MARYLAND
Electric Vehicle
Infrastructure Council

Annual Report

December 31, 2017

Chaired and Staffed by the Maryland Department of Transportation

MARYLAND DEPARTMENT OF TRANSPORTATION

Presented to

Governor Lawrence J. Hogan, Jr.

and the

Maryland General Assembly

Presented by the

Electric Vehicle Infrastructure Council

(SB 714, Chapter 378, Acts of 2015)

MSAR #10491

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Acronyms

The following acronyms are used in this report:

ADA	Americans With Disabilities Act
AFIP	Alternative Fuel Infrastructure Program
BEV	Battery Electric Vehicle
BEVI	Baltimore Electric Vehicle Initiative
CAFE	Corporate Average Fuel Economy Standards
CVF	Clean Vehicles and Fuels Workgroup of the Transportation Climate Initiative
DC	Direct Current
DGS	Maryland Department of General Services
EMT	Environmental Mitigation Trust Fund (VW Settlement)
EV	Electric Vehicle
EVI	Electric Vehicle Institute
EVIC	Electric Vehicle Infrastructure Council or The Council
EVIP	Electric Vehicle Infrastructure Program
EVSE	Electric Vehicle Supply Equipment
FAST	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
GHG	Greenhouse Gas

The following acronyms are used in this report:

HOV	High Occupancy Vehicle
kWh	Kilowatt-Hour
MDE	Maryland Department of Environment
MDOT	Maryland Department of Transportation
MEA	Maryland Energy Administration
MOU	Memorandum of Understanding
MVA	Motor Vehicle Administration
PEV	Plug-In Electric Vehicle - term used collectively for BEVs and PHEVs
PHEV	Plug-In Hybrid Electric Vehicle
PSC	Public Service Commission
TCI	Transportation Climate Initiative
TSFC	TransIT Services of Frederick County
TSO	The Secretary's Office of Maryland Department of Transportation
USGBC	U.S. Green Building Council
VMT	Vehicles Miles Travelled
VW	Volkswagen
ZEV	Zero Emission Vehicle

A Message from R. Earl Lewis, Jr., EVIC Chair

"As the Chair of the Electric Vehicle Infrastructure Council, I am pleased with the collaborative accomplishments we have achieved this year. Our group of diverse stakeholders played an integral role in the passage of the Maryland Clean Cars Act of 2017, ensuring that important electric vehicle and infrastructure incentives continue. We also made strides in public outreach efforts, installing electric vehicle charging infrastructure, and obtaining designation of signage-ready electric vehicle corridors statewide.

This report highlights the demonstrable progress that Maryland is making toward the goals of increasing the number of electric vehicles registered in the State and ensuring that we have a comprehensive, publicly available electric vehicle charging network.

As we continue to make progress toward those goals, we remain dedicated to providing customer-driven leadership that delivers safe, sustainable, intelligent, and exceptional solutions in order to connect Marylanders to life's opportunities."

Introduction

This document fulfills the requirement to submit an annual report of the Maryland Electric Vehicle Infrastructure Council's (EVIC) work for 2017 and recommendations to the Governor and General Assembly under the Maryland Electric Vehicle Infrastructure Council Act.

Notable Achievements

Since 2011, EVIC has worked to remove barriers to Plug-in Electric Vehicle (PEV) usage in Maryland through the development of infrastructure action plans, permitting standards, and state incentives for the purchase of PEVs and Electric Vehicle Supply Equipment (EVSE).

In 2017, EVIC supported the passage of SB 393/HB 406, the Clean Cars Act of 2017, which Governor Hogan signed into law on May 4, 2017.

Governor Hogan at the May 4, 2017 Bill Signing Event

This bill made the following changes:

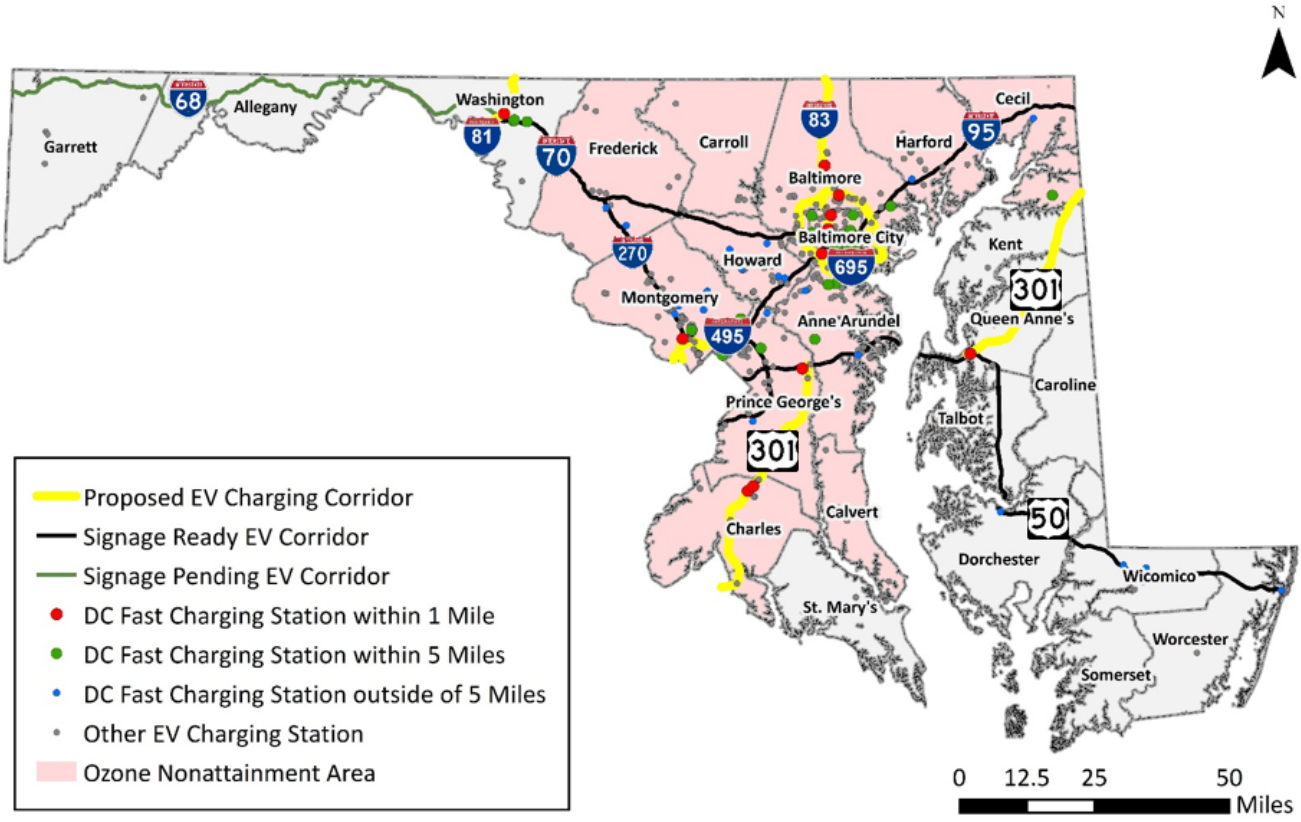
- Extended the Electric Vehicle Recharging Equipment Rebate Program and authorization to issue motor vehicle excise tax credits for qualified PEV vehicles through fiscal year[1] 2020.
- Increased the total amount of equipment rebates from up to $600,000 to a maximum of $1,200,000 per fiscal year, increasing the amount required to be transferred from the Strategic Energy Investment Fund to the Transportation Trust Fund.
- Increased the amount of motor vehicle excise tax credits that may be issued during a fiscal year. The credit value was reduced to $100 per kilowatt-hour (kWh) of battery capacity of the vehicle up to $3,000.
- Added additional eligibility requirements, capping qualifying vehicle purchase prices at $60,000, and requiring a minimum battery capacity of 5 kWh.

Also in 2017, the Maryland Department of Transportation (MDOT) submitted a nomination to the Federal Highway Administration (FHWA) to designate five additional alternative fuel corridors. The five nominated corridors included I-81, I-83, an extension of the existing I-495 corridor, I-695, and US 301. If approved, the nominated corridors would add to the existing corridor network, increasing the total network coverage to 96% of Maryland's population, based on the total populations of counties that contain

[1] *In this document, fiscal year, refers to the Maryland State fiscal year (July 1st through June 30th) unless otherwise noted.*

corridors. All of the 2017 corridor nominations were submitted for 'Signage-Ready' status, meaning that distances between Direct Current (DC) Fast Charging stations is less than 50 miles along each corridor. Figure 1 below shows the proposed alternative fuel corridors along with the existing corridor network.

Figure 1: Existing and Proposed Alternative Fuel Corridors



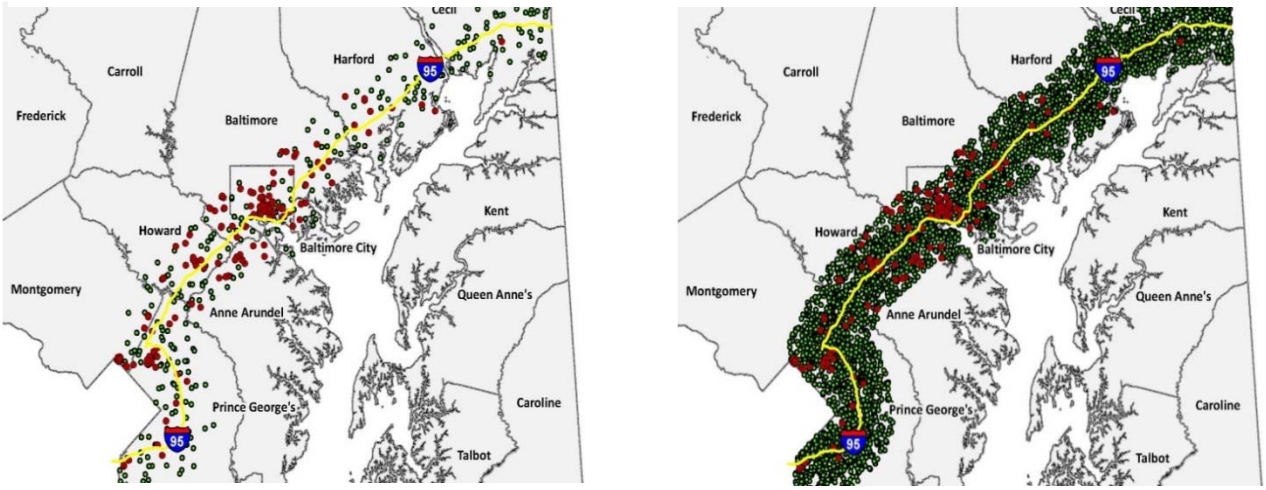
Opportunities and Challenges

The widespread introduction of PEVs into the light-duty fleet can have significant benefits, including the reduction of fossil fuel consumption, resulting in decreased emissions of greenhouse gases (GHG) and other harmful air pollutants. Vehicle technology improvements, including Electric Vehicle (EV) technology, will be critical to reducing air pollution in Maryland and helping the State meet its environmental goals.

While the State has made significant progress in the past several years, our goals have been ambitious from the beginning: 60,000 EVs by 2020, approximately 300,000 by 2025, and the infrastructure to support these numbers. The latest estimates, which were updated with the submission of the EV Corridor nomination, now project that as many as 60,000 to 100,000 EVs will be registered in the State by 2020

and nearly 1.5 million EVs will be registered by 2040. To accommodate those vehicles, Maryland assumed a total of 2,227 and 32,713 publicly available chargers would be required by 2020 and 2040, respectively. Figure 2 illustrates the current and projected EVSE along the I-95 corridor. Each red dot represents an existing station and each green dot represents 4 new charging outlets at one location.

Figure 2: I-95: Summary of Potential Charger Locations in 2020 (left) and 2040 (right)



As new, more affordable, and longer-range PEVs are introduced to the marketplace, Maryland must prepare for the burgeoning PEV fleet by continuing to work with private industry and encouraging infrastructure investment in Maryland. To date, private industry has made a significant investment in installing DC Fast Charging stations in the State; at the time this report was authored, there were 154 DC Fast-Charging outlets at 67 locations across Maryland. Additionally, there were over 930 outlets at 406 Level 2 locations and 70 outlets at 37 Level 1 locations[2]. EVSE providers have recently announced DC Fast charging technologies capable of delivering up to 400 kW, which could significantly reduce charging times.

In addition to championing the development of a reliable public charging network, EVIC is continuing to strive to improve public education and outreach efforts, and keeping the lines of communication open between all stakeholders working toward realizing Maryland's PEV registration goals.

[2] http://www.afdc.energy.gov/locator/stations/

EVIC Background

EVIC Composition and Support

The Council includes a diverse representation of interests, perspectives, and responsibilities, including utilities, State agencies, private enterprise, and non-profit EV advocates. The Council membership list is provided in Appendix A. In addition, all Council meetings are open to the public and time is allotted at every meeting for the Council to hear public comments.

EVIC has four workgroups, which support the Council by providing analysis and recommendations for consideration by the full EVIC. The workgroups are:

- Communications
- Legislative
- State Agency
- Workplace and Urban Charging

EVIC Formation and Requirements

EVIC was originally established in 2011. In 2015, EVIC was extended through 2020 via Maryland legislation. In addition to creating EVIC, the legislation established requirements for the Council. Table 1 illustrates the original requirements and the status of those requirements as of December 2017.

Table 1: EVIC Legislative Requirements & Status

	Requirement	Status
1	Develop an action plan to facilitate the successful integration of electric vehicles into the State's transportation network.	The Action Plan was delivered in 2012 (See Appendix B).
2	Assist in developing and coordinating statewide standards for streamlined permitting and installation of residential and commercial PEV charging stations and supply equipment.	Addressed through Legislative Workgroup and EVIC recommendations.
3	Develop a recommendation for a statewide charging infrastructure plan, including placement opportunities for public charging stations.	Discussed in 2017 at the State Agency Workgroup Meetings and currently being developed in conjunction with Volkswagen Consent Decree efforts.
4	Increase consumer awareness and demand for electric vehicles through public outreach.	Continued improvements through Communications and State Agency Workgroups.

Table 1: EVIC Legislative Requirements & Status

	Requirement	Status
5	Make recommendations regarding monetary and nonmonetary incentives to support electric vehicle ownership and maximize private sector investment in electric vehicles.	Addressed through the Legislative Workgroup and EVIC recommendations related to the Maryland Clean Cars Act of 2017.
6	Develop targeted policies to support fleet purchases of electric vehicles.	Discussed in 2017 at the State Agency Workgroup Meetings.
7	Develop charging solutions for existing and future multi-dwelling units.	Addressed through the Legislative Workgroup and EVIC recommendations.
8	Encourage local and regional efforts to promote the use of electric vehicles and attract federal funding for State and local PEV programs.	Currently being developed in conjunction with Volkswagen Consent Decree efforts.
9	Recommend policies that support PEV charging from clean energy sources.	To be addressed by Workgroups.
10	Recommend a method of displaying pricing information at public charging stations.	To be addressed by Workgroups.
11	Establish performance measures for meeting PEV–related employment, infrastructure, and regulatory goals.	To be addressed by Workgroups.
12	Pursue other goals and objectives that promote the utilization of electric vehicles in the State.	To be addressed by Workgroups.

Status of EVIC's 2012 Recommendations

In addition to the requirements outlined in the previous section, EVIC was also responsible for developing an initial report in 2012 comprised of a Statewide Charging Infrastructure Plan, an Action Plan, and 32 recommendations intended to promote widespread PEV adoption. In March 2016, based on advice from the State Agency Workgroup, each of the recommendations from the Council's 2012 report was assigned to a workgroup for further investigation and comment. The workgroups met in the intervening months to address the matters assigned to them. Appendix B includes a status update on each recommendation.

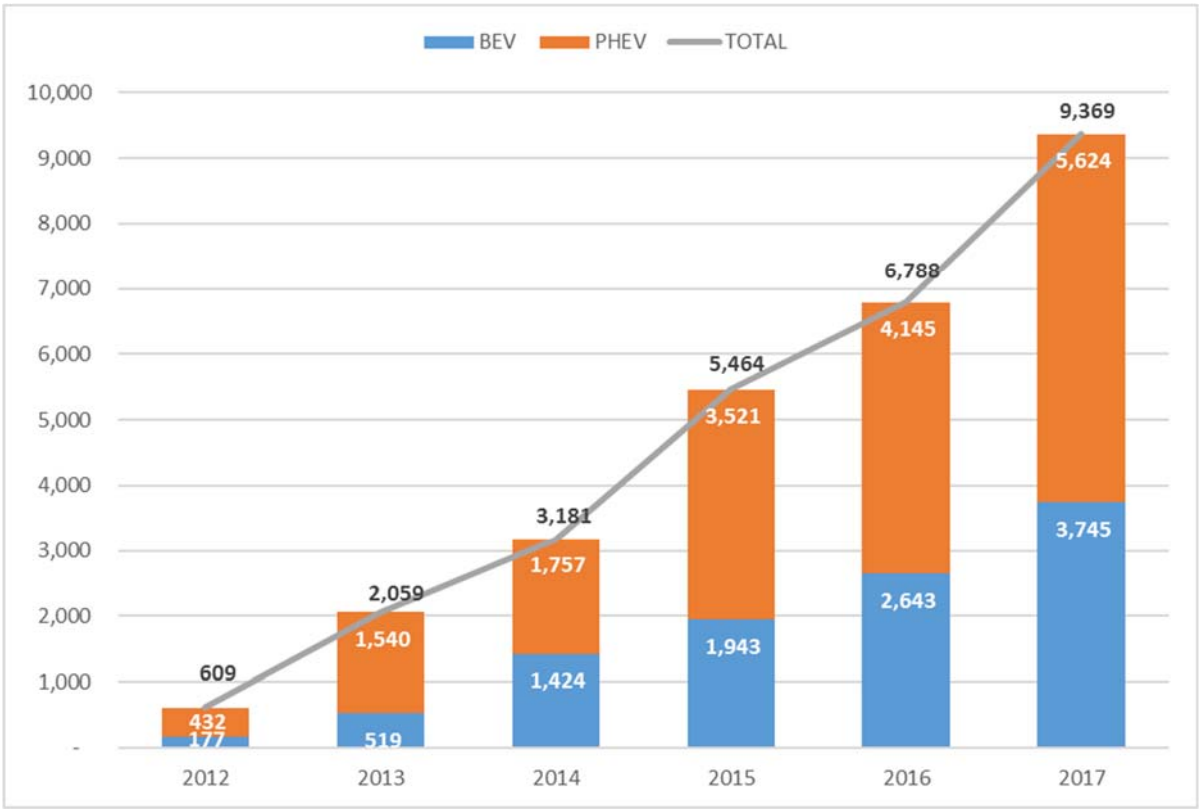
Electric Vehicle Market and Electric Vehicle Supply Equipment Status

Vehicles

In recent years, EV technology has improved rapidly, leading to lower vehicle costs and increased numbers and types of available models. In 2012 there were two Battery Electric Vehicles (BEV) models available in Maryland, (the Nissan Leaf and the Chevrolet Volt). Today, there are over 15 BEV models available for purchase in Maryland in addition to 20 plug-in hybrid vehicles. Appendix C includes a list of all PEVs currently available for purchase in Maryland.

As illustrated in Figure 3, the total number of PEVs registered in Maryland increased from 609 in fiscal year (FY) 2012 to 9,369 in FY 2017. In FY 2017, 40% (3,745) of the vehicles registered were BEVs and 60% (5,624) were Plug-in Hybrid Electric Vehicles (PHEVs).

Figure 3: Total PEVs Registered in Maryland (Fiscal Years 2012-2017)



While the total number of PEVs registered in Maryland represents less than one percent of light-duty vehicle registrations, PEV ownership is anticipated to continue to rise at an accelerated pace through 2018 and 2019 with the recent introduction of more affordable PEVs with over 200 miles of battery range.

Notably, Maryland has already begun to benefit from the manufacturing of PEVs. Maryland currently has approximately 10 EV-related employers, collectively providing 2,300 jobs. These companies provide millions of dollars in wages; and state tax revenues[3].

Infrastructure

A goal of the 2012 Infrastructure Plan was to facilitate charging both at home and the workplace to ensure EV drivers would have the opportunity to recharge. The establishment of adequate charging infrastructure is necessary to alleviate "range anxiety." The concerns about short battery life and long periods required for charging are quickly changing. There are now three types of chargers that can be installed: Level 1, Level 2 and DC Fast charging. The U.S. Department of Energy's Station Locator is an on-line tool that allows users to find charging stations. The speed of charging and the power required varies by charger type and is illustrated in Table 2.

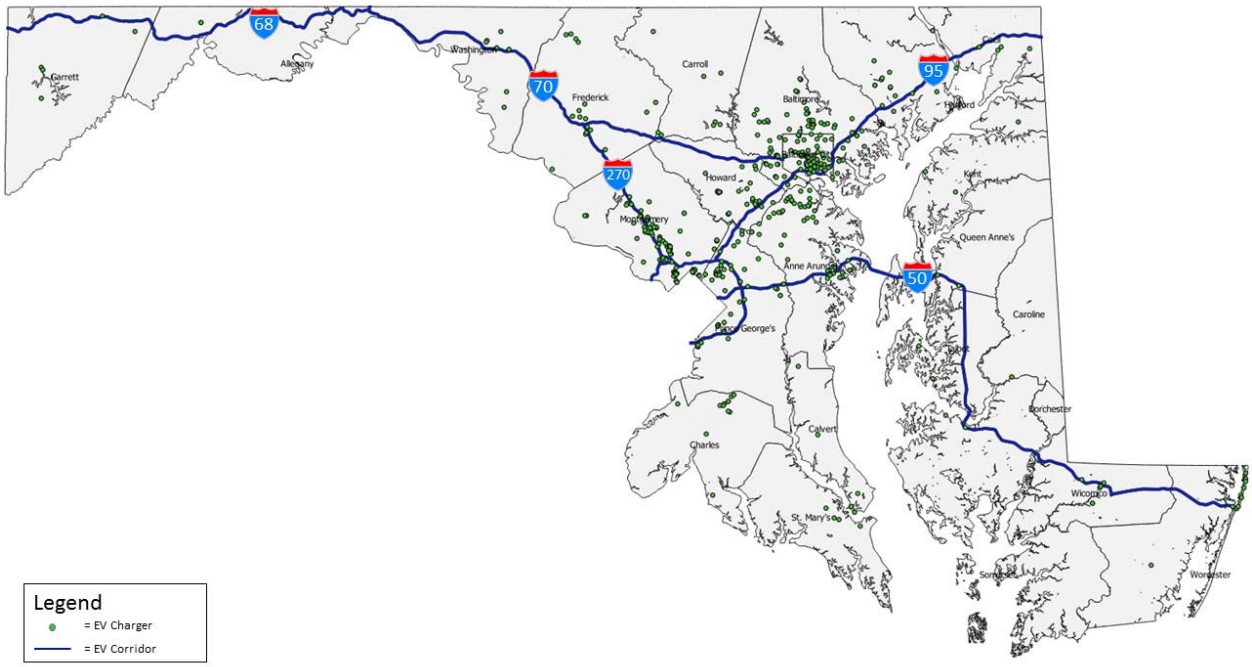
Table 2: EVSE Power Requirements, Charging Speed and Public Availability in Maryland

EV Charger Type	Speed	Power Required	Total in MD[4]	% of Total
Level 1	11-20 hours for Full Charge	120 volts	76	7%
Level 2	3-8 hours for Full Charge	240 volts	915	80%
DC Fast Charge	30 minutes for 80% Charge	208-600 volts	152	13%

Figure 4 illustrates the locations of the over 450 EV charging stations and over 1,100 public outlets available in Maryland as of September 2017. Each location has one or more chargers, and each charger has one or more outlets.

[3] https://www.bgafoundation.org/programs/visualizing-the-clean-economy-autos/
[4] http://www.afdc.energy.gov/locator/stations/

Figure 4: Existing, Publicly Available EV Charging Stations & EV Charging Corridors



There are now nearly 200 outlets for charging vehicles installed at state owned or leased facilities. These charging stations are located at facilities owned by MDOT, Maryland Department of Energy (MDE), Maryland Department of General Services (DGS), and the University System of Maryland (USM).

USM maintains chargers at the campuses of Frostburg State, Shady Grove, Coppin State, Salisbury, Towson, Baltimore City, Baltimore County; and College Park.

Chargers are also located at the Montgomery Park Business Center where the MDE, Maryland Energy Administration (MEA), and the Maryland State Lottery are located.

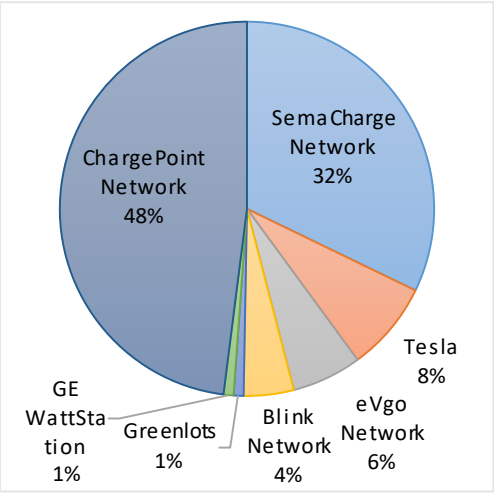
Maryland has invested over $1.5 million in chargers at MARC Train Service and Metro stations, Park and Rides, and other transit connection and public locations.

Maryland's two travel plazas – the Chesapeake House and Maryland House – reopened in 2017 after renovation and now include multiple charging stations. The public charging stations available between the two travel plazas include 18 Tesla superchargers, 2 Americans With Disabilities Act (ADA) compliant Tesla Level 2 chargers, and 8 Electric Vehicle Institute (EVI), Level 3 DC Fast chargers.

Charging Networks[5]

As illustrated in Figure 5, there are several charging networks now operating in Maryland. Though offerings vary among EVSE providers, charging networks may include advanced functionalities for site hosts, such as pricing and access controls, data reporting, and charger availability notifications. The two largest networks in the State are ChargePoint and SemaCharge and these two companies are currently responsible for 80% of the available chargers statewide.

Figure 5: Maryland's Charging Network



EVIC's 2017 Activities

EVIC Meeting Agendas

The Council held seven meetings in 2017. Meeting dates and topics that were discussed are listed in Table 3. EVIC typically meets every other month at MDOT's Secretary's Office (TSO) and the workgroups meet in the intervening months. All Council meetings are open to the public and the agendas are posted on EVIC's website in advance of the meetings.

Table 3: 2017 EVIC Meeting Agendas

EV Charger Type	Council Agenda
01/05/17	Public Service Commission (PSC) Updates, Walk-Through of 2016 Annual Report, VW Settlement Updates, Workgroup Discussions
02/03/17	Legislative Discussion, Discussion on Opportunity to Attend Legislative Hearings
03/16/17	2017 Priorities, 2016 EVIC Report, PSC EV Workgroup, State Agency Updates: Workplace Charging Events, FHWA Signage, EVSE Efforts

[5] http://www.afdc.energy.gov/locator/stations/

Table 3: 2017 EVIC Meeting Agendas

05/25/17	Existing Outreach Efforts: Workplace Charging Events, Survey Effort, Next Steps on Outreach, PSC EV Workgroup
07/20/17	PSC EV Workgroup Updates, Baltimore Electric Vehicle Initiative (BEVI) /UMBC / MDOT Summer Internship Update
09/21/17	Legislative updates, PSC EV Workgroup Updates, 2017 EVIC Report
11/14/17	Alternative Fuel Corridor Nominations, EV Website Update, TCI, State Agency Updates, Legislative Updates, 2017 EVIC Report, PSC EV Workgroup

2017 EVIC Priorities

During its first meetings in 2017, the Council established the following priorities:

1. Developing and Approving EVIC Procedures.
2. Maximizing the use of grant and alternative funding opportunities for EV / EVSE in MD.
3. Education and Outreach – including any partnerships to be solidified before the end of June.
4. Developing and implementing the legislative agenda for 2018.
5. Ensuring the prioritization of the deployment of EVSE Statewide, keeping the importance of our EV Charging Corridors in mind.
6. Improving workplace and urban charging.

2017 EVIC Committee Work

Each of the workgroups met several times throughout 2017 to work on the priorities outlined above. The recommendations of all of the workgroups are reflected in Appendix B and are interspersed throughout this report. The Communications workgroup developed a preliminary work plan, which is included in Appendix E. The recommendations of the Legislative workgroup were presented to the Council and are included in the policy recommendations outlined below.

Efforts Related to the Council's Work

EV Outreach Efforts

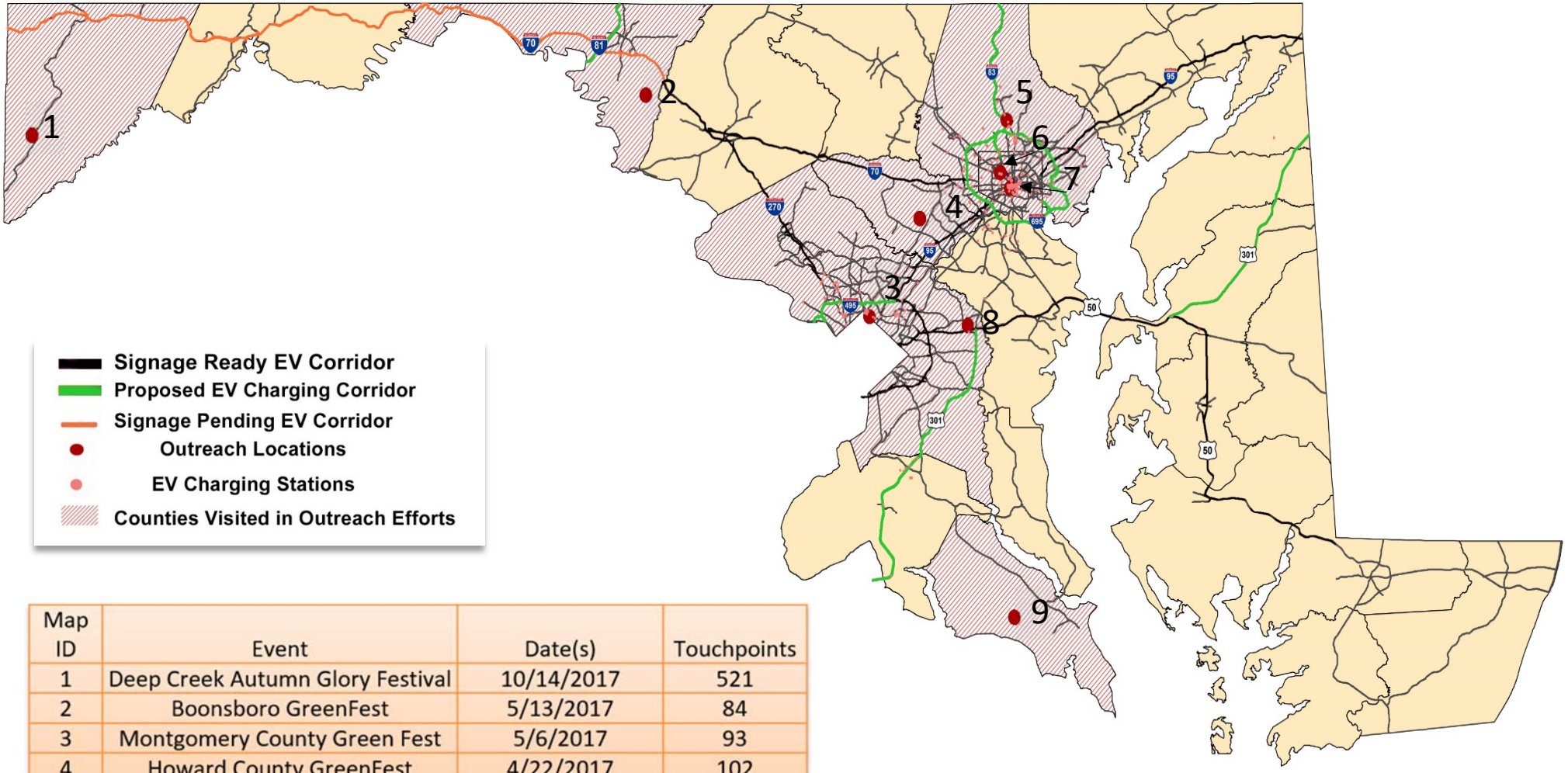
In coordination with EVIC's Communications Committee, MEA, MDE, and MDOT are currently partnering to increase PEV awareness through an outreach effort focused on workplace charging, vehicle dealership, and public education.

In 2017, State partners worked with various consultant teams and planned, organized, and participated in a series of events and conducted several outreach efforts including:

- Worked with the BEVI and UMBC to update the MarylandEV.org website.
- Presented EV materials to over 10,000 Marylanders, spanning every county in the state, while engaging with more than 3,000 residents to increase their EV awareness through a series of events, surveys, and outreach campaigns.
- Hosted two workplace charging workshops reaching 92 participants.
- Hosted a mini workshop and attended The Energy Summit, an event cohosted by Montgomery County Department of Environmental Protection and the U.S. Green Building Council (USGBC).
- Staffed informational booths at nine events statewide (listed below and illustrated in Figure 6).

    1. Deep Creek Autumn Glory Festival
    2. Boonsboro GreenFest
    3. Montgomery County GreenFest
    4. Howard County GreenFest
    5. Maryland State Fair
    6. Maryland Zoo Oktobearfest
    7. Maryland Governor's Business Summit
    8. Bowie Green Expo 2017
    9. St. Mary's U.S. Oyster Festival

Figure 6: 2017 Maryland Public Outreach Events



Map ID	Event	Date(s)	Touchpoints
1	Deep Creek Autumn Glory Festival	10/14/2017	521
2	Boonsboro GreenFest	5/13/2017	84
3	Montgomery County Green Fest	5/6/2017	93
4	Howard County GreenFest	4/22/2017	102
5	Maryland State Fair	8/25 - 9/5/2017	500
6	Maryland Zoo Oktobearfest	10/22/2017	180
7	Maryland Governor's Business Summit	5/18/2017	49
8	Bowie Green Expo 2017	4/8/2017	44
9	St. Mary's U.S. Oyster Festival	10/22/2017	256

Some highlighted events are detailed below.

Maryland State Fair

Date: 8/25/17

MDEV Booth at the Maryland State Fair

The Maryland State Fair is an annual event, held at the Timonium fairgrounds. The state partners team spent seven days at the fair hosting a booth with information on EVs, charging infrastructure and available incentive programs. The booth was located in the exhibit center amongst other departments from MDOT. Staff spoke to an average of 100 fair attendees per day. The attendees had varying responses to the EV information, reflecting varying levels of understanding. The fair was a good opportunity to engage with Maryland residents from all over the state. The team was able to educate members of the public on available Maryland tax incentives and answer a substantial number of questions about EV Feasibility.

People engaged with: 799
Approximate event attendees: 10,000

Deep Creek Autumn Glory Festival

Date: 10/14/17


MDEV Booth at the Deep Creek Autumn Glory Festival

The 50th Annual Autumn Glory Festival was held in McHenry, Maryland. The MDEV booth was located near the farmer's market/craft market and about a block or so from the parade route. As a part of this effort, the team offered balloon animals to children, helping engage families and

parents to exchange information about electric vehicles. Outreach staff walked participants through the incentive and information brochures. In general, most people were very receptive to the idea of owning an electric vehicle.

People engaged with: 521
Approximate attendees: 3,000

Maryland Zoo Oktobearfest

Date: 10/21/17

The Oktobearfest is a beer tasting festival held at the Baltimore Zoo. The MDEV Table was on the left side of the stage in the center of the traffic amongst beer tents, arts and crafts, and the food vendors. A handout that displayed the lists of available electric and hybrid electric vehicles with photos drew the most attention at the booth. The handout that explained the federal and state tax incentives was also of high interest to the crowd who were interested in learning more.

MDEV Booth at the Maryland Zoo Oktobearfest

People engaged with: 180
Approximate attendees: 3,500

St. Mary's U.S. Oyster Festival

Date: 10/22/17

The U.S. Oyster Festival, held in St. Mary's County is a national festival including oyster shucking contests, cook-offs and other events. At this event, the MDEV booth was placed next to a Ford C-Max Energi plug-in hybrid vehicle. Event goers were intrigued by the car and were very interested in seeing the interior of the car, trunk space, and learning about how it charged. Deputy Secretary Earl Lewis Jr. (shown on the left of the above photo)

MDEV Booth at the St. Mary's U.S. Oyster Festival

attended the event and stopped by the tent several times to talk with event attendees. The handout that displayed the lists of available electric and hybrid electric vehicles with photos was the most popular handout. The handout that explained the tax incentives was also popular. Balloon animals were offered to children, which helped engage families, and provide time to talk with parents about electric vehicles. The overall reaction from the event goers was very positive. There was a lot of interest about electric vehicles and there were many 10-15 minute, in-depth discussions with attendees due to their interest.

People engaged with: 256
Approximate attendees: 5,000-7,500

Maryland EV Website

MDOT and BEVI are currently working together to update the Maryland EV website marylandev.org to ensure it includes current and useful information for EV drivers and Maryland residents. Figure 7, below, shows the home page for the Maryland EV website.

Figure 7: Maryland EV Website Homepage

Maryland Clean Cars Program and the ZEV Memorandum of Understanding

Under federal law, California is permitted to promulgate vehicle emission standards that are more stringent than the national standards. Other states have the option to choose whether to follow either the national or California standards. In 2007, Maryland elected to follow the California standards and enacted the Clean Cars Program via legislation which officially adopted California's vehicle emissions standards. The program went into effect for all cars beginning with model year 2011.

Since the Federal Government harmonized the national and California vehicle emission standards beginning with model year 2012, a critical piece of the Maryland Clean Car program was the incorporation of the zero-emission vehicle (ZEV) mandate. The mandate requires all automobile manufacturers to make an increasing percentage of their new vehicles ZEVs. The mandate began in 2011 and steadily increases to 22% in 2025.

On October 24, 2013, Maryland joined seven other states (California, Connecticut, Massachusetts, New York, Oregon, Rhode Island, and Vermont) and signed a memorandum of understanding (MOU) committing to coordinated action to ensure the successful implementation of their state ZEV programs. Collectively, these states committed to having at least 3.3 million ZEVs operating on their roadways by 2025. The MOU identified joint cooperative actions the signatory states would undertake (such as working to develop uniform standards to promote ZEVs), and additional actions that individual jurisdictions could consider, to build a robust market for ZEVs. As part of this effort, a Multi-State ZEV Action Plan was developed and released in 2014. This plan detailed the various efforts outlined in the ZEV MOU.

To reflect the changes that have occurred since the Action Plan was released in 2014, the ZEV MOU states are now in the process of updating and revising the ZEV Action Plan. The revised Action Plan is scheduled to be released in 2018.

To learn more about the Multi-State ZEV Task Force please visit this website: http://zevstates.us/

Maryland Infrastructure Promotion

In accordance with the Council's Statewide Infrastructure Plan recommendations, MEA administers several transportation incentive programs designed to accelerate the adoption of PEVs and the installation of EVSE.

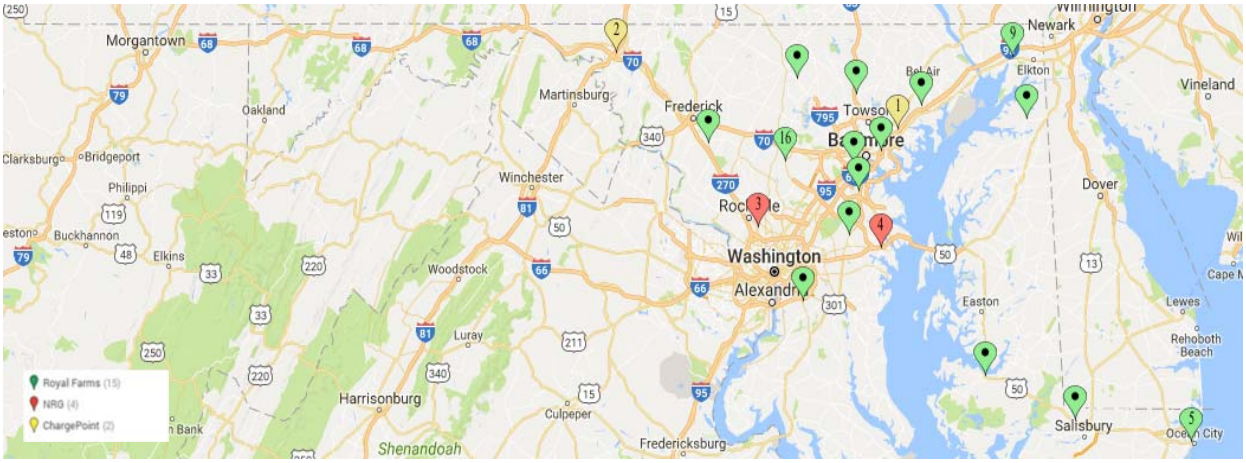
Example EV Charging Highway Signage

Electric Vehicle Infrastructure Program

EVIP was established to facilitate the development of a network of DC Fast Charge stations across Maryland. This limited grant program was funded by settlement proceeds from a Clean Air Act enforcement action by the State. EVIP utilized $1 million in settlement funds to leverage private funds with a minimum 50% match. The program is now closed and the final awards were granted to three vendors: Royal Farms Stores (15), NRG (4), and ChargePoint, Inc. (2) to install 21 DC Fast Charge stations at 19 locations throughout the State.

Figure 8 illustrates the locations of the charging stations. Many of the stations are located along Maryland's newly designated EV corridors. Through the third quarter of 2017, the three grantees have reported total lifetime estimated displacement of over 11,000 gallons of gasoline.

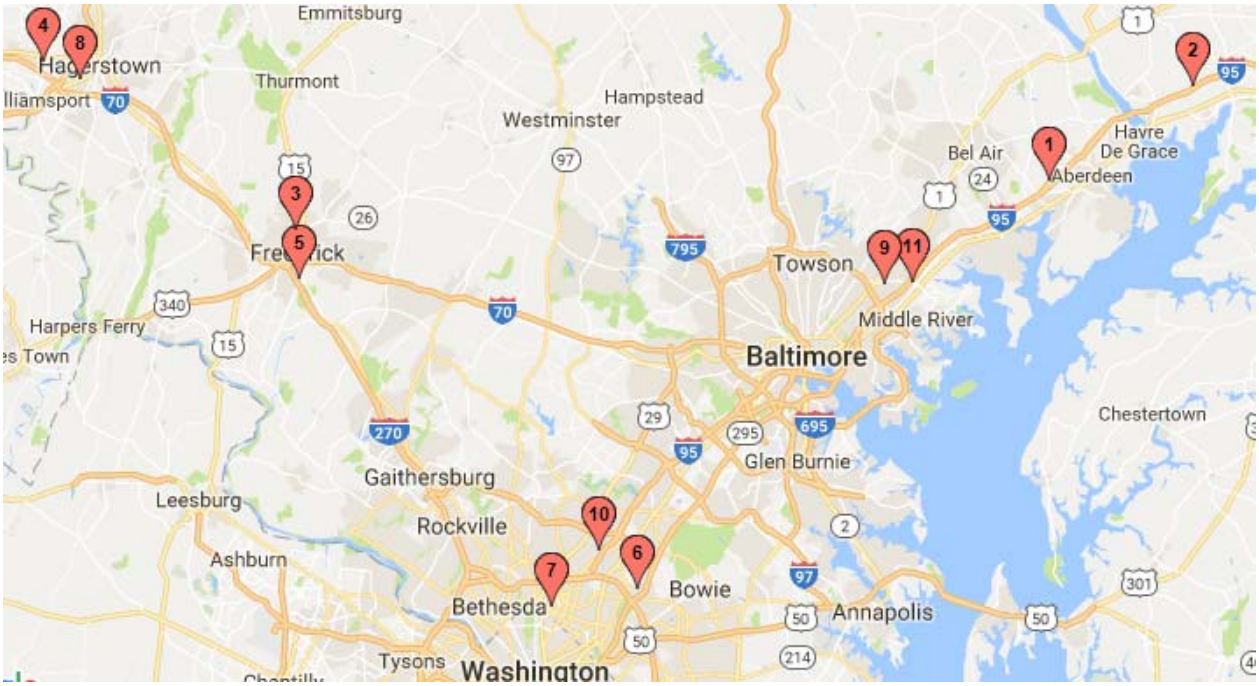
Figure 8: Maryland EVIP Station Locations and Vendors



Alternative Fuel Infrastructure Program

The Alternative Fuel Infrastructure Program (AFIP) was created to increase the availability of alternative refueling infrastructure, including EVSE. Eligibility includes ethanol, hydrogen, propane, natural gas and DC Fast Charging stations. The DC Fast Charging stations require a minimum 50% match and are eligible for a maximum award of $45,000 per station. In 2017, MEA awarded approximately $1.6 million to three grantees for 37 fast chargers at 11 locations. Once completed, these chargers (shown in Figure 9) have the potential to displace over 200,000 gallons of petroleum annually. The FY 2018 AFIP program opened September 1, 2017 and will close February 1, 2018.

Figure 9: Fiscal Year 2017 DC Fast Charging AFIP Awards



Electric Vehicle Excise Tax and EVSE Rebate Incentives

In addition to the federal tax incentive (up to $7,500) for the purchase of a PEV, Maryland offers an excise tax credit of up to $3,000 based on the PEV battery capacity. The incentive is scaled in increments of $100 per kilowatt hour (kWh), and has a maximum eligible vehicle purchase price of $60,000.

Maryland also provides a rebate program for the installation of charging infrastructure. Rebates are available for up to 40% of the purchase and installation price of the EVSE and are capped at the following amounts:

- Residential: 40% up to $700
- Commercial: 40% up to $4,000
- Retail Service Station: 40% up to $5,000

Both Maryland incentives were set to expire in 2017, but were adjusted and extended through 2020. The legislation adjusting and extending the credits is listed in Appendix D.

Between FY 2015 and FY 2017, 590 residential rebates and 259 commercial incentives were distributed. These rebates totaled a collective $1.46 million. The average residential rebate was $672, and the average commercial rebate was $4,102. As of November 2017, the FY 2018 distributions included 126 residential rebates and 60 commercial rebates totaling $274,000. The average residential rebate was $517 and the average commercial rebate was $3,482.

Volkswagen Settlement

In the fall of 2016, Volkswagen (VW) settled to pay $14.7 billion dollars through a case filed by EPA alleging that VW violated the Clean Air Act with regards to approximately 580,000 vehicles, model years 2009 to 2016 with 2.0 and 3.0-liter diesel engines. The VW vehicle computers contained algorithms that caused the emission control system of those vehicles to perform differently during normal operations than during emission testing. The vehicles were emitting NOx emissions significantly in excess of EPA compliance levels under normal operating conditions. The settlement is divided into three pools of money: the Environmental Mitigation Trust (EMT), the Zero Emission Vehicle (ZEV) Investment, and the Consumer Vehicle Buyback and Modification.

Maryland is currently developing a draft work plan for use of the EMT funds as defined in Appendix D-2 of the settlement. The EMT funds are primarily designed to reduce diesel emissions, and up to 15% of the allotted funds may be used for the installation of EVSE. Maryland has been allocated approximately $76 million dollars under the EMT.

Appendix C of the settlement establishes a nationwide, ZEV investment program which provides a total of $2 billion to install EVSE and conduct brand-neutral outreach efforts. The program specifies that $800 million will be dedicated to California projects and $1.2 billion will be available for the rest of the Country. The funding will be implemented in 30-month increments of $300 million per period, and must be fully spent within 10 years. On December 9, 2016, VW launched their website, www.electrifyamerica.com, for accepting the first round of project proposals and ideas under the ZEV Investment fund.

October 2, 2017 was the effective start date of the Environmental Mitigation Trust. Wilmington Trust, N.A. has been designated as the trustee. As trustee, Wilmington Trust is required to post mitigation plans and funding requests submitted by approved beneficiaries on a public website. Additional information will be posted and updated on the website throughout the processes for beneficiary designation and fund distribution (http://www.vwenvironmentalmitigationtrust.com).

Transportation Climate Initiative (TCI)

The Transportation and Climate Initiative (TCI) is a collaboration of the transportation, energy, and environment agencies of the 11 Northeast and Mid-Atlantic states and the District of Columbia. Through the TCI Clean Vehicles and Fuels workgroup, state agency participants have shared best practices and coordinated multi-state initiatives to facilitate the deployment of electric vehicle charging infrastructure and other alternative fueling stations in the region.

Maryland is an active participant in the Clean Vehicles and Fuels (CVF) workgroup of TCI which aims to support the mass-market deployment of clean vehicles in the TCI states, and to maximize the economic opportunities that these vehicles can bring to our region.

Over the upcoming year, the CVF workgroup will discuss and develop best practices for locating signage along federally designated alternative fuel corridors in the region. This work will include discussions of best practices for coordinating signage deployment along inter-state corridors, as well as engagement with federal, state, and local agency officials. The TCI workgroup may also explore how regional coordination on alternative fuel corridor signage can enhance existing state programs to increase consumer awareness of alternative fuel infrastructure.

PSC Public Conferences

The Maryland Public Service Commission (PSC) continued efforts they began in 2016 relating to EVs.

Public Conference 44 (PC44) 'Transforming Maryland's Electric Grid' was initiated to review and ensure that electric distribution systems in Maryland are customer-centered, affordable, reliable, and environmentally sustainable. One part of PC44 is Electric Vehicles, and EV efforts are ongoing and will culminate at the end of 2017 with formal utility proposals being submitted to the PSC. These formal proposals will include detailed infrastructure investment plans, rate design proposals, technology demonstration projects, and customer outreach and engagement plans. Other subjects of PC44 include

Rate Design, Competitive Markets and Customer Choice, Interconnection Process, Energy Storage, and Distribution System Planning.

Greenhouse Gas Reduction Act

The Greenhouse Gas Reduction Act of 2009 was enacted in light of Maryland's vulnerability to the impacts of climate change. The Act required the State to develop plans, adopt regulations, and implement programs to reduce greenhouse gas (GHG) emissions by 25% from 2006 levels by 2020. In 2016, Senate Bill 323 (Ch. 11) reaffirmed the GHG reduction goal of 25% from 2006 levels by 2020 and establishes a new reduction goal, requiring the State to develop plans, adopt regulations, and implement programs to reduce GHG emissions by 40% from 2006 levels by 2030. Innovative and widespread vehicle technology improvements, including the proliferative of PEVs, will be vital to reducing transportation sector emissions and meeting Maryland's GHG reduction goals.

Electrified Transit Systems

Across the state, a number of transit agencies have begun to operate electrified transit vehicles. Howard County and Frederick County have both implemented Electric Bus programs.

Howard County Transit now has three electric buses, which were funded through a grant from the federal Transit Investments for Greenhouse Gas and Energy Reduction, or TIGGER, program in the Federal Transit Administration, as part of an effort to reduce greenhouse gas emissions in transit systems. To support the charging of these buses during operations, an innovative inductive charging station has been installed in downtown Columbia, MD, allowing the buses to wirelessly charge when they are parked over the station. The buses are also plugged in to charge fully before and after service.

In 2016, TransIT Services of Frederick County (TSFC) put 5 all-electric transit buses in service as well as 10 charging stations. The buses have a range of about 120 miles and take approximately 4-6 hours to charge. The buses are monitored remotely by the manufacturer and TSFC receives email alerts if a bus does not charge or there is some other issue. After an initial period of refining some bus features (turning radius, efficiently heating the cabin in extreme cold) and training drivers to conserve energy, the electric buses have proven to be a great addition to the fleet, and TSFC intends to add more in the coming years. The battery range of new electric transit buses has already increased by 25% over the models TSFC purchased. Newer models are also able to charge more quickly.

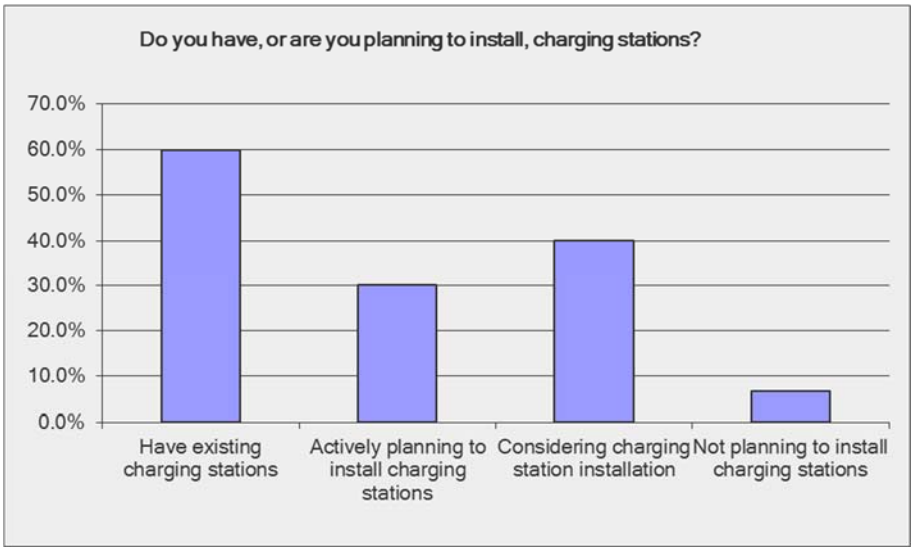
Now that operations have been ongoing for over a year, TSFC understands the savings provided by their electric buses. Per bus, electric buses are saving over $18,000 a year relative to diesel fuel costs, and over $7,000 a year on maintenance costs.

Survey Efforts

As part of state outreach efforts, three surveys were conducted in 2017 to better understand public perception of workplace charging and general EV Awareness. The results of these surveys are summarized below.

- **Workshop Attendee Survey:** A survey was provided in hard copy format to the mini-workshop attendees and collected back at the event. It served to evaluate event success and complete NAFTC Odyssey Day requirements.
    - 42% of respondents felt the workplace charging workshops met their expectations and 58% of respondents felt the events were better than expected. Three attendees said they would now consider purchasing an EV after the education gained at the workshops.

- **Workplace Charging Survey:** An online survey, posted to SurveyMonkey.com after workplace charging events and sent to the event distribution list, aimed to capture the needs and challenges of employers installing workplace charging stations in Maryland.
    - 60% of responding employers already had charging, with 7 companies actively planning to install charging. The organizations planning to install charging include the City of Rockville, Duball, Johns Hopkins Medical, MOM's Organic Market, Montgomery County, Lions Gate Bethesda, and St. Johns Properties. The City of Rockville and Lions Gate Bethesda do not have any current charging stations. Adventist Health Care, Anne Arundel County Public Schools, Ballard Corp, Clean Tech Advisors, Montgomery College, and NASA are all considering installing their first charging stations.



- The most common motivation to install workplace charging was for employee benefit, with one employer (Adventist Health Care) considering installing charging stations as employees are already plugging in to 120 V outlets to charge. Several other respondents noted that they needed to stay competitive and/or futureproof their offerings. Fifteen companies cited cost as the largest deterrent, with another ten stating lack of current demand has prevented installation. To overcome costs, 11 companies received the Maryland charging station rebate previously and 18 plan to utilize the new rebate.
- Most responding employers do not have formal workplace charging programs in place. Only seven responding employers have received recognition for their charging programs, ranging from grateful public emails to news articles to industry and State awards or recognition. Half of respondents promote their charging stations to employees through the company website or emails. 64% noted an increase in employee and customer attraction due to charging station installation[6].
- Only 6 respondents have charging stations solely for employees[7], with most allowing visitors, customers, and the public to charge as well. On average, respondents are not tracking the exact demand or the number of employees using the stations, although MOM's Organic Market has 15 employees driving all-electric vehicles and 85 employees driving plug-in hybrid electric vehicles. MOM's tracks this information through employees that apply for their EV rebate program.
- Overall, 73% of respondents are interested in additional workplace charging educational events or ride & drives.

- **Public EV Awareness Survey:** Maryland agencies hired Nielson to survey 2,000 Maryland residents. This survey was a random sample, with 2,010 results, including responses from every county in the state.
  - 54% of respondents plan to purchase a vehicle within the next two years, and 65% of these would consider buying an EV. Multi-car households are twice as likely to consider purchasing an EV.
  - Motivations to purchase an EV varied, with fuel cost savings the main motivator, followed and often accompanied by environmental benefits.
  - Marylanders identified the most prominent deterrents to purchasing an EV as cost and lack of charging stations.
  - Most Marylanders would charge at a single-family home if they owned an EV, with an increase in potential apartment and neighborhood charging stations in more urban areas. Workplace was the main charging location in a few areas in central Maryland, with many respondents indicating they would prefer to charge at both home and work.
  - Workplace charging is highly valued amongst respondents, with 60% more likely to be an EV if they had access to workplace charging.
  - Marylanders are largely unaware of incentives available for EV purchase and charging station installation, with 60% unaware any incentives exist. 21% knew of the federal tax credit, 17% knew of the Maryland tax credit, 10% knew of the Maryland charging station rebate, and 21% knew of the HOV lane access. The increased awareness of the HOV lane access is likely due to HOV signage on Interstate 270 and US Route 50, indicating that EV awareness may increase with the MDOT installation of EV charging station signage along Maryland's Signage Ready EV Corridors. Most that knew of the incentives, thought the incentive amounts were just right.

[6] 64% of the employers that have installed charging stations.

[7] Based on charging station access for employers with charging stations and those planning to install charging stations.

Recommendations

Policy Recommendations

EVIC came to consensus on two policy recommendations to pursue in 2018:

- **Right to Charge**: EVIC proposed a policy initiative that would seek to clarify how chargers can be installed and operated in and around apartment buildings, condos, and dwellings that are governed by home owners' associations (HOAs).
- **EV Parking**: EVIC proposed a policy initiative that would seek to eliminate the parking of non-EVs in EV charging spaces.

Additional Recommendations

Volkswagen Settlement Efforts

EVIC recommends the following actions related to the VW settlement efforts:

- Utilization of the full 15% of allowable VW Environmental Mitigation Trust funds on costs necessary for, and directly connected to, the acquisition, installation, operation and maintenance of new light-duty zero emission vehicle supply equipment.
- As the State of Maryland, regional partners, local governments and other EV stakeholders prepare applications for the ZEV Investment Fund, EVIC recommends transparency and information sharing as early and often as practicable. Cross-referencing applications and keeping lines of communication open will assist in attracting VW investment to Maryland.
- The State will coordinate with Utilities and other appropriate stakeholders in its efforts to develop a state plan on the use of the VW Mitigation Trust funds for the installation of EV infrastructure.

Future Development and Research

There are several recommendations for areas that warrant further research and analysis:

- Finding an appropriate balance between home/workplace/public charging infrastructure.
- Determining the incentives necessary for underserved communities to access the benefits of PEVs.
- Continuing to monitor the effects of PEVs on the reliability of the electric grid infrastructure and develop a better understanding of any potential benefits that PEVs may bring to the grid.
- Assessing the long term financial impact of advanced technologies (EV, PEVs, hybrids, etc.), new Corporate Average Fuel Economy (CAFE) Standards, and shifting vehicles miles travelled (VMT) on the Maryland Transportation Trust Fund.

- Developing a better understanding of the environmental and economic opportunities that can be realized through the growth of BEV ownership and EVSE installation in Maryland.

Communications

EVIC came to consensus on the following communications goals for the upcoming year:

- Continue to strive toward open lines of communication between all EVIC partners.
- Seek alliances with other advanced technology groups including those related to connected and autonomous vehicles.
- Review and implement the Draft Communication and Media Plan (Appendix E).

Appendix A – 2017 EVIC Membership

Address	Details
Academic Community; a Maryland institution of higher education with expertise in energy, transportation, or the environment (1)	**Z. Andrew Farkas, Ph.D.** Morgan State University, Director and Professor for National Transportation Center
Maryland Association of Counties; rural region (1)	**Raymond Clarke** Talbot County
Maryland Association of Counties; urban or suburban region (1)	**Theodore Atwood** Director, General Services Baltimore City Government
Maryland Municipal League; rural region (1)	**Timothy P. Davis** Planner, City of Frederick
Maryland Municipal League; urban or suburban region (1)	**Konrad Herling** Greenbelt City Council
Baltimore Electric Vehicle Initiative (1)	**Jill Sorensen** Baltimore Electric Vehicle Initiative
Electric Companies (2)	**John J. Murach, Jr.** BGE **Robert Stewart** PEPCO Holdings, Inc.
Electric Vehicle Manufacturer (1)	**Britta Gross** General Motors Corporation

Address	Details
Electric Vehicle Charging Station Manufacturer (1)	**Colleen Quinn** V.P. Government Relations ChargePoint, Inc.
Fleet Operators (1)	**Gary Anderson** PHH / Arval
Electrical Workers (1)	**Michael A. Wall** Clinton Electric Company
Environmental Community (1)	**Scott Wilson** Electric Vehicle Association of Washington D.C.
Public, with expertise in energy or transportation policy	**vacant**
Maryland Automobile Dealers Association (1)	**Travis Martz**
Retail Electric Supplier Community (1)	**Michael A. Wall** Clinton Electric
Senator (1)	**James N. Mathias, Jr., Senator** District 38, Somerset, Wicomico & Worcester Counties
Delegates (2)	**Richard K. Impallaria** Republican, District 7, Baltimore & Harford Counties **Clarence K. Lam, M.D.** Democrat, District 12 Baltimore & Howard Counties

Address	Details
Secretary of Transportation	**R. Early Lewis, Jr.** Deputy Secretary **(Council Chair)**
Maryland Department of Planning	**Bihui Xu** Manager, Transportation Planning
Secretary of the Environment	**Benjamin Grumbles**
Secretary of Commerce	**R. Michael Gill**
Technical Staff of the Maryland Public Service Commission	**Kevin Mosier** Wholesale Markets Liaison
Director of the Maryland Energy Administration	**Mike Jones** Transportation Program Manager

Appendix B – 2012 Recommendations & Action Plan Status

The following tables outline the status of each of the 32 recommendations included in the 2012 EVIC report. The recommendations are grouped by key themes and include the following details:

- The initial (2012) Phase of the recommendation:
  - Phase I: results in little to no immediate fiscal impact and could be undertaken swiftly pending shifts in policy;
  - Phase II: requires substantial new funding and may have to be implemented over several years as funding becomes available;
  - Phase III: exhibits potential for significant benefits, but requires additional study and / or resources.
- Whether or not any legislation is required to implement the recommendation.
- The workgroup that the recommendation has been referred to.
- Details on any future action(s) required.

	Coordinated Action	
1	A coordinated effort to promote PEV adoption will require continued oversight and management. It is recommended that EVIC be continued beyond its current sunset date of 6/2013.	
	Phase	I
	Legislation Required	Y SB714 extended EVIC until June 2020
	Refer to Workgroup	Not at this time.
	Future Action Required	SB714 requires interim reports on December 1st of each year and a final report of EVIC's work and recommendations by June 30, 2020.
2	Creation of an Urban/ Workplace Charging Task Force to specifically study the issues and opportunities presented by workplace and urban charging and develop solutions and best practices.	
	Phase	I
	Legislation Required	N
	Refer to Workgroup	Workplace / Urban Charging Workgroup Existing Workplace Charging Committee will now include efforts related to urban charging.
	Future Action	To be determined through workgroup.
3	Creation of a State Agency Task Force to develop policies for PEV charging at State facilities by State employees, including the use of existing electrical outlets where feasible.	
	Phase	I
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action	State Agency Workgroup meeting regularly to implement recommendation.
4	Dedicated staff should be identified to implement the recommendations of EVIC.	
	Phase	I

	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action	To be determined through workgroup.

	Policy Changes	
5	The State should place increased emphasis on the electrification of transportation, and its accompanying potential for energy storage and peak load management, as a specific component of the State's overall energy goals. Several aspects of current state policy are technically in conflict with the goal of expanded PEV adoption. The mandates of State programs and funding sources directed toward petroleum use reduction, GHG emissions reduction, and/or support for renewable energy, including the programs of instrumentalities such as the Maryland Clean Energy Center, should be realigned where necessary to ensure support for the advancement of Electric Vehicles.	
	Phase	I
	Legislation Required	TBD
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	To be determined through workgroup. Informal discussions on this have taken place w/ DGS.
6	Institute goal for state agencies that the state vehicle fleet increase the number of its zero-emission vehicles through the normal course of fleet replacement so that at least 10% of fleet purchases of light-duty vehicles be zero-emission by 2020 and at least 25% of fleet purchases of light-duty vehicles be zero-emission by 2025. This directive shall not apply to vehicles that have special performance requirements necessary for the protection of the public safety and welfare. DBM should be directed to investigate: • Potential for leasing PEVs • Bulk purchase agreements, with local government • Bulk purchase or lease agreements with the NE corridor states.	
	Phase	I
	Legislation Required	TBD
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	To be determined through workgroup. Informal discussions on this have taken place w/ DGS and MDE drafted an executive order.
7	Integration of EVs into State and regional plans and policies: State government should promote EVs through engaging all levels of government in a collaborative approach to EV-friendly plans and policy development consistent with State and Local Smart Growth goals. Policy should include integration of EVs and infrastructure planning into existing regional and local planning processes, such as regional transportation plans, regional (nonattainment area) action plans, local comprehensive plans, zoning, building and other related ordinances and regulations.	
	Phase	I
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	Workshops have been held at Baltimore and Washington, DC MPOs. Future actions to be determined through workgroup.

	Policy Changes (Continued)		
8	The PEV Excise Tax Credit expires July 1, 2013. EVIC recommends: a. The legislature extended the statute expiration date to July 1, 2016 b. Remove the 10-vehicle limit placed on businesses c. Consider turning the credit into a point of purchase rebate to reduce the consumer's cash outlay d. Consider expanding beyond the 8,500-pound weight limit		
	Phase	I - II	Recommendation a. is Phase I. Recommendations b.-d. are Phase II.
	Legislation Required	Y	Excise tax credit was extended to 2017
	Refer to Workgroup	Legislative Workgroup	
	Future Action Required	To be determined through workgroup.	
9	Regarding the PEV Charging Station Income Tax Credit, EVIC recommends: a. Extend the program for an additional 3 years b. Remove the 30-tax credit limit imposed in the statute (per year cap on stations)		
	Phase	I - II	Recommendation a. is Phase I. Recommendations b. is Phase II.
	Legislation Required	Y	PEV charging station tax credit was changed to a rebate and extended to 2017. Legislation required to remove the cap under item b.
	Refer to Workgroup	Legislative Workgroup	
	Future Action Required	To be determined through workgroup.	
10	Support extension of the Federal Section 30C tax credit for alternative fuel infrastructure. The IRS Code Sec 30C alternative fuel vehicle refueling property credit (commonly referred to as the infrastructure or 30C credit) originally provided 30% of the cost of any property for storing (at the point of dispensing) or dispensing alternative fuel placed in service after 2005 and before the end of 2009. These credits were extended through 2011.		
	Phase	I	
	Legislation Required	Y	Was extended through the end of 2016.
	Refer to Workgroup	Legislative Workgroup	
	Future Action Required	To be determined through workgroup.	
11	Extend the HOV lane Use Permits to 2020, continuing the caveat to consult with SHA on potential congestion management		
	Phase	I	
	Legislation Required	Y	Was extended to 2017.
	Refer to Workgroup	Legislative Workgroup	
	Future Action Required	To be determined through workgroup.	
12	Multi-dwelling Unit Charging Grant Program: Establish a grant program to assist in the funding of EVSE equipment, installation & initial procurement of transaction management software for Multi-Unit Dwellings		
	Phase	II	
	Legislation Required	Y	Was addressed.
	Refer to Workgroup	Legislative Workgroup	
	Future Action Required	To be determined through workgroup.	

Outreach & Education		
13	Adopt a specific symbol or logo to identify State funded or supported EV equipment, technology or materials, i.e., a State EV website, posters, newsletters, materials etc. This logo would be prominently displayed on State Fleet Vehicles that are EV, as well as on any EV License Plate or decal that may be developed for any state use.	
	Phase	I
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	To be determined through workgroup.
14	A state website should be developed for Maryland specific EV info on any incentives, regulations, programs, plus links to other EV sites. Website can be used to promote any related state priority, such as choosing renewable energy for consumers' electricity generation.	
	Phase	I
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	To be determined through workgroup.
15	It is recommended that educational workshops or webinars be conducted for developers, property managers and homeowner associations about the benefits of providing charging. These should provide information about best practices and implementation of charging programs, cover applicable regulations, incentives, real world costs of installation, most cost-effective options, possibilities for using renewable energy in support of charging, and the types of chargers and management services available. Workshops should provide models for dealing with allocation of electricity and maintenance costs, reservation of parking spaces, installation issues, and policies for visitor use. Workshops should also provide a showcase for charging and management service businesses active in Maryland. Workshops/webinars could be provided through partnership with EV non-profits.	
	Phase	II
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup to follow-up with Education & Outreach Workgroup
	Future Action Required	To be determined through workgroup(s).
16	It is recommended that a series of guidance documents be developed to provide guidance on charger installation, management and regulation. The Transportation and Climate Initiative (TCI) and others have produced guidance documents that could be the basis of MD documents, along with the findings of EVIC. EV Infrastructure Planning Guide for Local Governments: to include model documents for permitting, siting and design, building codes, and zoning, including historic district overlays, and parking ordinances. Guidance Document for Local Governments on the issues and complexities of providing urban charging and potential solutions. Document on Charging in the Urban & Multi-unit Setting: To include best practices in the implementation of charging programs. Cover applicable regulations and incentives, real world costs, most cost-effective options, possibilities for using renewable energy in support of charging, charger types and management services available. Provide models for allocation of electricity and maintenance costs, reservation of parking spaces, and policies for visitor use. Should include templates or "sample policy" documents that homeowner and condo associations, apartment complexes, etc. can use in adopting their own policies.	
	Phase	I
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	To be determined through workgroup. TCI and other applicable guidance documents have been posted to EVIC resources website.

17	Outreach Materials should be developed, i.e. brochures, presentations, e-newsletter, and webinars on sub-topics.	
	Phase	II
	Legislation Required	N
	Refer to Workgroup	Education & Outreach Workgroup
	Future Action Required	To be determined through workgroup. Include State efforts / coordinate with State Agency Workgroup.

Promotion of Infrastructure: State Charging Stations		
18	The State should promote, through new and existing programs, and incentives, and in conformance with the State's goals for Smart Growth, the establishment of adequate EV charging infrastructure to support a goal of 60,000 EVs on the road by 2020.	
	Phase	I
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	To be determined through workgroup. Include target of 300,000 EVs by 2025.
19	There are currently seventy-three charging stations accessible by the public installed at state facilities. The Council recommends that the State monitor the installation of private sector charging facilities across the state and continue to add charging infrastructure at state facilities in areas that are underserved.	
	Phase	I
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	Workgroup is coordinating with DBM and other State agencies to monitor the total of state and private sector charging installations.
20	The Council recommends that the State retain the data collection software and continue to allow public access to these charging stations, free of charge until June 30, 2014. In the interim, host agencies shall collect data on the usage of the stations and the amount of electricity used in order to facilitate planning for future installations, electrical infrastructure and cost recovery. Utilization data will be available to the public.	
	Phase	I
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	To be determined through workgroup.
Promotion of Infrastructure: Urban Charging Infrastructure		
21	In urban areas state and local officials, along with utilities, business organizations and property managers should discuss options for wiring existing garages for charging. Garage managers could then incorporate that service into long-term parking agreements with urban area employers.	
	Phase	I
	Legislation Required	N
	Refer to Workgroup	Workplace / Urban Charging Workgroup
	Future Action Required	To be determined through workgroup.
22	Urban Demonstration Projects: a.) Work with a local county or municipality to install and make available charging stations in government parking garages for urban resident charging. b.) Work with county or municipality to identify off-street outdoor parking locations where local resident PEV charging can be provided (Level 1 and Level 2). c.) Work with a business or institution to make Level 1 and/or Level 2 PEV charging available to nearby residents. d.) Work with a multi-unit dwelling owner or property manager to make Level 1 and Level 2 charging	

	available for one or more spaces in a shared parking facility and arrange for tracking and billing for electricity usage by residents.	
	Phase	II
	Legislation Required	N
	Refer to Workgroup	Workplace / Urban Charging Workgroup
	Future Action Required	To be determined through workgroup. Several local governments have charges in municipal garages.

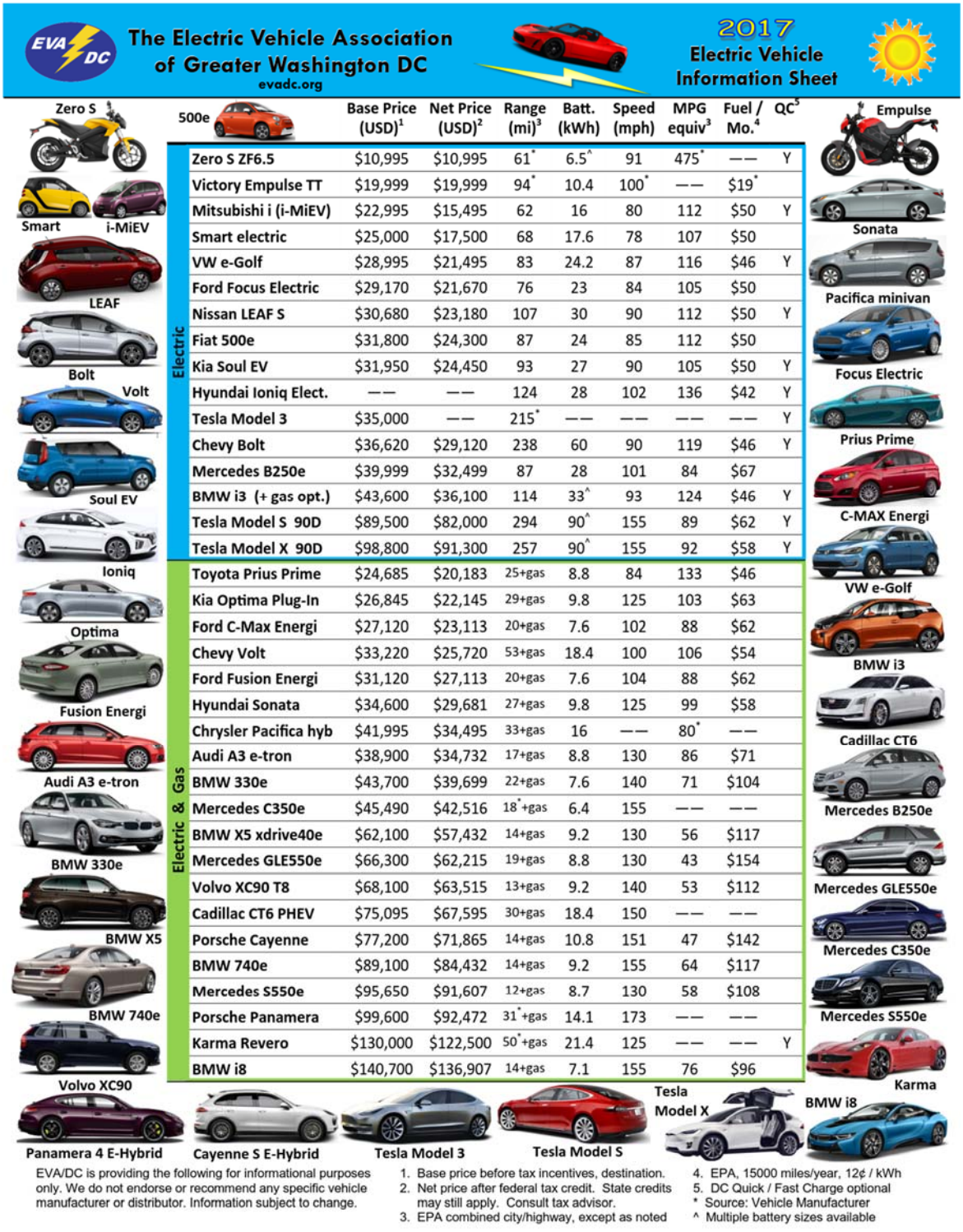
Charging Solutions		
23	Revision of Zoning and Planning Codes: Municipal zoning and planning codes should be amended to permit and regulate on-street PEV charging, require PEV parking spaces in new developments and re-development initiatives and include siting and design guidelines for PEV charging stations, Level 1 outlets and parking spaces.	
	Phase	NA
	Legislation Required	Y
	Refer to Workgroup	Legislative and Education & Outreach Workgroups
	Future Action Required	To be determined through workgroup(s). Potential example from Montgomery County.
24	Historic District Restrictions: State and local zoning and historic district codes should be reviewed for the existence of provisions that could effectively prohibit the installation of PEV charging stations and outlets in historic districts or in close proximity to historic properties. The adoption of code amendments that prohibit unreasonable restrictions on the installation of charging equipment in historic districts while conforming to the federal requirements may be necessary to ensure the location of an adequate number of charging stations and outlets in these communities. Reasonable alternatives, such as siting charging in adjacent public and/or business parking areas should be considered and encouraged.	
	Phase	NA
	Legislation Required	Y
	Refer to Workgroup	Legislative and State Agency Workgroups
	Future Action Required	To be determined through workgroup(s).
25	On-Street Parking: Building on the municipal parking permit model for residential on-street parking, local government-owned and maintained PEV charging stations (Level 2 charging) and 120V outlets (Level 1 charging) can be installed and made available in designated on-street spaces for use by residents who purchase a PEV upgrade to their on-street parking permit.	
	Phase	NA
	Legislation Required	N
	Refer to Workgroup	Legislative and Workplace / Urban Charging Workgroups
	Future Action Required	To be determined through workgroup(s).

26	Measures to Discourage Overstaying: There are a number of possible measures that, if adopted, can discourage overstaying. Limiting the number of hours a car can occupy the parking space, with associated fines, is one option. Rate structures can also be an effective disincentive. Usage of a pricing mechanism that is based on hourly rates and charges progressively higher rates once the vehicle is fully charged, alone or in combination with the automatic assessment of additional "inconvenience fees," is another option that could encourage drivers to move their vehicles once they are fully charged.	
	Phase	NA
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	Suggested this measure be tabled for the time being.
27	Charging and Metering Configurations: To address challenging parking and metering configurations at multi-dwelling unit properties property owners and managers should consider the addition of Level 2 chargers at unassigned shared parking spaces in configurations that maximize the number of spaces that the charging cord can reach.	
	Phase	NA
	Legislation Required	N
	Refer to Workgroup	None
	Future Action Required	Recommendation to be removed as it is no longer relevant
28	Clustering Level 1 Charging: Assigned parking spaces can be reassigned to locate parking for PEV drivers in clusters close to 120V outlets.	
	Phase	NA
	Legislation Required	N
	Refer to Workgroup	None
	Future Action Required	Suggested this measure be tabled for the time being due to technology.
Charging Solutions (Continued)		
29	Allocation of Costs and Responsibility for Installation and Maintenance of Charging Stations: Installing necessary panel and wiring upgrades and maintaining the PEV equipment in good repair, and tracking and paying for the electricity usage is a threshold issue for all multi-dwelling unit residents and property owners. The following strategies should be considered: • Use of a business model in which a charging station provider, at its own expense, installs, maintains and owns the charging station and rebates the cost of electricity usage back to the property owner. The PEV owner pays for access to charging in the network through a monthly membership fee. (www.PEVgonetwork.com) • Installation of charging stations by the property owner who recovers the cost of the station and electricity usage through add-ons to leases or, in condominiums or cooperatives, through a special assessment for PEV drivers. • Future State and/or local government programs to support the installation of PEV charging in these more challenging environments and reduce the cost to the property manager/owner.	

	Phase	NA
	Legislation Required	N
	Refer to Workgroup	None
	Future Action Required	Suggested this measure be tabled for the time being.
30	Technical Workshops: Recommend that the PSC hold Technical Workshops to gather information on innovations in the interface between PEVs and the electrical grid, including both technical feasibility and cost/benefit. Workshop topics should include: • Vehicle –to-Grid (V2G) • Vehicle to Home • Potential for use of down-cycled batteries for power storage.	
	Phase	NA
	Legislation Required	N
	Refer to Workgroup	None
	Future Action Required	The Chair of EVIC did send a letter to the PSC requesting workshops in 2013. The State Agency Workgroup determined this was not within the State's role.
31	Investment: Foster emerging PEV technologies and their potential for a role in electrical grid management through existing financing vehicles, such as InvestMaryland.	
	Phase	NA
	Legislation Required	N
	Refer to Workgroup	TBD
	Future Action Required	The State Agency Workgroup determined this was not within the State's role.
32	Financing: The State should explore opportunities to reduce the upfront costs of PEVs and charging infrastructure installation through public/private financing to allow for the provision and underwriting of low-interest, low-risk loans to energy projects that further the State's energy goals, and to link EV charging to renewable energy and grid management.	
	Phase	NA
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	Many incentives currently exist.

Charging Solutions (Unnumbered Recommendations)		
	Permit Streamlining: Based on the Council's review and outreach to the community they found no significant existing barriers to the permitting of EVCS, and therefore make no recommendation for action at this time.	
	Phase	NA
	Legislation Required	N
	Refer to Workgroup	NA
	Future Action Required	None.
	Pricing Displays: The Council recommends that no action be taken to fix a pricing display model for Maryland until after the national standard has been developed and adopted by the National Institute of Standards and Technology (NIST), as those standards are anticipated in July 2013.	
	Phase	NA
	Legislation Required	N
	Refer to Workgroup	State Agency Workgroup
	Future Action Required	To be determined by workgroup.

Appendix C – PEVs Available for Purchase in Maryland
Appendix D – Related Legislation (enacted 2011-2017)



		Base Price (USD)[1]	Net Price (USD)[2]	Range (mi)[3]	Batt. (kWh)	Speed (mph)	MPG equiv[3]	Fuel / Mo.[4]	QC[5]
Electric	Zero S ZF6.5	$10,995	$10,995	61*	6.5^	91	475*	——	Y
	Victory Empulse TT	$19,999	$19,999	94*	10.4	100*	——	$19*	
	Mitsubishi i (i-MiEV)	$22,995	$15,495	62	16	80	112	$50	Y
	Smart electric	$25,000	$17,500	68	17.6	78	107	$50	
	VW e-Golf	$28,995	$21,495	83	24.2	87	116	$46	Y
	Ford Focus Electric	$29,170	$21,670	76	23	84	105	$50	
	Nissan LEAF S	$30,680	$23,180	107	30	90	112	$50	Y
	Fiat 500e	$31,800	$24,300	87	24	85	112	$50	
	Kia Soul EV	$31,950	$24,450	93	27	90	105	$50	Y
	Hyundai Ioniq Elect.	——	——	124	28	102	136	$42	Y
	Tesla Model 3	$35,000	——	215*	——	——	——	——	Y
	Chevy Bolt	$36,620	$29,120	238	60	90	119	$46	Y
	Mercedes B250e	$39,999	$32,499	87	28	101	84	$67	
	BMW i3 (+ gas opt.)	$43,600	$36,100	114	33^	93	124	$46	Y
	Tesla Model S 90D	$89,500	$82,000	294	90^	155	89	$62	Y
	Tesla Model X 90D	$98,800	$91,300	257	90^	155	92	$58	Y
Electric & Gas	Toyota Prius Prime	$24,685	$20,183	25+gas	8.8	84	133	$46	
	Kia Optima Plug-In	$26,845	$22,145	29+gas	9.8	125	103	$63	
	Ford C-Max Energi	$27,120	$23,113	20+gas	7.6	102	88	$62	
	Chevy Volt	$33,220	$25,720	53+gas	18.4	100	106	$54	
	Ford Fusion Energi	$31,120	$27,113	20+gas	7.6	104	88	$62	
	Hyundai Sonata	$34,600	$29,681	27+gas	9.8	125	99	$58	
	Chrysler Pacifica hyb	$41,995	$34,495	33+gas	16	——	80*	——	
	Audi A3 e-tron	$38,900	$34,732	17+gas	8.8	130	86	$71	
	BMW 330e	$43,700	$39,699	22+gas	7.6	140	71	$104	
	Mercedes C350e	$45,490	$42,516	18*+gas	6.4	155	——	——	
	BMW X5 xdrive40e	$62,100	$57,432	14+gas	9.2	130	56	$117	
	Mercedes GLE550e	$66,300	$62,215	19+gas	8.8	130	43	$154	
	Volvo XC90 T8	$68,100	$63,515	13+gas	9.2	140	53	$112	
	Cadillac CT6 PHEV	$75,095	$67,595	30+gas	18.4	150	——	——	
	Porsche Cayenne	$77,200	$71,865	14+gas	10.8	151	47	$142	
	BMW 740e	$89,100	$84,432	14+gas	9.2	155	64	$117	
	Mercedes S550e	$95,650	$91,607	12+gas	8.7	130	58	$108	
	Porsche Panamera	$99,600	$92,472	31*+gas	14.1	173	——	——	
	Karma Revero	$130,000	$122,500	50*+gas	21.4	125	——	——	Y
	BMW i8	$140,700	$136,907	14+gas	7.1	155	76	$96	

EVA/DC is providing the following for informational purposes only. We do not endorse or recommend any specific vehicle manufacturer or distributor. Information subject to change.

1. Base price before tax incentives, destination.
2. Net price after federal tax credit. State credits may still apply. Consult tax advisor.
3. EPA combined city/highway, except as noted
4. EPA, 15000 miles/year, 12¢ / kWh
5. DC Quick / Fast Charge optional

* Source: Vehicle Manufacturer
^ Multiple battery sizes available

Legislation Passed

In the 2017 Legislative Session, the General Assembly enacted the following:

- SB 393/HB 406, Chapter 362, Acts of 2017 – Vehicle Laws – Licensing and Registration– Clean Cars Act of 2017

This bill made the following changes:

- Extended through fiscal year 2020, the Electric Vehicle Recharging Equipment Rebate Program and authorization to issue motor vehicle excise tax credits for qualified PEV vehicles.
- Increased the total amount of rebates from up to $600,000 to a maximum of $1,200,000, increasing the amount required to be transferred from the Strategic Energy Investment Fund to the Transportation Trust Fund
- Increased the amount of motor vehicle excise tax credits that may be issued during a fiscal year. The credit value was reduced to $100 kWh of battery capacity of the vehicle up to $3,000.
- Added additional eligibility requirements, capping qualifying vehicle purchase prices at $60,000, and requiring a minimum battery capacity of 5 kWh.

http://mgaleg.maryland.gov/2017RS/Chapters_noln/CH_362_hb0406e.pdf

In the 2016 Legislative Session, the General Assembly enacted the following:

- HB 1179, Chapter 734, Acts of 2016 – Vehicle Laws – HOV Lanes – Plug-In Electric Drive and Hybrid Vehicles

This bill extended the authorization of BEVs to use HOV lanes regardless of the number of passengers through September 30, 2018. It also allows for qualified hybrid vehicles to use HOV lanes (effective from October 1, 2016 through September 30, 2018). The hybrid HOV lane use is restricted to the portion of US 50 designated as an HOV lane, between I-95 / I-495 and US 301. All PEVs must obtain a permit to use HOV lanes. A copy of the bill can be found here:

http://mgaleg.maryland.gov/2016RS/chapters_noln/Ch_734_hb1179T.pdf.

- SB 998/HB 1279, Chapters 334 and 335, Acts of 2012: Motor Vehicle Administration - Plug-In Vehicles - Disclosure of Personal Information

This bill addressed concerns expressed by the utility companies and other stakeholders over the potential for PEV clustering and the maintenance of local grid reliability. This legislation helped to alleviate that concern by requiring the Motor Vehicle Administration (MVA) to share PEV registration information necessary for grid planning purposes with the appropriate utility, specifically (1) the street address and (2) type of PEV purchased. When a PEV is registered with the MVA, the MVA can provide the residential address of the owner to the electric utility to ensure that the utility can make any necessary upgrades to the transformers and maintain safe and efficient load distribution. A copy of the bill can be found here: http://mlis.state.md.us/2012rs/chapters_noln/Ch_335_hb1279T.pdf

- SB 997/HB 1280, Chapters 631 and 632, Acts of 2012: Electric Vehicle Users and Charging Stations – Exclusions

  This bill provided regulatory clarification for owners and operators of PEV charging stations and PEV charging station service companies or providers by excluding them from the definition of an "electricity supplier" or a "public service company" as defined in law and regulated by the Maryland PSC. The bill also made it clear that these entities continue to remain within the definition of "retail electric customer." The elimination of regulatory uncertainty removed a potential barrier preventing PEV investors and industry participants from entering the market in Maryland. With this new level of regulatory certainty, Maryland's PEV market will be better poised to grow beyond its existing infrastructure and is a signal of Maryland's commitment to the development of a vibrant PEV market. A copy of the bill can be found at: http://mlis.state.md.us/2012rs/bills/hb/hb1280t.pdf

In the 2015 Legislative Session, the General Assembly enacted the following:

- SB 714, Chapter 378, Acts of 2015 - Maryland Electric Vehicle Infrastructure Council - Reporting and Sunset Extension

  This bill extended the tenure of the Council until 2020 and set out annual reporting requirements. A copy of the bill can be found at: http://mgaleg.maryland.gov/2015RS/Chapters_noln/CH_378_sb0714t.pdf

In the 2014 Legislative Session, the General Assembly enacted the following:

- SB908/HB1345, Chapters 359 and 360, Acts of 2014 - Electric Vehicles and Recharging Equipment - Rebates and Tax Credits

  This bill extended the excise tax incentive for three (3) years until June 30, 2017 and amended the credit to relate the amount credited to the battery capacity of the vehicle. An electric vehicle would receive a credit of $125 per kWh of capacity up to a cap of $3,000. It also converted the Income Tax Credit for EVSE to a rebate program that includes installation costs in the incentive calculation, remove the provision limiting businesses to a maximum of 30 chargers, and increases the residential and commercial caps. Copies of the bills can be found at: http://mgaleg.maryland.gov/2014RS/Chapters_noln/CH_359_sb0908t.pdf and http://mgaleg.maryland.gov/2014RS/Chapters_noln/CH_360_hb1345e.pdf

In the 2013 Legislative Session, the General Assembly enacted the following:

- SB 600/HB836, Chapter 64, Acts of 2013: Vehicle Laws –Electric Vehicles

  This bill, in addition to harmonizing variations in the definition of "plug-in electric drive vehicle" that appeared in various sections of the Maryland Code, extended the termination date for the exemption allowing the use of Maryland's High Occupancy Vehicle (HOV) lanes by PEVs, regardless of the number of passengers, to September 30, 2017. It also extended the tenure of the Council to June 30, 2015. A copy of the bill can be found at: http://mgaleg.maryland.gov/2013RS/Chapters_noln/CH_64_sb0600t.pdf

- HB 791/SB728, Chapter 389, Acts of 2013: Tax Credits – Electric Vehicles – Extensions

  This bill extended the existing tax credits that incentivize the purchase of PEVs and their charging equipment. The credit against the State income tax for PEV charging equipment was extended through tax year 2016. The credit against the motor vehicle excise tax was extended to July 1, 2014 and tied the amount of the credit allowed to the size of the vehicle's battery capacity. A copy of the bill can be found at: http://mgaleg.maryland.gov/2013RS/Chapters_noln/CH_389_hb0791e.pdf

Appendix E – Draft EV Communication and Media Plan

EV Communication and Media Plan

- How to promote EVs and change behavior in favor of clean transportation choices?
- A simple message, repeated often, by trusted sources.
- Breathe easier. Plug In. Drive Electric.

Goals:

1. Raise awareness of electric vehicles
2. Create and strengthen association of EVs to progressive businesses, employers, communities, regions
3. Promote economic development opportunities for EV supporters
4. Provide reliable and current information about EVs and EVI
5. Connect EV sellers and EVSE installers; help consumers figure out what to buy
6. Make room and voice for youth; energize the EV campaign
7. Centralize EV information amongst different constituents, utilities, agencies, county governments and sustainability offices, universities
8. Coordinate EV events and process: electric vehicle week, Earth Day, auto shows, central place for recording EV events and information; need person and coordination.

Key 2017 Messaging Points

- Central Message
    - Electric vehicles (EVs) (including plug-in hybrid electric vehicles (PHEVs)) are cheaper, [more] convenient, and cleaner than conventional vehicles.
- Transportation
    - Supporting Electric Vehicles helps advance State and local government efforts to achieve the statewide goals for greenhouse gas emission reduction, while also cutting fuel use and costs.
    - In 2025, the cost of EVs will be down from $45,800 to $35,200 making EVs more affordable. An estimated $1.2 million in annual sales will come from electric vehicles alone in 2025, and 11.4 million electric vehicles will be on the road.
    - Maryland invests in the growing electric vehicle industry by providing residents with incentives such as tax credits, rebate offers, and open HOV lane access.

- Environment

    - Electric Vehicles produce limited emissions due to the electricity needed to charge the vehicles from local power plants. Some geographic areas are producing clean energy making the EV charging process completely emissions free.
    - Electric Vehicles use half the amount of fossil fuels to operate.

- Technology

    - Electric vehicles are the future of car ownership. Electric vehicle batteries are becoming cheaper and making electric vehicles more affordable.
    - Charging stations are widely available in many parts of Maryland, increasing convenience. Maryland has 451 electric stations and 1,132 charging outlets. EV drivers use apps like the Alternative Fueling Station Locator and Chargepoint. There are over 23,000 alternative fuel stations in the United States. The industry has seen a 36% increase in EVSE stations (July 2015 – July 2016).
    - EV and PHEV electric ranges continue to increase – from a couple dozen miles to as many as 300 miles in some cases – significantly decreasing the need to charge frequently or for long periods of time.

- Economic

    - Importing barrels of crude oil costs the U.S. approximately $425 mil a day. Relieving the U.S. economy of this plus the health and environmental benefits of cleaner air makes electric vehicles exponentially the smarter choice.
    - The federal tax credit is $7,500 and the Maryland provides its electric vehicle consumers with an additional $3,000. The state also provides rebates of up to $900 for Electric Vehicle Supply Chargers.
    - The yearly cost of electricity for an electric vehicle is $612 versus the $1,200 annual cost of gas for a standard vehicle. EVs and PHEVs are very efficient and have fewer moving parts and fluids to change, reducing the maintenance costs.

Key 2018 objectives

- Increase recognition of EVs for stakeholders

    - Car dealers (how to communicate EV benefits to car buyers)
    - Local governments (how to include EVs in fleets, EVI)
    - New drivers (how to put EVs on the buying options list)
    - Urban commuters (how to save money and reduce congestion by pairing EVs with transit)
    - Employers – workplace charging and wellness
    -
- Increase EV outreach and networking

    - Maintain the marylandEV.org website; keep content current, media feeds active
    - Continue MDEV EV blog - one entry per week by BEVI interns

- Coordinate activities with Sustainable Maryland, MAACO, MML, Sierra Club MD, Union of Concerned Scientists, USDOE, EPA, MEA, MDE, MDOT
- Post one Facebook photo per week
- Enter one Twitter feed per week
- Plan specific, fun EV Outreach Campaigns.
- EV videos, webinars, tutorials

- Impact Metrics

  - New drivers or prospective users who will consider an EV
  - Fleet conversions (government, business)
  - Web Analytics
  - Events
  - Vehicle charging activity
  - Growth in EV infrastructure
  - Growth in EVSE use
  - Increase in EV sales and registered vehicles in Maryland
  - Emission benefits
  - Fleet conversions