in addition to the reduction of more than 75,000 metric tons (mt) of carbon dioxide equivalent. (CO2e). In 2023, the reduction in emissions resulted in a total savings of 48.53 million

	dollars. Thus, CHART operations in 2023 generated a total net benefit of 2.23 billion dollars.
	The University of Maryland Center for Advanced Transportation Technology (CATT) Lab continues to support MDOT by forecasting traffic conditions for the days immediately prior to, during, and after major summer holidays for the National Capital and Baltimore regions. This forecasting assists in reducing roadway congestion, improving mobility, safety, and efficiency, and contributing to GHG reduction.
Freight and Freight Rail Programs	Several components of the Howard Street Tunnel project, including lowering the track, are in or preparing to enter construction.
Pricing Initiatives (Electronic Tolling)	Electronic tolling continues to provide multiple benefits in reducing congestion at MDTA toll facilities. Automated gates, operated by the Authority, have been installed to better control the flow of traffic and reduce accidents at the William Preston Lane Jr. Memorial (Bay) Bridge. The change to electronic tolling at the JFK Highway (I-95) has reduced traffic accidents and enables a continued flow of traffic at highway speeds.

Challenges and Opportunities

Increasing demands on Maryland's transportation system, particularly due to increases in freight travel, continue to result in reliability challenges. As a result, even relatively minor disruptions can lead to significant system-wide delays. Harnessing technology through the deployment of systems along roadways and in vehicles to reduce delays, clear traffic incidents efficiently, and provide accurate and real-time traveler information continues to help transportation agencies and system users make better decisions to manage or avoid congestion.

Strategies for FY 2025

- The CHART program is expected to continue to provide significant congestion mitigation benefits in FY 2025.
- Work to prepare the Howard Street Tunnel for future container double-stacking will continue.
- A truck plaza improvement project at Dundalk Marine Terminal has received funding and is in the planning stages. This one-stop truck plaza will eliminate a stop for truckers entering the terminal, reducing idling and truck emissions.

VIII. SUSTAINABLE DESIGN, MATERIALS AND PRACTICES

MDOT continues to take steps to ensure that its assets and facilities are designed to be sustainable and resilient to the impacts of climate change while also supporting the goal of reduced GHG emissions throughout its transportation system. This includes projects that focus on renewable energy systems, energy efficiency upgrades, long-term resilience of transportation assets and infrastructure, and that incorporate evolving needs and changing technology, including the potential for carbon sequestration. A large element of this is keeping MDOT assets in a state of good repair and updating facilities when necessary to optimize energy efficiency. This asset management approach, from facilities to vehicles, reduces the environmental impact while also making them more resilient to climate impacts.

Accomplishments

GHG Reduction Strategies	MDOT Accomplishments
Lead-By-Example (Renewable Energy)	SHA is supporting the CPRP targets by developing renewable energy projects utilizing MDOT's alternative energy master agreement. SHA is collaborating with the MDOT Office of the Environment to finalize a task order request for proposals for solar canopy installations about parking lots at 14 SHA Park and Ride locations.
	MAA negotiated an additional supply of renewable energy, including hydropower and solar, to bring the supply of non-carbon-based power to 70% at BWI Marshall and 50% at Martin State. Delivery will occur in FY 2025 and FY 2026 with a 20 yr. term of supply for the solar and BWI Marshall will own the Solar Renewable Energy Credits (SRECS).
	WMATA provides significant clean air and carbon emissions benefits to the region and continues to improve operations and reduce energy use by transitioning to clean electricity. WMATA's solar carport program uses an innovative lease agreement at four Metrorail stations that will provide nearly 10 MW community solar to the region annual revenue to WMATA, and station improvements to customers. In 2023-2024, WMATA energized solar carports at three sites, with the fourth at the Cheverly station anticipated to be energized by the end of calendar year 2025.
	MAA received a Maryland Energy Administration (MEA) grant in May 2023 to study the feasibility of a microgrid. Phase 1 of this study resulted in the Solar Siting and Feasibility Study that analyzed over 60 sites for both BWI Marshall and Martin State Airports.
	MDTA is assessing the feasibility of installing solar panels at MDTA owned facilities. MDTA currently has two existing projects with planned solar panel installation, and the feasibility study will expand the range of sites available.
	In 2024, MPA began work on a project to assess the feasibility for potential solar infrastructure installation at their Hawkins Point facility, a 67-acre facility that is mainly operated as a capped landfill. A task order will be released in 2024, with an anticipated start date early 2025.
	WMATA utilizes green certifications such as the U.S. Green Building Council's LEED® standards to enhance building efficiency, reduce carbon emissions, create healthier workspaces, and to be a good neighbor in the communities where WMATA operates and serves. WMATA received LEED® certification on all three of its new administrative buildings, including achieving LEED® Gold at the New Carrollton building in MD.
Lead-By-Example (Building Energy Use)	The BWI Marshall A/B Connector and Baggage Handling System improvement project is projected to achieve a 24% energy cost saving through improved lighting, chiller replacement, hot water heating, building design and control systems.
	As part of MPA's ongoing efforts to support the CSNA goal of net-zero GHG emissions by 2045, the first phase of energy audits and net zero assessments were completed in 2023. The first phase focused on buildings at Dundalk Marine Terminal, South Locust Point Marine Terminal, and the Baltimore World Trade Center.

	MVA adopted the Target Net Zero End of Emissions Reduction Program by utilizing technology solutions for emission reduction and upgrading heating, ventilation and air condition (HVAC) systems MVA wide.
	MPA is installing several projects to increase building efficiency and lower energy usage at the World Trade Center, including installation of high efficiency air coils to reduce HVAC energy needs and the replacement of existing elevator motors with more efficient units.
	MDTA is upgrading the software used in its existing building automation system, which will enable maximum control of the HVAC system to optimize performance
	MDTA has installed Light-emitting Diode (LED) lighting at several buildings and other facilities, including replacing high mast lighting that significantly reduces electricity demand. Along the Intercounty Connector, a total of 224 high mast lighting fixtures were replaced over the past year, and it is estimated that 165,112 KWH of electricity usage will be reduced over a one-year period, saving approximately $29,868.
	SHA has completed a lighting retrofit this spring at the Hanover Complex, converting a total of 67 site lights to LED while taking advantage of the EmPOWER MD BGE incentive program.
	MDTA is upgrading the existing tunnel lighting within the Baltimore Harbor Tunnel (BHT) with energy-efficient LED luminaires. New lighting will be monitored and controlled by an intelligent lighting control system with automatic dimming capabilities for required nighttime and daytime luminance levels to further improve energy savings.
Airport Decarbonization Initiatives	MAA received two Federal Aviation Administration grants in July 2023 to fund a decarbonization roadmap for both BWI Marshall and Martin State Airports. This effort will analyze the feasibility of a variety of decarbonization measures including on-site renewable energy production, microgrid development, and electrifying fleet vehicles, ground support equipment, and HVAC systems.
Port Decarbonization Initiatives	MPA submitted two grant applications for EPA's Clean Ports Program to update and expand its emissions inventory and emissions reduction strategy plan, and to deploy 213 zero-emission vehicles and equipment and chargers at Dundalk and Seagirt Marine Terminals. If awarded, these projects will reduce pollution-related impacts in nearby communities and result in an estimated 20% GHG reduction compared to 2020 MPA activities.
Carbon Sequestration	MVA continued its partnership with the Department of Natural Resources (DNR) Tree-Mendous Maryland Program, a cooperative effort that focuses on planting native trees on public lands, at schools, and in community open spaces. MVA enables its customers to make donations when registering or renewing their vehicle registrations. In FY 2024, more than $125,600 was donated through MVA's registration feature, funding the planting of approximately 3,140 trees. To continue to highlight this partnership and encourage Marylanders to plant trees to help the state reach its 5 million Trees goal, MVA will be planning to host a volunteer tree planting event in the Fall of 2024 at one MVA branch location.
	MPA contracted with the University of Maryland Center for Environmental Studies (UMCES) to develop an assessment of the rate of carbon sequestration on the restored wetland at Poplar Island using the Blue Carbon Manual protocols. This study will provide an estimated carbon update and a

	project scale to better understand the benefit of using dredged materials for wetland restoration and future beneficial use of dredged material restoration sites.
Lead-By-Example (Innovative Pavement)	SHA continued to advance actions under the FHWA Climate Challenge Grant Project received in 2023, exploring options for reducing emissions from asphalt and concrete. A core SHA team consisting of representatives from various offices and districts was established to coordinate, collaborate and support the evaluation of all aspects related to Environmental Product Declarations (EPDs). The Team surveyed SHA stakeholders to assess knowledge and understanding of EPDs, and additional outreach was performed with asphalt and concrete industry partners to assess readiness for providing EPDs. The Team coordinated with FHWA and organized workshops focusing on implementation of EPDs.
Other	In 2023, more than 130 tons of food scraps were collected from the BWI Marshall's restaurant kitchens and composted, equating to 82.677 MT CO2e in GHG emissions.
	In 2023, BWI Marshall collected 61 tons of used cooking oil to be refined into Sustainable Aviation Fuel (SAF) by Neste, which then sells it to airlines around the world. By utilizing SAF over conventional jet fuel in airplanes, 80% of GHG emissions can be reduced over its lifecycle without having to make additional investments in aircraft or fueling infrastructure.
	In June 2023, Oyster Recovery Partnership (ORP) began collecting oyster shells from the two oyster bar restaurants at BWI Marshall. ORP recycles the shells by cleaning and treating them with baby oysters called spat and then plants them back into the Chesapeake Bay. Approximately 1,500 oysters are collected weekly at BWI Marshall, and between July 2023-March 2024, two tons of oyster shell were collected.
	In April 2024, MDOT initiated a composting program within the Headquarters Building. Between April and June, over 695 pounds of compostable materials were delivered to the Prince George's County Organics Composting Facility.
	The MDOT Urban Tree Program (UTP) provides funds to plant trees in communities that have been impacted by tree removal as part of previous transportation projects, such as the Purple Line construction. In FY 2024, MDOT sponsored communities and non-profit organizations which resulted in the planting of 767 trees across Maryland. The program has helped plant a total of 1,678 trees since its establishment in FY 2022.

Challenges and Opportunities

Several challenges and opportunities exist as MDOT continues to work to ensure that its facilities and operations are efficient and promoting the use of renewable energy. Acquiring new equipment can be a significant capital investment, and the installation and maintenance of new equipment requires trained staff. As more local governments and private companies develop GHG reduction targets, there may be additional opportunities for partnerships and collaboration to seek funding. Opportunities to partner with local communities, such as through the MDOT Urban Tree Program, provide significant co-benefits.

Strategies for FY 2025

- MAA will continue projects to upgrade LED lighting at BWI Marshall and Martin State Airports, including interior lighting and hangars, much of which is being coordinated through BGE at no cost to MAA. Through the BGE partnership, LED lighting at 10 locations around BWI Marshall will yield savings of 1.2 MWH/yr.
- MAA received a RAISE Grant to study the feasibility of developing a ground transportation center and automated people mover to enhance customer experience and operational efficiency, reduce congestion and reduce engine idle time and remove shuttle buses (fossil fuel powered) from fleet.
- MAA will conduct a feasibility study to consider adding back-up battery storage to solar sites to create a microgrid to enhance resiliency of the system.
- MPA is in the planning phase of a system-wide design approach to reduce carbon emissions and energy usage at Dundalk Marine Terminal. This electrification will include the installation of resilient power system monitoring equipment for the terminal electrical distribution system, improvements to electrical conduit systems for durability and reliability, installation of electric vehicle charging stations, and solidifying pathways for shore to ship power.
- MVA will be working to complete a solar siting assessment to identify viable ground solar installation locations on MVA property.
- MDOT plans to continue the highly successful Urban Tree Grant Program, which supports tree plantings in areas that have been previously impacted by the removal of trees due to the development of transportation projects.

IX. RESILIENCE AND ADAPTATION

Maryland has been a leader in integrating climate change resilience and adaptation into agency processes by identifying system vulnerabilities, investing in resilience projects and activities, coordinating with partners and stakeholders on responding to the challenges, and communicating the potential risks and benefits of action for transportation system users.

Accomplishments

Strategies	MDOT Accomplishments
Resilience and Adaptation	MDOT developed an agencywide multimodal Transportation Resilience Improvement Plan (TRIP). This planning effort, established under the Bipartisan Infrastructure Law, enables State DOT's to incorporate resiliency from natural hazards into transportation planning. FHWA approved the plan in August 2024 opening the door to potentially reduce the non-federal share of projects funded through the Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) formula funding and discretionary grant programs.
	OCCRA established the MDOT Resiliency Task Force (RTF), composed of representatives of each of the MDOT modal administrations that collaborate and share information on approaches and data to help enhance resiliency of Maryland's transportation system.

	MDOT continues to actively participate in the Maryland Resiliency Partnership, a collaboration of public and private partners working to enhance the resilience of Maryland. In addition, MDOT serves on the core team supporting the Office of Resilience in the development of a statewide resilience plan.
	SHA's Climate Change Vulnerability Viewer (CCVV) visualizes flood inundation now and in the future associated with projected sea level rise that are based on 2015 flood depth grid data (LiDAR data). Updates are underway, county by county as new LiDAR data is available from the USGS, based on 2021 levels.
	SHA is also working with vulnerable coastal communities such as Deale Island and Oxford to assess their situation and better understand their needs relating to roadway accessibility and flood mitigation.
	SHA's Highway Hydraulics Division published a major update to the Highway Drainage Manual in September of 2023, integrating new resilient design considerations for changing climate. The Highway Drainage Manual sets forth highway drainage design standards and documents policies and procedures for drainage infrastructure design. The 2023 update requires the use of projected rainfall data for hurricane evacuation routes and recommended using this projected data in vulnerable areas.
	SHA continues to coordinate with the Chesapeake Bay Critical Area Commission to develop a regional banking program. The goal of this program is to develop mitigation in advance of impacts so that projects, including resiliency improvements, can be designed and constructed more efficiently.
	WMATA continues to integrate climate resilience into their operational practices and capital programs. In 2024, WMATA adopted new design criteria that require WMATA capital projects to proactively consider changing climate conditions early in the project development process, accounting for risks and ongoing costs. Making early adaptation investments can reduce future costs – often at low-or no- cost change to the project.
	The Engineering Geology Division has begun executing the tasks outlined in the Geotechnical Asset Management Plan for SHA slope, embankment, and ground modification assets. The plan documents how vulnerability is assessed as well as their approach to resilience.
	MPA received a $150,000 FEMA grant to develop a comprehensive flood and storm vulnerability assessment and improve overall coastal resiliency at its marine terminals. This assessment was conducted in 2023, and a coastal resiliency report with interactive mapping will be completed in 2024.
	MPA and the University of Maryland received a grant to study dredged material blends that can be used for vegetative berms. The initial testing for environmental and physical properties was completed and found to be acceptable. The project moved into the second phase of the project with material blended at different ratios, formed into a berm and planted with grass seed to test the mixtures for vegetative growth.
	MVA successfully completed the flood mitigation project at MVA's Loveville Branch in Leonardtown and made improvements to stormwater management features at nine facilities.
	MPA and the USACE continued progress with the Mid-Bay Island Ecosystem Restoration Project. Phase 1 construction of the Barren Island portion of the project was completed in 2024. Design efforts for James Island progressed and

	workshops were held with stakeholders to discuss natural and nature-based solutions that could potentially be incorporated into the design.
	MAA is designing Midfield Drainage Improvements at Martin State Airport to improve airport drainage and reduce the potential for flooding along Wilson Point Road. This road is the only public entrance road to the airport and the Wilson Point community, and frequently experiences storm related flooding, particularly during periods of high tide, impacting access for all stakeholders.

Challenges and Opportunities

MDOT continues to be a recognized leader in the planning and implementation of transportation resiliency strategies. Collaboration across MDOT modal administrations and the Secretary's Office have been beneficial in sharing information, including through the Resiliency Task Force have produced significant opportunities to enhance the resiliency of the State's transportation system. Ensuring the sharing of current data and developing new tools to address changing conditions remains necessary.

Strategies for FY 2025

- MDOT will prioritize resiliency projects across the Modal Administrations to maximize the return on investment of existing and new MDOT transportation assets.
- MVA will continue to design stormwater management improvements for the Frederick and Salisbury branches.
- Continue to seek funding opportunities for implementing resiliency projects agencywide.

X. FY 2025 CLIMATE MITIGATION ACTIONS

In FY 2025, MDOT will continue to provide a safe, reliable, and efficient transportation system for the State of Maryland. MDOT will build upon a very successful foundation of strategic planning, and grant and other funding opportunities received in FY 2024 to continue to advance the State's GHG reduction goals. Working in partnership with other State agencies, local governments, businesses, and organizations, MDOT will seek opportunities to further reduce GHG emissions and enhance resiliency and dependability agency wide.

Increasing the deployment of electric vehicles and charging infrastructure is a significant priority for MDOT over the next year. Implementation of the NEVI program, Carbon Reduction Program, CPRG, and other opportunities to increase the availability and accessibility of EVs and infrastructure, is being coordinated to increase both Maryland-wide EV registrations and across the MDOT state fleet.

MDOT will promote the reduction of vehicle miles traveled by providing alternatives to solo-occupancy trips through transportation demand management opportunities, including connecting travelers with ride-sharing options. MDOT will also promote mode shift by ensuring that the public transit systems throughout the region are safe, efficient and reliable, and continue to expand access to existing and new transit opportunities, such as the Purple and Red Lines.

Coupled with a continued commitment to Transportation Demand Management and Transit Oriented Development, MDOT will advance several VMT reduction strategies over the next year.

MDOT will continue to seek additional funding opportunities by applying for discretionary grants and engaging in partnerships to produce GHG-beneficial projects, such as electrifying the MDOT vehicle fleet, installing EV charging infrastructure, and increasing the deployment of solar arrays at MDOT facilities. In FY 2025, MDOT will continue implementing the NEVI program funding, grant funds awarded through the CPRG, and federal formula funding available through the Carbon Reduction Program and PROTECT. Finally, MDOT will work to implement the MDOT CPRP and support the prioritization and advancement of critical GHG-beneficial transportation projects to help ensure that Maryland meets the ambitious goals established in the Climate Solutions Now Act and the Maryland Transportation Plan.