GOAL: Ensure Environmental Protection and Sensitivity

Deliver sustainable transportation infrastructure improvements that protect and reduce impacts to Maryland's natural, historic, and cultural resources

OBJECTIVES:

- **Protect and enhance the natural, historic, and cultural environment through avoidance, minimization, and mitigation of adverse impacts related to transportation infrastructure, including support for broader efforts to improve the health of the Chesapeake Bay**
- **Employ resource protection and conservation practices in project development, construction, operations, and maintenance of transportation assets**
- **Implement initiatives to reduce fossil fuel consumption, mitigate Greenhouse Gas (GHG), and improve air quality**

MDOT has demonstrated its continued commitment to minimizing adverse impacts on the environment, conserving natural resources, and integrating sustainability into various aspects of transportation systems at the policy, program, and project levels of implementation. MDOT and each Transportation Business Unit (TBU) recognize that the protection of natural resources and conducting business in an environmentally responsible manner are among the core elements of their overall mission. They continue to reduce effects of transportation and built-environment by way of effective planning, interdisciplinary approach to project development, sustainable operations, and maintenance procedures.

MDOT's commitment to environmental protection influences a wide variety of plans, projects, and initiatives and is present in the day-to-day operations of the TBUs. Examples of the far-reaching environmental initiatives of the department include the MDOT MPA Innovative and Beneficial Reuse of Dredged Material Initiative, the Port of Baltimore Dray Truck Replacement Program, and MDOT SHA's Bay restoration projects, implemented to meet regulatory requirements. MDOT MPA was honored for its continued commitment and stewardship of wildlife habitat through outreach and educational programming. The American Association of Port Authorities (AAPA) has honored MDOT MPA for its 10-year stewardship of community education and outreach programs at Masonville Cove, an urban wildlife habitat area along the Patapsco River.

All MDOT TBUs incorporate environmental Best Management Practices (BMPs) as part of the Chesapeake Bay Restoration efforts. To effectively reduce pollution in stormwater runoff from highway projects, MDOT SHA developed a Bay Restoration viewer that allows the public to view completed and proposed highway projects implementing BMPs such as tree planting, removing impervious areas, stream restoration, etc.

Interagency coordination efforts including Maryland's Green Infrastructure Plan and Chesapeake Bay Restoration priorities have facilitated better alignment between transportation, land use, and natural features to minimize or mitigate impacts to the environment. MDOT continues to collaborate with other regional, State, and local agency partners in exploring regional policies to reduce carbon emissions and other pollutants from the transportation sector and improve transportation systems as part of their ongoing participation in the Transportation and Climate Initiative (TCI).

MDOT continues to lead the way in renewable energy by demonstrating leadership and vision in implementing the installation of solar photovoltaic systems on sites owned by MDOT's TBUs to be considered for development. It has become the first State DOT to generate jobs in the process of adding solar power to MDOT's facilities.

MDOT makes a continued commitment to environmental compliance, enhances improvement of its environmental performance through established and innovative processes and adherence to sustainable practices, while maintaining outreach and communication about its environmental activities with the project stakeholders and the general public.

MDOT ENVIRONMENTAL INITIATIVES

MDOT MAA: MDOT MAA has ordered an additional 20 clean diesel heavy-duty transit shuttle buses (15 40-foot and five 60-foot buses) to be used at the BWI Marshall Airport to replace older vehicles on shuttle routes between terminals, airport parking facilities, and the BWI Marshall Airport Rail Station.

MDOT TSO: MDOT issued Master Services Agreements (MSAs) to six qualified contractors to design, construct, commission, finance, operate and maintain photovoltaic (PV) energy facilities at MDOT locations throughout Maryland generating 1.8 megawatts. The MSAs provide MDOT with the flexibility of developing PV energy systems quickly and efficiently. The GHG benefit has increased by 10% over the last year and resulted in 15 metric tons of reductions.

MDOTs leadership of the Zero Emission Electric Vehicle Infrastructure Council (ZEEVIC) continues to build opportunities, financial incentives, and promotion of the purchase of electric vehicles (EVs) and the installation of electric vehicle supply equipment (EVSE) to support the State's EV goals. As of July 31, 2019, there are a total of 21,359 EVs registered in Maryland, of which 11,492 are Battery Electric Vehicles (BEVs) and 9,867 are Plug-in Hybrid Electric Vehicles (PHEVs).

MDOT MTA: As part of the MDOT MTA bus replacement program, 140 buses were delivered in FY 2018 and FY 2019, with 350 additional clean diesel buses expected for delivery in the FY 2019–FY 2024 period.

MDTA: MDTA continues to implement an active environmental management program through the deployment of EV charging stations. In 2019 MDTA initiated construction of EV charging stations at the Baltimore Harbor Tunnel and Fort McHenry Tunnel customer service centers and initiated a feasibility study for EV charging stations at MDTA facilities.

MDOT MPA: MDOT MPA has replaced 173 Drayage Trucks with an ongoing goal to replace 50 trucks per year. They continue to progressively pursue Diesel Emission Reduction Act (DERA) grants to replace or repower diesel engines, marine vessels, and cargo handling equipment, thereby reducing emissions from transportation used at and around the port. It also helped the Canton Railroad install idle-reduction technology in six switcher locomotives that operate at the Port.

MDOT MVA: MDOT MVA continues its energy conservation efforts including management of its carbon footprint, mitigation of emissions, and reducing facility energy consumption by 20% by FY 2020, while providing comfortable cooling and heating temperatures aligned with Maryland's Energy Code. MDOT MVA has conducted an energy audit at Beltsville, Glen Burnie, Easton, Hagerstown, Largo, and Westminster sites and expects temperature adjustments and new conservation devices will reduce MDOT MVA's carbon footprint.

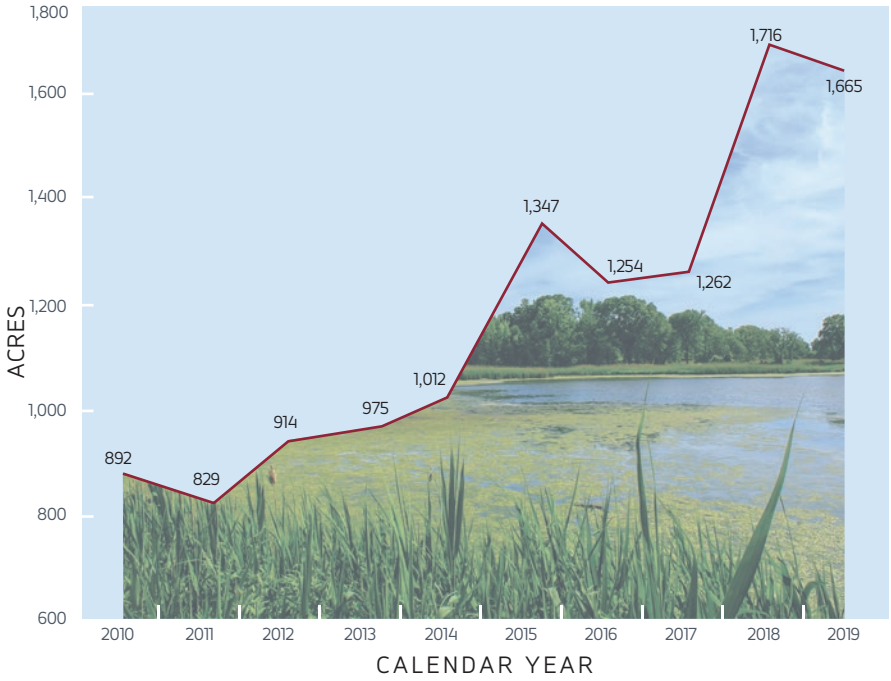
MDOT SHA: MDOT SHA implemented new water quality improvement projects that treated 265 acres of previously untreated impervious surfaces. MDOT SHA continued progress toward its FY 2020 restoration goal of treating 20% of its impervious surface not previously treated by stormwater management controls, reporting 15% treated in its FY 2019 National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) annual report to the Maryland Department of the Environment (MDE).

OBJECTIVE:

Protect and enhance the natural, historic, and cultural environment through avoidance, minimization, and mitigation of adverse impacts related to transportation infrastructure, including support for broader efforts to improve the health of the Chesapeake Bay

ACRES OF WETLANDS OR WILDLIFE HABITAT CREATED, RESTORED, OR IMPROVED*

MDOT agencies are in compliance with the various permits that are granted to construct projects needed to improve the transportation system on land and offshore.



*This measure now includes data provided by MDOT MPA, MDOT SHA, and MDTA cumulatively.

Why Did Performance Change?

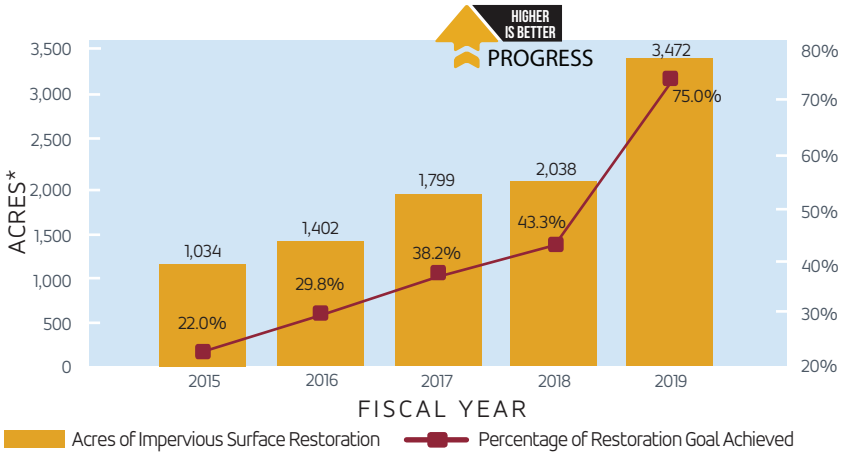
- Installed a trash interceptor at the Dundalk Marine Terminal to prevent trash from entering via the storm drain system into the Patapsco River
- Partnered with Blue Water Baltimore to plant 1,000 trees in Baltimore City and received credits for Total Maximum Daily Load (TMDL) reduction/restoration

What Are Future Performance Strategies?

- Develop a clean air and water strategy for the terminal based on emerging technologies and programs
- Implement a "trash-free Port" pilot program with a tenant at the Port
- Initiate a study to determine carbon sequestration in the created wetland/coastal ecosystems at Hart Miller Island; a Storm Water Improvements contract will be awarded to remove a variety of stormwater pollutants at four terminals: ICTF, Masonville, Fairfield, and South Locust Point Marine Terminal
- The MDOT MPA is planning two projects to reduce the TMDL of pollutants going into the Bay; one is Mercedes pond at Masonville and the other is in partnership with the Maryland Zoo

WATER QUALITY TREATMENT TO PROTECT AND RESTORE THE CHESAPEAKE BAY

This measure tracks MDOT SHA compliance with achieving impervious surface restoration as required by the NPDES MS4 permit. This measure reports the acres of impervious surface treatment associated with Bay restoration projects to determine overall progress toward the 20% restoration goal during the current five-year permit term.



Target: 4,621 Acres by October 2020

* Number of Acres each year are rounded.

Why Did Performance Change?

- MDOT SHA continued implementation of stormwater management and TMDL improvements to reduce pollution entering local waterways and ultimately, the Chesapeake Bay
- MDOT SHA has restored 3,471.6 acres as of FY 2019, which is nearly 75% of its goal of restoring 4,621 acres by October 2020

What Are Future Performance Strategies?

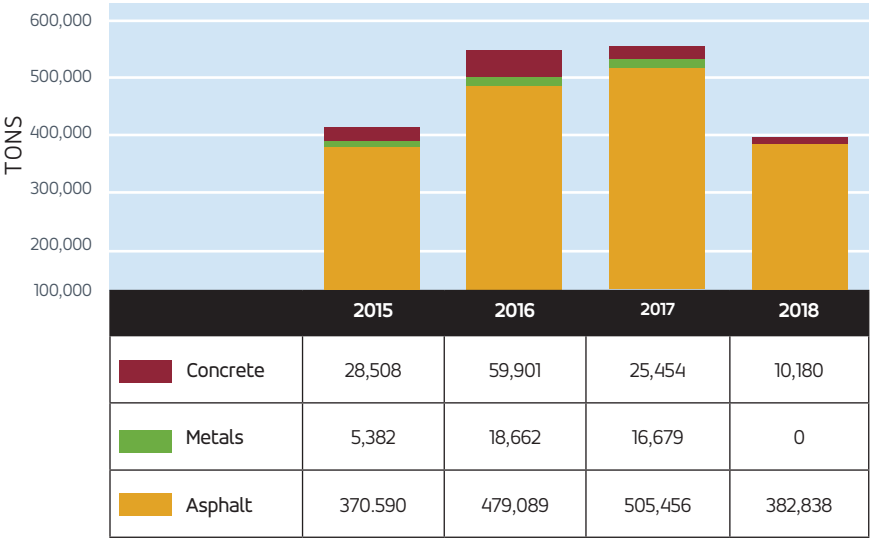
- MDOT SHA is piloting new technology/applications to better track and coordinate inlet cleaning to improve efficiency of those maintenance operations and ultimately increase the amount of pollutants removed before they enter natural systems
- MDOT SHA is investigating and developing approaches to empower local citizen stewardship groups to increase the reach of MDOT watershed restoration resources

OBJECTIVE:

Employ resource protection and conservation practices in project development, construction, operations, and maintenance of transportation assets

RECYCLED/REUSED MATERIALS FROM MAINTENANCE ACTIVITIES AND CONSTRUCTION/DEMOLITION PROJECTS*

MDE has established a "Zero Waste" Action Plan. This measure tracks the reduction of the TBU's impact on solid waste landfill through recycling/reuse of metal, asphalt and concrete. Due to the number and type of construction/demolition activities and projects, we recognize that there may be variability among reporting periods and TBUs.



	2015	2016	2017	2018
Concrete	28,508	59,901	25,454	10,180
Metals	5,382	18,662	16,679	0
Asphalt	370.590	479,089	505,456	382,838

CALENDAR YEAR

*Due to the number and type of construction/demolition activities and projects, there is variability among reporting periods and TBUs.

Why Did Performance Change?

- The use of recycled asphalt materials in Hot Mix Asphalt (HMA) in CY 2018 was 23%, which is consistent with usage in previous years (20%-22%); the variations in the tonnages per year reflect the changes in the yearly tonnage of asphalt mix placed
- The tonnage of recycled concrete-graded aggregate base (RC-GAB) used in CY 2018 (10,180 tons) was greater than the average for the period 2012-2018 (8,997 tons); this may be attributed to having two qualified plants producing RC-GAB (instead of only one in 2018)

What Are Future Performance Strategies?

- MDOT SHA specification encourages the use of recycled concrete and asphalt in construction and will continue to partner with the industry to identify areas where improvements can be made to increase the use of recycled materials to construct roads that meet the safety, system preservation, and environmental needs of Maryland's communities
- Coordinate with pavement and highway design group to recommend placing more recycling road projects where applicable and explore the possibility of using more RC-GAB in road maintenance projects

UTILITY ELECTRICITY USE AND RENEWABLE ENERGY GENERATION

MDOT has prioritized improving air quality, increasing the usage of renewable energy sources, and improving water quality for all current infrastructure and future projects. With these initiatives, MDOT can reduce electricity consumption, supporting Maryland as it moves toward its clean energy and GHG reduction goals. Reducing energy consumption and generating renewable energy benefits all Maryland residents, saving taxpayers money, generating economic revenue, and decreasing air pollutants. MDOT measures the consumption of utility energy, as well as the amount of renewable energy generated by MDOT.

MEGAWATT HOURS IN THOUSANDS (FY)	2014	2015	2016	2017	2018
Electricity Use	393	383	384	364	379
Renewable Energy Generation	1.525	1.759	1.998	1.629	1.431

Why Did Performance Change?

- MDOT issued MSAs to six qualified contractors to design, construct, commission, finance, operate, and maintain PV energy facilities at MDOT locations throughout Maryland; the MSAs provide MDOT with the flexibility of developing PV energy systems quickly and efficiently
- MDOT MAA is replacing outdated HVAC units and converting airfield lighting to LED where appropriate and is in the process of incorporating energy saving and sustainability considerations into development and tenant design standards

What Are Future Performance Strategies?

- MDOT continues to expand its Renewable Energy Program and has installed solar, wind, and geothermal energy systems at a number of MDOT facilities
- MDOT's Solar Program has recently established a Renewable Energy Development Contract, which will allow a number of PV systems to be installed on MDOT properties and many of these facilities will run on solar power; this contract can be used by Maryland State agencies, counties, municipalities, and non-profits to install PV systems on their own properties

OBJECTIVE:

Implement initiatives to reduce fossil fuel consumption, mitigate greenhouse gases, and improve air quality

TRANSPORTATION-RELATED EMISSIONS BY REGION*

MDOT plans, programs, and projects continue to meet federal and State requirements for air quality by reducing vehicle emissions, improving air quality for Maryland residents. MDOT programs encourage more participation in the shared mobility economy, more usage of transit and EVs, and more safety and support for people riding bikes and walking.

		CALENDAR YEAR				
PERFORMANCE MEASURE	REGION	2008	2011	2014	2017	% CHANGE 2005-2014
Volatile Organic Compound (VOC) Tons per Day	Baltimore	52.8	45.5	41.3	25.9	-51%
	Washington**	44.2	39.2	35.4	23.9	-46%
	Other	25.8	20.7	21.1	13.4	-48%
Nitrogen Oxide (NOx) Tons per Day	Baltimore	107.8	89.5	79.5	53.7	-50%
	Washington**	84.0	74.4	63.3	45.3	-46%
	Other	52.7	44.4	44.2	32.8	-38%
Carbon Monoxide (CO) Tons per Day	Baltimore	541.9	445.1	431.8	365.0	-33%
	Washington**	433.4	363.6	352.6	335.5	-23%
	Other	273.2	202.4	229.1	180.1	-34%
Particulate Matter (PM2.5) Tons per Day	Baltimore	4.6	3.5	3.4	2.2	-52%
	Washington**	3.6	2.9	2.7	1.9	-48%
	Other	1.9	1.4	1.5	1.1	-44%

* All emission estimates developed as part of the USEPAs National Emissions Inventory (NEI). The NEI is published every three years.

** All Washington data represents Maryland's share of emissions in the Washington region non-attainment areas, including Charles, Frederick, Montgomery, and Prince George's counties.

Why Did Performance Change?

- MDOT continues to implement emission-reduction strategies in non-attainment areas to foster transportation alternatives to single occupancy vehicles, including bicycle and pedestrian projects, transit improvements, and travel demand management strategies, such as telecommuting, alternative work schedules, and carpooling, promoted through our Commuter Choice Maryland Program
- Motor vehicle emissions continue to decrease through the U.S. Environmental Protection Agency (EPA) Tier 3 Motor Vehicle Emission and Fuel Standards Program; the standards began in 2017 and will reduce ozone pollutants (NOx and VOC) by 80%, fine particulates (PM2.5) by 70%, and sulfur in gasoline by 60%
- Through the Congestion Mitigation and Air Quality (CMAQ) program, MDOT invested $48.1 million in FY 2018 on 22 projects including smart signal systemization, guaranteed ride home programs, transit improvements, and bicycle and pedestrian projects that all have emissions reductions benefits
- MDOT MPA continues to coordinate with MDE on the acquisition and implementation of GRANTS to replace drayage truck engines and cargo handling equipment at the Port of Baltimore

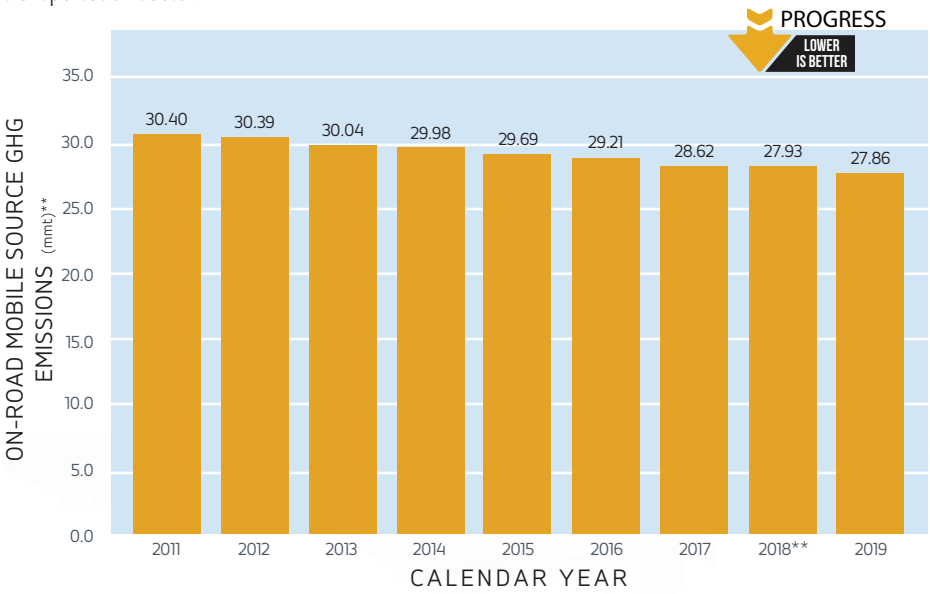
What Are Future Performance Strategies?

- MDOT MTA will continue to administer the Statewide Transit Innovation Grant (STIG) aimed at incorporating innovative transit-related investments to modernize Maryland's transit options
- MDTA will continue to update its toll facilities to be all-electronic and reduce the amount of time spent idling in payment lines
- Maryland will invest more than $9.0 million in FY 2020 grants to support 37 bicycle and pedestrian safety and connectivity across the State
- Through the Volkswagon settlement opportunity, MDOT will coordinate with MDE to implement diesel emission reduction measures, including an MDOT MAA investment in electric shuttle buses

TRANSPORTATION-RELATED GREENHOUSE GAS (GHG) EMISSIONS

MAKING PROGRESS

Many of MDOT's programs, policies, and investments support short- and long-term GHG reduction goals. MDOT is an active participant in the Maryland Commission on Climate Change and is working closely with the MDE, as well as other stakeholders, on mitigating GHG emissions from the transportation sector.



Target: 25% below 2006 emissions by 2020. For on-road transportation, the goal equals 23.5 mmt CO2e in 2020 and 40% below 2006 emissions by 2030*

* The MDOT selected GHG emission reduction goal is consistent with the statewide target set in the 2009 Greenhouse Gas Reduction Act and the subsequent 2016 Greenhouse Gas Reduction Act reauthorization.

** MMT CO2e stands for million metric tons of carbon dioxide equivalents, the standard unit of measurement for GHG emissions. Emissions are calculated using the most recent data and version of EPAs MOVES model available at time of analysis. MOVES2014a is used for analysis year 2016, 2017, 2018 and 2019. 2018 annual VMT revised to reflect actual MDOT SHA reported 2018 HPMS VMT.

Why Did Performance Change?

- MDOT MTA continues to work with Maryland's metropolitan planning organizations (MPOs), major employers and universities to expand transportation emission reduction and monitoring (TERM) programs, aimed at providing commuters and students access to financial incentives and information to support ridesharing and transit use
- On-road transportation GHG emissions continue to decrease in Maryland as the efficiency of the on-road vehicle fleet improves, even as vehicle miles traveled (VMT) growth continues
- MDOT SHA's Coordinated Highways Action Response Team (CHART) program utilizes Intelligent Transportation System (ITS) technologies to enhance travel, reduce traffic congestion, and address capacity inefficiencies that contribute to GHG reductions; this includes the deployment of cameras, traffic detectors, weather sensors, dynamic message signs, traffic websites, and telecommunications infrastructure networks
- MDOT's leadership of the ZEEVIC continues to build opportunities, financial incentives, and promotion of the purchase of EVs and the installation of EVSE to support the State's EV goals

What Are Future Performance Strategies?

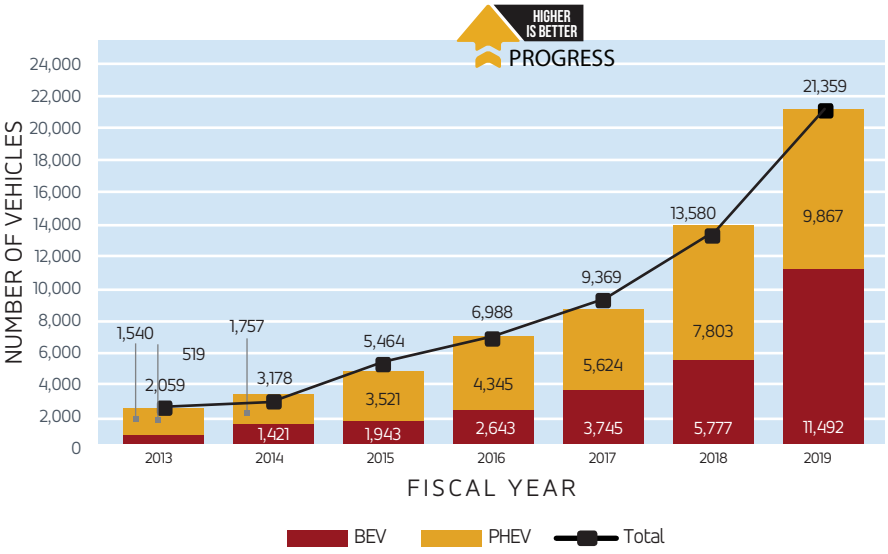
- Within the FY 2020–FY 2025 CTP, MDOT estimates that 63% (approximately $7.077 billion) of Maryland's $11.293 billion six-year capital program (excluding MDTA, capital salaries, wages, and other costs) is associated with investments that could reduce GHG emissions by 2020 and beyond
- MDOT is leading implementation of the bicycle and pedestrian priority area (BPPA) program, supporting localities in designating areas and developing plans leading toward implementation of network improvements in these areas
- MDOT SHA's investment in a progressive, design-build approach to improve reliability and reduce congestion in the I-270 corridor is an example of a project that will utilize innovative and technology focused approaches to manage congestion

TOTAL ELECTRIC VEHICLES (EVS) REGISTERED IN MARYLAND AND TOTAL PUBLICLY AVAILABLE EV CHARGING INFRASTRUCTURE

ON TRACK

Maryland has a goal of 60,000 EV registrations in the State by 2020 and 300,000 by 2025. These goals represent a key component of ensuring that Maryland meets our GHG emission reduction goal of 40% from 2006 levels by 2030.

Drivers in Maryland are encouraged to buy EVs through educational efforts, tax benefits, and rebates, leading to an increase in EVs registered across the State. The installation of EVSE will continue to be critical in addressing range-anxiety and ensuring that adequate EV charging infrastructure is in place as EV adoption accelerates.

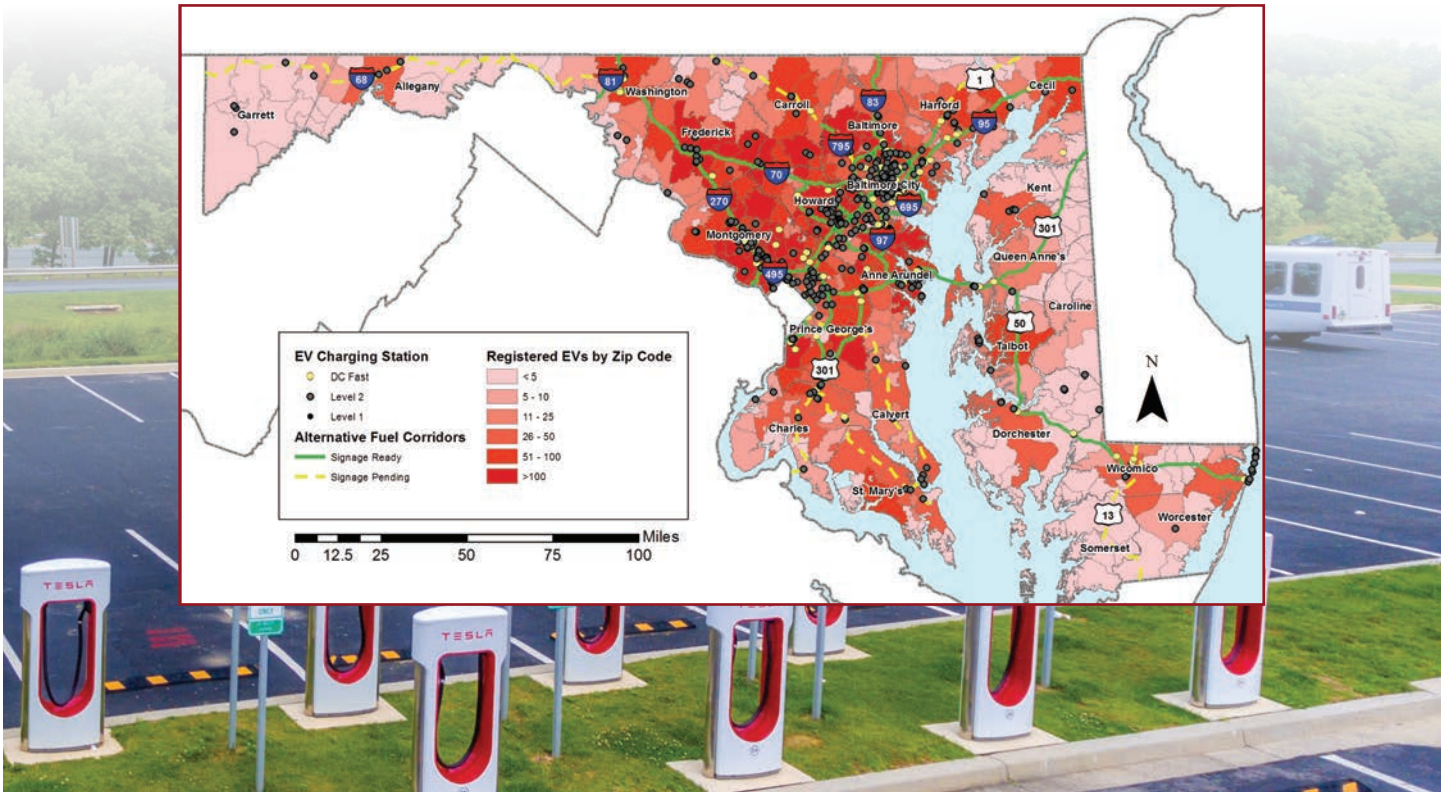


Why Did Performance Change?

- MDOT continued a direct outreach campaign throughout 2019 and has engaged over 6,700 Marylanders across 12 Counties and Baltimore City; the outreach campaign is designed to educate Marylanders on the availability and benefits of EVs
- Maryland now has 20 alternative fuel/EV corridors designated as signage ready or signage pending throughout the State
- In addition to EV excise tax incentive and the funding available for the installation of EVSE, Maryland's public utilities have entered the EVSE space under the direction of the Public Service Commission (PSC); under this order, more than 5,000 new chargers will be installed across Maryland

What Are Future Performance Strategies?

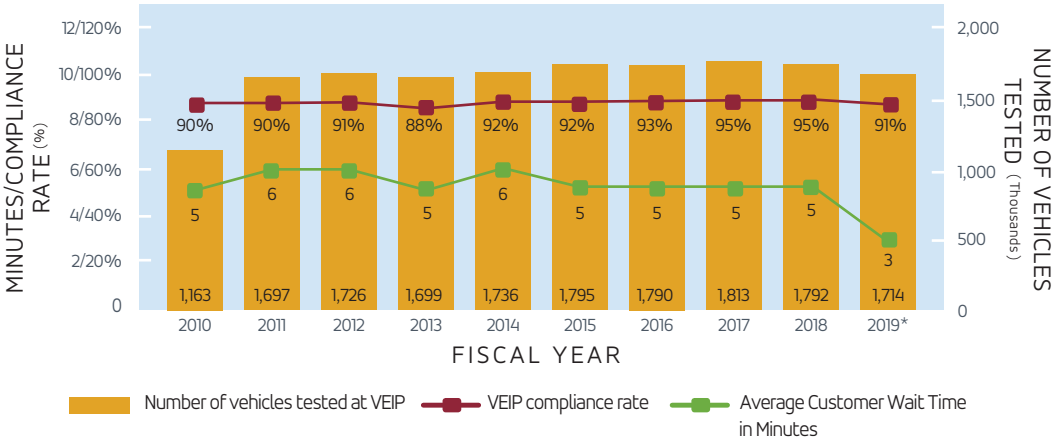
- MDOT will continue to lead the ZEEVIC to promote and incentivize zero emission vehicle (ZEV) adoption, including the promotion of EV adoption and EVSE installation
- Maryland will continue to participate in State and region-wide efforts to install signage along our EV charging corridors
- Maryland will continue to provide educational materials through the **MarylandEV.org** and #MarylandEV platforms



COMPLIANCE RATE AND NUMBER OF VEHICLES TESTED FOR VEHICLE EMISSIONS INSPECTION PROGRAM (VEIP) VERSUS CUSTOMER WAIT TIME

MAKING PROGRESS

Monitoring the VEIP testing compliance rate ensures system effectiveness and identifies vehicles exceeding allowable standards. Tracking the average wait time at VEIP stations ensures that the 15-minute average wait time requirement is met. Timely and efficient customer service helps the State meet federal clean air standards by identifying polluting vehicles and encouraging regular vehicle maintenance.



* 2019 data is preliminary and subject to change. 14 counties offer VEIP tests: Anne Arundel, Baltimore, Baltimore City, Carroll, Harford, Howard, Queen Anne's, Cecil, Washington, Calvert, Charles, Frederick, Montgomery, and Prince George's.

Why Did Performance Change?

- In FY 2019, MDOT MVA saw an overall decrease in number of VEIP-eligible vehicles being tested due to regulations which extended VEIP compliance for new cars and exempted pre 1995 vehicles
- There were slight changes in the compliance rate due to an increase in VEIP extensions which are excluded from the compliance rate until their vehicles are tested
- The VEIP self-serve kiosks are available twenty four hours a day, seven days a week (24/7) in a total of nine locations and provide a $4 cost savings to the customer; the same On Board Diagnostics (OBD) test that a station inspector would do in the lanes is performed by the customer, but at their convenience since the kiosk is open 24/7

What Are Future Performance Strategies?

- MDOT MVA will track and monitor the recently installed VEIP self-serve testing kiosks
- MDE and MDOT MVA continue to look at new technologies for testing such as mobile units, telematics and remote testing for future enhancements to our centralized program