



Interim Report

January 2017

*Chaired and Staffed by the 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)

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Acronyms

The following acronyms are used in this report:

AFIP	Alternative Fuel Infrastructure Program
BEV	Battery Electric Vehicle
BEVI	Baltimore Electric Vehicle Initiative
EV	Electric Vehicle
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
GGRA	Greenhouse Gas Reduction Act
GHG	Greenhouse Gas
MDE	Maryland Department of Environment
MDOT	Maryland Department of Transportation
MEA	Maryland Energy Administration
NHS	National Highway System
PHEV	Plug In Hybrid Electric Vehicle
PEV	term used collectively for BEVs and PHEVs
PSC	Public Service Commission
TCI	Transportation Climate Initiative
VTG	Vehicle to Grid
VW	Volkswagen
ZEV	Zero Emission Vehicle

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



“Maryland is making demonstrable progress 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 strive 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

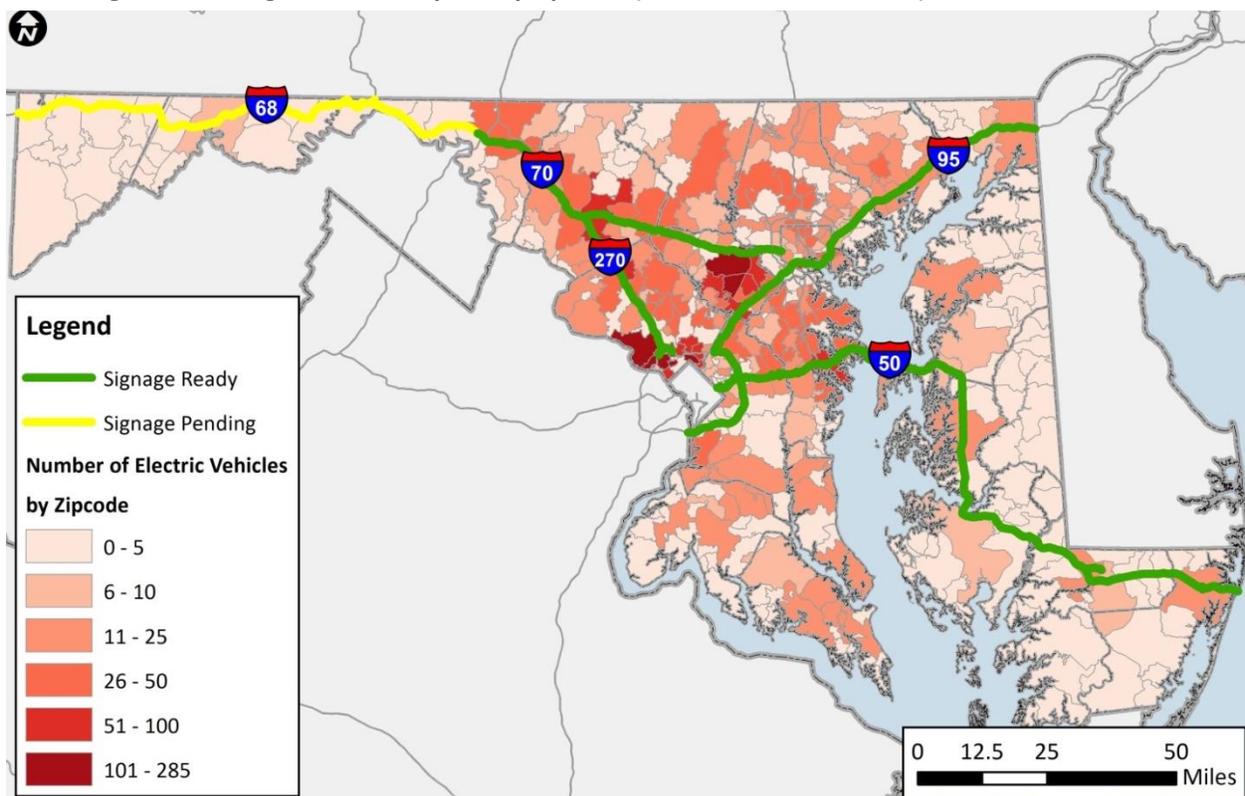
This document fulfills the requirement to submit an annual, 2016, interim report of the Maryland Electric Vehicle Infrastructure Council’s (EVIC) work and recommendations to the Governor and General Assembly under the Maryland Electric Vehicle Infrastructure Council Act.

Notable Achievements

Since 2011, the EVIC has worked to remove barriers to Plug-in Electric Vehicles (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 2016, the Council supported the successful Maryland nomination of Alternative Fuel / Electric Vehicle (EV) charging corridors under the Fixing America's Surface Transportation (FAST) Act. The Maryland Department of Transportation (MDOT) submitted four corridors for nomination: I-95, US 50, I-270 and I-70/I-68 in August 2016 (see Figure 1).

Figure 1: EVs Registered in Maryland by Zip Code (As of November 30, 2016) & FAST Corridors



The nomination was made in conjunction with Maryland Energy Administration (MEA) and the Maryland Department of Environment (MDE) and was supported by more than fifteen additional agencies and organizations. MDOT was notified by the US Department of Transportation (US DOT) in November of 2016 that all of the nominated corridors had been designated as Alternate Fuel / EV Corridors (see Figure 1).

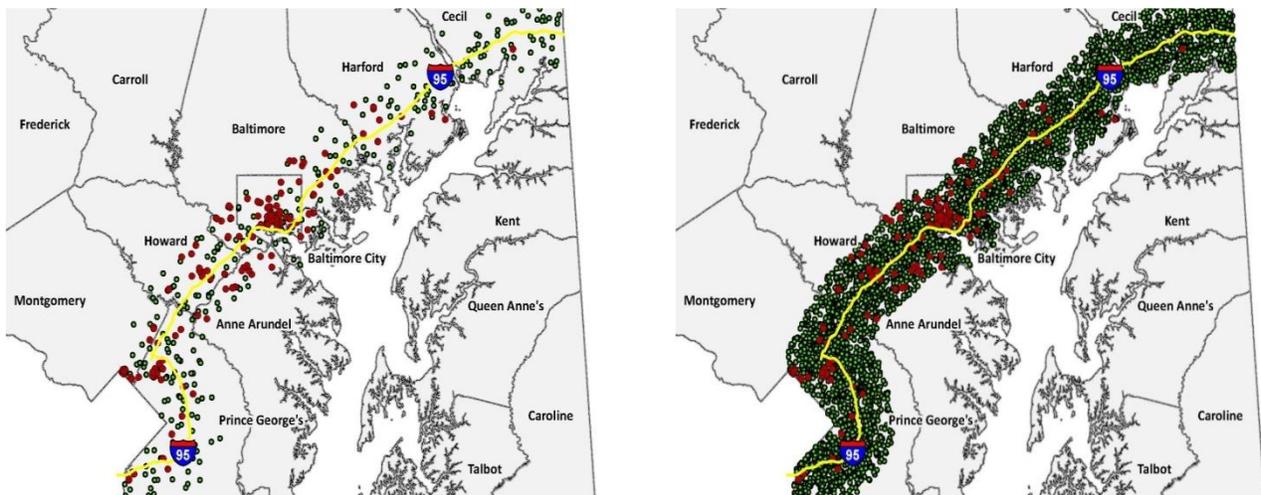
These corridors represent a critical cross section of our State and provide valuable regional and national linkages for freight and passenger travel. The EV Charging Corridor designations will assist Maryland and the Council as we continue working toward establishing a reliable and accessible Statewide EVSE network.

Opportunities and Challenges

The widespread introduction of PEVs into the light-duty fleet can have significant benefits including the reduction of oil consumption and environmental benefits such as the reduction of greenhouse gases (GHG) and other harmful air pollutants. Vehicle technology improvements, including EV technology will be critical to reducing air pollution in Maryland and helping us meet our environmental goals.

While we have made significant progress in the past several years, our goals have been ambitious from the beginning: 60,000 EVs by 2020, 300,000 by 2025, and the infrastructure to match. Our latest estimates, which were updated with the submission of our EV Corridor nomination to US DOT, now project that as many as 100,000 EVs will be registered in the State in 2020 and 1,472,084 EVs will be registered in 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 and 2040



As new, more affordable, and longer-range PEVs, such as the Chevy Bolt and the Tesla Model 3, are introduced to the marketplace, we 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; there are now 128 DC Fast-Charging outlets at 63 locations across Maryland. 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 providing a reliable public charging network, we must also continue to improve our public education and outreach efforts, and keep the lines of communication open between all of the stakeholders working toward realizing Maryland's PEV registration goals.

Background on Maryland’s Electric Vehicle Infrastructure Council

EVIC Composition and Support

The Council is comprised of 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.

The 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

The EVIC was originally established in 2011 and, in 2015, was extended through 2020 via Maryland legislation. In addition to creating the EVIC, the legislation also established requirements for the Council. Table 1 illustrates the original requirements and the status of those requirements as of December 2016.

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 <i>Action Plan</i> was delivered in 2012 and the 32 recommendations were revisited this year (<i>See Appendix B</i>).
2	Assist in developing and coordinating statewide standards for streamlined permitting and installation of residential and commercial Plug-in Electric Vehicle (PEV) charging stations and supply equipment.	Prioritized for 2016 and addressed through Legislative Workgroup and <i>EVIC recommendations</i> .
3	Develop a recommendation for a statewide charging infrastructure plan, including placement opportunities for public charging stations.	Discussed in 2016 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.	Prioritized for 2016. Addressed through the Communications and State Agency Workgroups.
5	Make recommendations regarding monetary and nonmonetary incentives to support electric vehicle ownership and maximize private sector investment in electric vehicles.	Prioritized for 2016. Addressed through the Legislative Workgroup and <i>EVIC recommendations</i> .
6	Develop targeted policies to support fleet purchases of electric vehicles.	Discussed in 2016 at the State Agency Workgroup Meetings.
7	Develop charging solutions for existing and future multi-dwelling units.	Prioritized for 2016. Addressed through the Legislative Workgroup and <i>EVIC recommendations</i> .
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 the EVIC’s 2012 Recommendations

In addition to the requirements outlined in the previous section, the EVIC was also responsible for developing an initial report in 2012 which was 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.

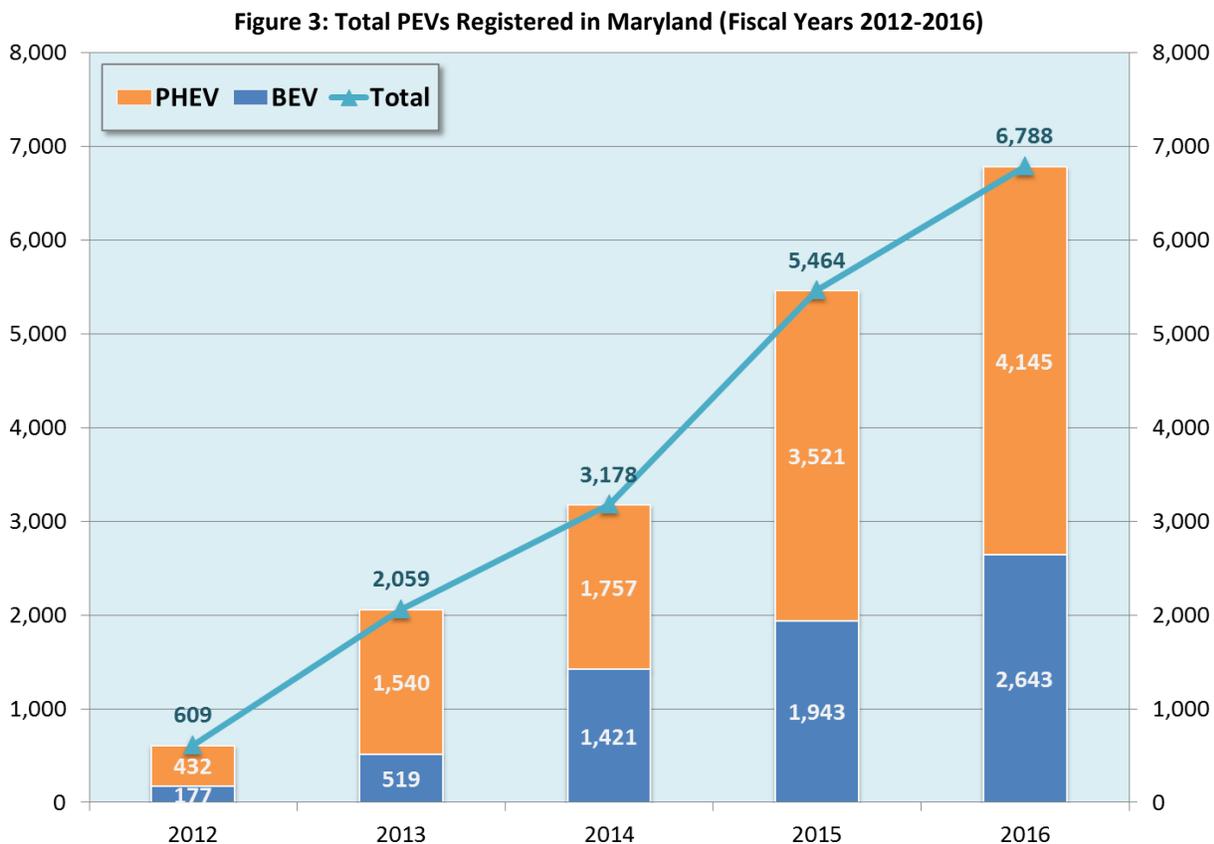
Electric Vehicle Market and Electric Vehicle Supply Equipment Status

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 30 PEV models available for purchase in Maryland. *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 6,788 in FY 2016. In FY 2016, 39% (2,643) of the vehicles registered were BEVs and 61% (4,145) were Plug-in Hybrid Electric Vehicles (PHEVs).

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 2017 and 2018 with the delivery of more affordable PEVs with over 200 miles of battery range, such as the Chevy Bolt, Nissan Leaf, and Tesla Model 3.



Notably, Maryland has already begun to benefit from the manufacturing of PEVs. General Motors (GM) has been manufacturing the drive train for the Chevrolet Spark EV at its facility in White Marsh, Maryland since 2013. The GM White Marsh facility employs 264 individuals and pays State wages of \$29,856,290.13 and income tax of \$2,038,982.32.¹

Infrastructure

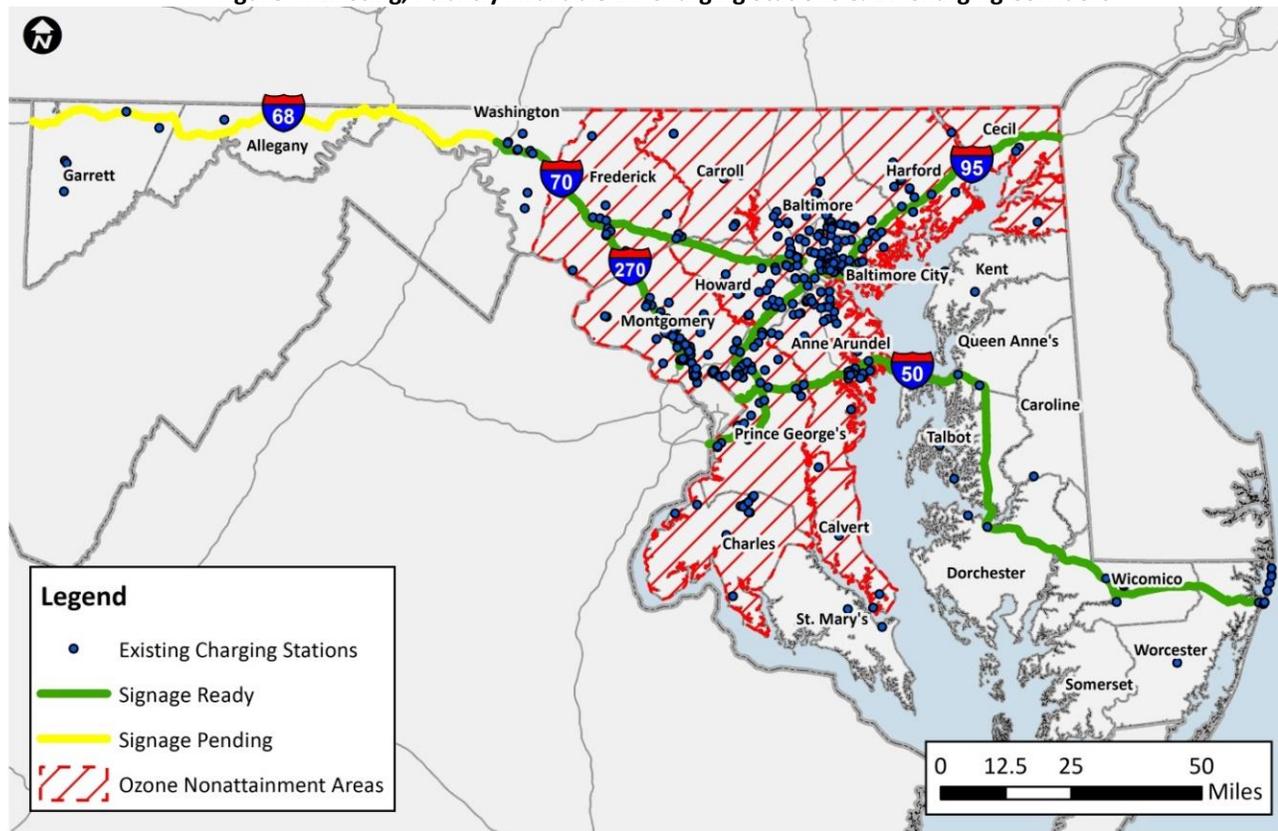
A goal of the 2012 Infrastructure Plan was to facilitate charging both at home and the workplace to ensure EV drivers would have the opportunity to recharge. The establishment of adequate charging infrastructure is necessary to alleviate "range anxiety." The concerns about short battery life and long 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 ²	% of Total
Level 1	11-20 hours for Full Charge	120 volts	97	9%
Level 2	3-8 hours for Full Charge	240 volts	824	79%
DC Fast Charge	30 minutes for 80% Charge	208-600 volts	126	12%

Figure 4 illustrates the locations of the 436 electric vehicle charging stations and 1,047 public outlets available in Maryland as of December 2016.

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



¹ http://media.gm.com/media/us/en/gm/company_info/facilities/powertrain/baltimore.html

² <http://www.afdc.energy.gov/locator/stations/>

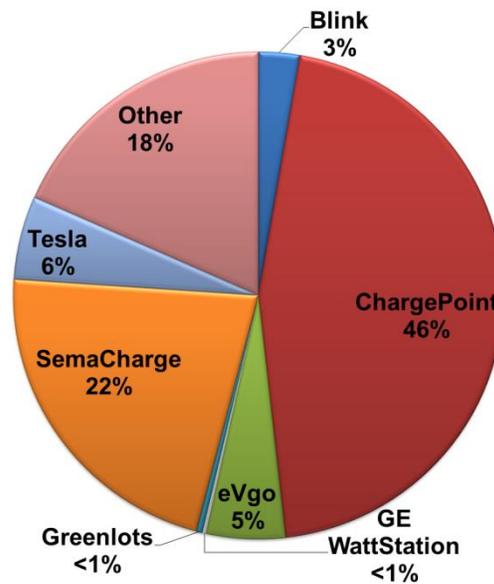
There are now nearly 200 outlets for charging vehicles installed at state owned or leased facilities. These charging stations are located at facilities owned by MDOT, MDE, DGS and the University of Maryland Systems.

The University of Maryland 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, MEA, and the Maryland State Lottery are located.

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

Figure 5: Maryland’s Charging Network



Charging Networks

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 primary networks in the State are ChargePoint and SemaCharge.

The EVIC’s 2016 Activities

EVIC Meeting Agendas

The Council held six meetings in 2016. Meeting dates and topics that were discussed are listed in Table 3. The 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 the *EVIC website* in advance of the meetings.

Table 3: 2016 EVIC Meeting Agendas

Meeting Date	Council Agenda
02/18/16	Legislative summary, vehicle ownership and charging site usage, workgroup updates including expanding the Workplace charging group to include urban charging.
04/21/16	Workgroup structure and updates; MD Clean Car Initiative, EVIC priorities for 2016; need for Communications Plan; workplace and urban charging events strategy.
06/16/16	Presentation on interoperability; workgroup updates and discussion of the recommendations matrix.
09/15/16	Presentation on electric vehicle owners survey completed by Morgan Transportation Center; discussion about potential recommendations on excise tax legislation
11/17/16	EVIC procedures and organization; workgroup updates; 2017 policy recommendations; State EV outreach summary; VW settlement update; EVIC Annual Report.
12/9/16	EVIC Annual Report walkthrough; VW settlement update

2016 EVIC Priorities

During its first meetings in 2016, the Council established the following five priorities:

1. Identify legislative needs.
 - In 2016 this has included recommending changes to and extensions of the state excise tax rebate, and the need for legislation pertaining to homeowners associations.
2. Identify and address infrastructure requirements – charging stations needed to reach 2020 and 2025 goals.
 - In 2016 four EV corridors were nominated as priorities under the national Alternate Fuel Corridors Program.
3. Flesh out communications issues – prioritize coalescing around a common marketing theme.
 - Through support of the Baltimore Electric Vehicle Initiative (BEVI) and UMBC the MarylandEV.org website has been revised.
 - Council members participated in the PSC's electric vehicle public conference.
 - Electric Vehicle Informational materials were prepared for use at public outreach events, including a booth at the MD State Fair.
4. Address technical and policy issues associated with workplace and urban charging:
 - Paid vs. Unpaid Charging Infrastructure
 - Interoperability concerns
5. Identify economic development opportunities associated with EVs and charging infrastructure.

2016 EVIC Committee Work

Each of the workgroups met several times throughout 2016 to discuss the 2012 recommendations and to work on the priorities outlined above. The recommendations of all of the workgroups are reflected in [Appendix B](#) and 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

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 2016, State partners:

- Worked with the BEVI and UMBC to update the [MarylandEV.org website](http://MarylandEV.org).
- Developed EV and EVSE fact sheets and educational materials for public distribution.
- Hosted a booth at the Maryland State Fair, which engaged 505 members of the public and documented frequently asked questions and general findings that will help focus future outreach efforts.



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 ZEV mandate. The ZEV mandate requires all automobile manufacturers to make an increasing percentage of their new vehicles zero emission vehicles. The mandate began in 2011 and steadily increases to 22% in 2025.

In October 2013, a Multi-State Memorandum of Understanding (MOU) was signed by the Governors of California, Connecticut, Maryland, Massachusetts, New York, Oregon, Rhode Island, and Vermont. The intent of the MOU is to coordinate action to ensure the successful implementation of the state ZEV requirements under the California program. A *Multi-State Action Plan* was released in May 2014 and included 11 specific recommendations to support the MOU goals, guide interstate coordination and advise on state-specific action.

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.



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 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 6 illustrates the locations of the charging stations. Many of the stations are located along Maryland’s newly designated EV corridors.

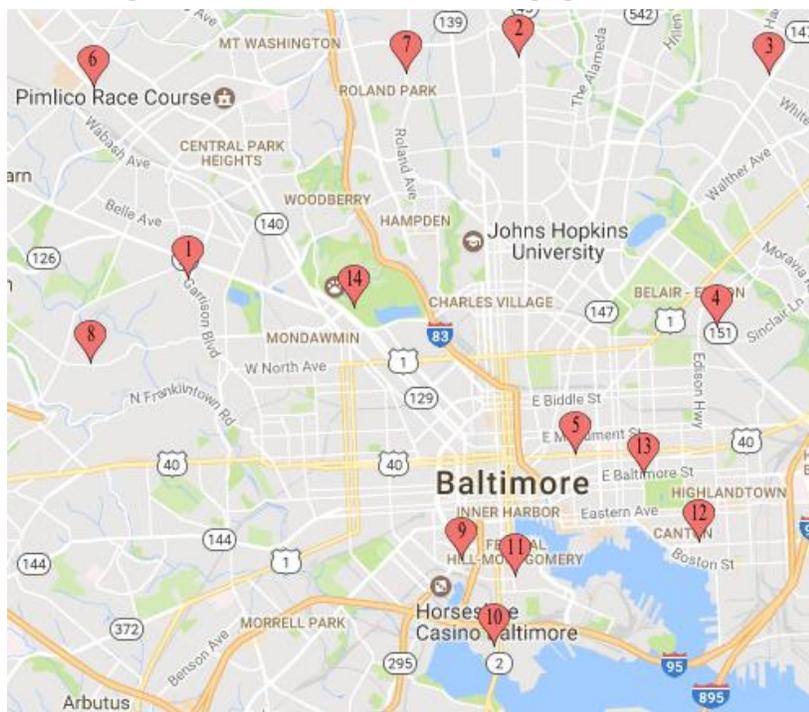
Figure 6: Maryland EVIP Station Locations and Vendors



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. MEA plans to award up to \$2 million in fiscal year (FY) 2017 with applications being accepted through February 10, 2017. Figure 7 illustrates the FY 2016 EVSE Installations (14) which were primarily located at libraries and parks. Charging stations were also installed at M&T Bank Stadium, the City Garage in Port Covington and at the Maryland Zoo.

Figure 7: Fiscal Year 2016 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 \$125 per kilowatt hour (kWh). The credit was effective from July 1, 2014 through June 30, 2017, which corresponds to Maryland fiscal years 2015-2017. Over the three-year period, the tax credit was applied to 2,165 vehicles at an average rate of \$2,478.47 per vehicle. The funding available for FY 2017, which ends on June 30, 2017, has already been exhausted.

Maryland also provides a rebate program for the installation of charging infrastructure. Rebates are available for up to 50% of the purchase and installation price of the EVSE and are capped at the following amounts:

- Residential: 50% up to \$900
- Commercial: 50% up to \$5,000
- Retail Service Station: 50% up to \$7,500

The legislation (*Appendix D*) which enables the State to fund the EV Excise Tax Credit and the EVSE Rebate program is set to expire in 2017. This issue is addressed in the *Priorities and Recommendations* section of this report, below.

Volkswagen Settlement

In the fall of 2016, Volkswagen (VW) was ruled to pay \$14.7 billion dollars in a settlement 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 and were actually emitting NOx emissions significantly in excess of EPA compliance levels under normal operating conditions.

The settlement is divided into three pots of money, the Environmental Mitigation Trust (EMT), the Zero Emission Vehicle ZEV Investment, and Consumer Vehicle Buyback and Modification. The breakdown of funding is illustrated in Figure 8.

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.

Transportation Climate Initiative (TCI)

The TCI is a regional collaboration of 11 Northeast and Mid-Atlantic States and the District of Columbia that seeks to develop the clean energy economy and reduce oil dependence and greenhouse gas emission from the transportation sector.

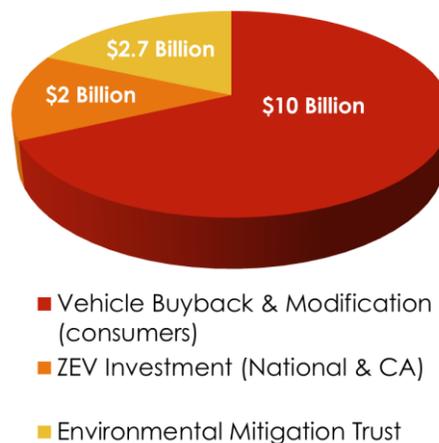
Maryland is an active participant in the Clean Vehicles and Fuels (CVF) workgroup of TCI which aims to support the mass-market deployment of clean vehicles in the TCI states, and to maximize the economic opportunities that these vehicles can bring to our region. In 2016, Maryland coordinated with the CVF workgroup to submit a joint, regional, EV corridor nomination in partnership with several other TCI States.

PSC Public Conferences

The Maryland Public Service Commission (PSC) held two Public Conferences related to EVs and EVSE in 2016. The first, Public Conference 43 (PC43), was initiated to explore the regulatory, technical and financial barriers to the deployment of electric vehicles in Maryland. The PSC solicited panel abstracts related to utility investment in EVSE, the grid-related costs associated with vehicle fleet electrification, and access to EVSE and charging incentives in limited-income and other under-served communities. PC43 was held on July 14, 2016.

Public Conference 44 (PC44) was initiated for the purpose of commencing a target review to ensure that electric distribution systems in Maryland are customer-centered, affordable, reliable, and environmentally sustainable. PC44 was held on December 8-9, 2016.

Figure 8: Volkswagen Settlement Funding



Maryland Utilities – EV Charging Pilots

Baltimore Gas & Electric and PHI Pepco-Maryland completed pilots of EV charging rates and strategies to support adoption of EV's in Maryland while encouraging EV users to charge their vehicles in times of lower demand on the electric grid. The utilities evaluated strategies like Time of Use (TOU) rates for residential customers with EV's, EV only TOU rates (separate from the rest of the house use), and controlled charging equipment for the home. Generally, the pilots were successful in demonstrating a positive EV charging behavior change and a shift of charging to off-peak demand periods. The utilities provided detailed reports to the Maryland Public Service Commission on their pilot findings and since have received PSC approval to continue to offer the EV rates as an ongoing tariff schedule.

Greenhouse Gas Reduction Act

The Greenhouse Gas Reduction Act of 2009 was enacted in light of Maryland's particular 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.

Baltimore Bike Share

Baltimore City launched the largest electric pedal assist (pedelec) bike share in the Western Hemisphere this fall. A total of 200 of the 500 bicycles available under the bike share system are electric. The City of Baltimore partnered with Bewegen Technologies, Inc., which designed, installed, operates and maintains the system. To date, the bike share has racked up a total distance of 11,414 miles over 8,503 total trips. There are 1,149 active members and 1,790 occasional members.³

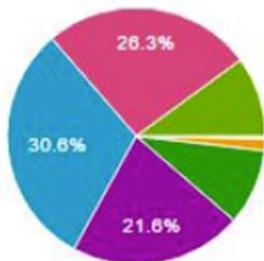
³ <https://www.bmorebikeshare.com/?goto=about-us>

Morgan State University National Transportation Center EV Survey

The Morgan State University National Transportation Center in cooperation with the Maryland Motor Vehicle Administration conducted an online survey of registered EV owners (no fleet owners) during summer 2016. This survey was supported by the USDOT University Transportation Centers Program. Of the total 4,282 EV owners contacted 1,323 responded. Figure 9 through Figure 11 illustrate some of the survey results. The respondents were predominately male (75%). Large percentages of the respondents possess a Bachelor's or more advanced degree (87%) and have a household income greater than \$100,000 (69%).

Figure 9: Morgan State University Survey Results

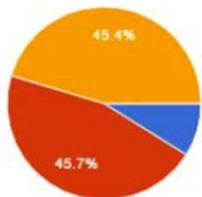
What is your age?



Under 20	2	0.2%
20 to 24 years old	3	0.2%
25 to 29 years old	19	1.4%
30 to 39 years old	125	9.5%
40 to 49 years old	284	21.6%
50 to 59 years old	402	30.6%
60 to 69 years old	345	26.3%
70 and older	132	10.1%

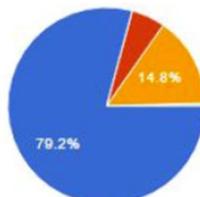
Figure 10: Morgan State University Survey Results

How many vehicles does your household have?



One	117	8.9%
Two	600	45.7%
Three or more	595	45.4%

Where does the primary driver charge the EV mostly?



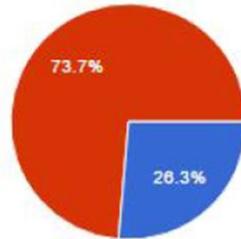
Home	700	79.2%
Work	49	5.5%
Both	131	14.8%
Don't know (Not sure)	4	0.5%

Most of the EVs are charged at home (79%). Other data show that 70% of EVs are used for the commute to work, but that EV owners (96%) do not use rail transit as part of their commute to work. For those able to use rail transit during the commute to work a large majority (about 74%) would still not use transit, if a charging facility were available.

As illustrated in Figure 11, survey respondents indicated that their top reasons for purchasing an EV include environmental concerns, such as air quality, a desire to reduce dependence on petroleum and the price of electricity versus the price of gasoline.

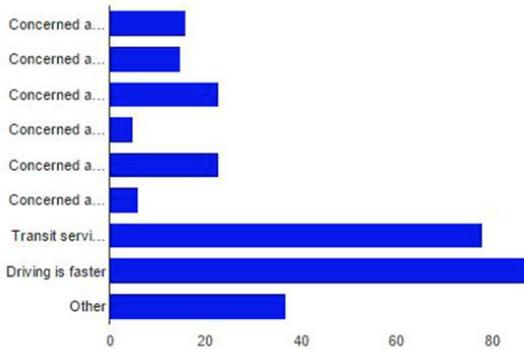
Figure 11: Morgan State University Survey Results (continued)

Would access to a charging facility influence the driver to use rail transit?



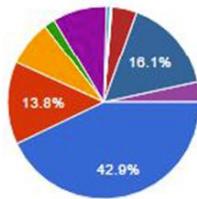
Yes	49	26.3%
No	137	73.7%

What are the reasons for not using a charging facility and taking rail transit for the rest of the commute?



Concerned about vandalism of vehicle	16	11.9%
Concerned about other crime in the parking lot	15	11.1%
Concerned about not finding an available charging facility	23	17%
Concerned about taking too long to hook up to charging facility	5	3.7%
Concerned about cost for charging vehicle	23	17%
Concerned about EV being hooked up to charging for too long	6	4.4%
Transit service is inconvenient	78	57.8%
Driving is faster	88	65.2%
Other	37	27.4%

What were the top three reasons for your household purchasing or leasing an electric vehicle (EV)?



Environmental concerns, e.g., air quality, pollution	561	42.9%
Price of electricity vs. gasoline	181	13.8%
Tax breaks and net price of vehicle	101	7.7%
Single occupant access to HOV lane	24	1.8%
Advanced technology	119	9.1%
Safety features of vehicle	8	0.6%
Status of EV ownership	3	0.2%
Available charging facilities	1	0.1%
Vehicle performance	55	4.2%
Reduce dependence on petroleum	210	16.1%
Make or model of vehicle	44	3.4%

Reason	Choice		
	1st	2nd	3rd
Env. Concerns, e.g. Air Quality	561	252	143
Reduce Dependence on Petroleum	210	294	192
Price of Electricity v. Gasoline	181	211	164
Advanced Technology	119	138	161
Tax Breaks & Net Price of Vehicle	101	190	193
Vehicle Performance	55	88	148
Make or Model of Vehicle	44	47	101
Single Occupant Access to HOV Lane	24	31	60
Safety Features of Vehicle	8	26	42
Status of EV Ownership	3	10	45
Availability of Charging Facilities	1	11	24



Recommendations

Policy Recommendations

Extending Electric Vehicle & Charging Equipment Rebates & Tax Credits

- The proposed policy initiative would reauthorize electric vehicle and charging equipment tax credits and rebates beyond 2017 in a manner that equitably addresses prior and future year applications.
- Rebates and tax credits should be structured to sustainably incentivize increased adoption and access while also stretching investments to support broader deployment of electric vehicles and charging infrastructure.
- Longer-term incentives send more stable signals to the market than shorter-term incentives.

Charging Infrastructure in HOAs and Condos

- The proposed policy initiative would seek to reduce barriers for owners of residences in multi-unit dwellings to installing residential electric vehicle charging stations.
- HOAs and condo associations would be prohibited from unreasonably restricting the installation of electric vehicle charging equipment by owners in such developments.
- The HOA or condo association may pass any or all costs associated with the purchase, installation, operation, and removal of EV charging equipment to the owner.

Ensuring Access to Electric Vehicle Charging Infrastructure

- The proposed policy initiative would seek to ensure that electric vehicle charging stations remain available for the purpose of connecting to electric vehicles.
- Drivers of internal combustion engine (“ICE”) (i.e. non-plug-in) vehicles would be prohibited from stopping, standing, or parking in electric vehicle charging station spaces.

Future-Proofing New Construction and Lowering Barrier to Deploying EV Charging Stations

- The proposed policy initiative would seek to reduce costs associated with installing EV charging stations by preparing a certain percentage of parking spaces in new construction to be “EV Ready”, which means providing sufficient electrical and physical capacity at the service panel to allow for future installation of EV charging stations.
- Making a parking space “EV Ready” at the time of construction, instead of retrofitting parking spaces after construction, would (i) have a minimal impact on construction costs by aligning EV Ready work with other construction taking place on site and (ii) significantly reduce the costs of installing EV charging equipment at a later date.
- This initiative could come in the form of legislation or model language for local adoption.

Additional Recommendations

Volkswagen Settlement Efforts

There are two significant funding mechanisms available under the VW Consent Decree, the Environmental Mitigation Trust and the Zero Emission Vehicle Investment Fund. The Council recommends the following:

- 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, the 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.

Future Development and Research Recommendations

The following recommendations are related to areas that require further research and analysis:

- Finding the right balance between home/workplace/public charging infrastructure.
- Determining the incentives necessary for disadvantaged 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 PEVs and shifting VMT demands on the Maryland Transportation Trust Fund.
- Developing a better understanding of the environmental and economic opportunities that can be realized through the growth of PEV ownership and EVSE installation in Maryland

Communications

- Continue to strive toward open lines of communication between all EVIC partners.
- Review and implement the Draft Communication and Media Plan (*Appendix E*).

Appendix A – 2016 EVIC Membership

Affiliation	Name
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
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 Wall Clinton Electric
Senator (1)	Brian Feldman, Senator District 15, Montgomery County
Delegates (2)	Richard K. Impallaria Republican, District 7, Baltimore & Harford Counties Clarence K. Lam, M.D. Democrat, District 12 Baltimore & Howard Counties
Secretary of Transportation	R. Early Lewis, Jr. Deputy Secretary (Council Chair)

Affiliation	Name
Maryland Department of Planning	Bihui Xu Manager, Transportation Planning
Secretary of the Environment	Benjamin Grumbles
Secretary of Commerce	Chris Clark Program Manager, Energy & Sustainability, Commerce
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 the EVIC be continued beyond its current sunset date of 6/2013.
	<i>Phase</i> I
	<i>Legislation Required</i> Y SB714 extended EVIC until June 2020
	<i>Refer to Workgroup</i> Not at this time.
2	<i>Future Action Required</i> SB714 requires interim reports on December 1st of each year and a final report of EVIC's work and recommendations by June 30, 2020.
	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.
	<i>Phase</i> I
	<i>Legislation Required</i> N
3	<i>Refer to Workgroup</i> Workplace / Urban Charging Workgroup
	<i>Future Action</i> Existing Workplace Charging Committee will now include efforts related to urban charging.
	<i>Phase</i> I
	<i>Legislation Required</i> N
4	<i>Refer to Workgroup</i> State Agency Workgroup
	<i>Future Action</i> State Agency Workgroup meeting regularly to implement recommendation.
	<i>Phase</i> I
	<i>Legislation Required</i> N
4	<i>Refer to Workgroup</i> State Agency Workgroup
	<i>Future Action</i> To be determined through workgroup.
	<i>Phase</i> I
	<i>Legislation Required</i> N

Policy Changes

5	<p>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.</p> <p><i>Phase</i> I</p> <p><i>Legislation Required</i> TBD</p> <p><i>Refer to Workgroup</i> State Agency Workgroup</p> <p><i>Future Action Required</i> To be determined through workgroup. Informal discussions on this have taken place w/ DGS.</p>
6	<p>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 percent of fleet purchases of light-duty vehicles be zero-emission by 2020 and at least 25 percent 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:</p> <ul style="list-style-type: none"> • Potential for leasing PEVs • Bulk purchase agreements, with local government • Bulk purchase or lease agreements with the NE corridor states. <p><i>Phase</i> I</p> <p><i>Legislation Required</i> TBD</p> <p><i>Refer to Workgroup</i> State Agency Workgroup</p> <p><i>Future Action Required</i> To be determined through workgroup. Informal discussions on this have taken place w/ DGS and MDE drafted an executive order.</p>
7	<p>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.</p> <p><i>Phase</i> I</p> <p><i>Legislation Required</i> N</p> <p><i>Refer to Workgroup</i> State Agency Workgroup</p> <p><i>Future Action Required</i> Workshops have been held at Baltimore and Washington, DC MPOs. Future actions to be determined through workgroup.</p>

Policy Changes (Continued)

8	<p>The PEV Excise Tax Credit expires July 1, 2013. EVIC recommends:</p> <p>a. The legislature extend the statute expiration date to July 1, 2016</p> <p>b. Remove the 10 vehicle limit placed on businesses</p> <p>c. Consider turning the credit into a point of purchase rebate to reduce the consumer's cash outlay</p> <p>d. Consider expanding beyond the 8,500 pound weight limit</p>
	<p><i>Phase</i> I - II Recommendation a. is Phase I. Recommendations b.-d. are Phase II.</p> <p><i>Legislation Required</i> Y Excise tax credit was extended to 2017</p> <p><i>Refer to Workgroup</i> Legislative Workgroup</p> <p><i>Future Action Required</i> To be determined through workgroup.</p>
9	<p>Regarding the PEV Charging Station Income Tax Credit, EVIC recommends:</p> <p>a. Extend the program for an additional 3 years</p> <p>b. Remove the 30 tax credit limit imposed in the statute (per year cap on stations)</p>
	<p><i>Phase</i> I - II Recommendation a. is Phase I. Recommendations b. is Phase II.</p> <p>PEV charging station tax credit was changed to a rebate and extended to</p> <p><i>Legislation Required</i> Y 2017.</p> <p>Legislation required to remove the cap under item b.</p> <p><i>Refer to Workgroup</i> Legislative Workgroup</p> <p><i>Future Action Required</i> To be determined through workgroup.</p>
10	<p>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 percent 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.</p>
	<p><i>Phase</i> I</p> <p><i>Legislation Required</i> Y Was extended through the end of 2016.</p> <p><i>Refer to Workgroup</i> Legislative Workgroup</p> <p><i>Future Action Required</i> To be determined through workgroup.</p>
11	<p>Extend the HOV lane Use Permits to 2020, continuing the caveat to consult with SHA on potential congestion management</p>
	<p><i>Phase</i> I</p> <p><i>Legislation Required</i> Y Was extended to 2017.</p> <p><i>Refer to Workgroup</i> Legislative Workgroup</p> <p><i>Future Action Required</i> To be determined through workgroup.</p>
12	<p>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</p>
	<p><i>Phase</i> II</p> <p><i>Legislation Required</i> Y Was addressed.</p> <p><i>Refer to Workgroup</i> Legislative Workgroup</p> <p><i>Future Action Required</i> To be determined through workgroup.</p>

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.
	<i>Phase</i> I
	<i>Legislation Required</i> N
	<i>Refer to Workgroup</i> State Agency Workgroup <i>Future Action Required</i> 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.
	<i>Phase</i> I
	<i>Legislation Required</i> N
	<i>Refer to Workgroup</i> State Agency Workgroup <i>Future Action Required</i> 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.
	<i>Phase</i> II
	<i>Legislation Required</i> N
	<i>Refer to Workgroup</i> State Agency Workgroup to follow-up with Education & Outreach Workgroup <i>Future Action Required</i> 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 the EVIC. <u>EV Infrastructure Planning Guide for Local Governments</u> : to include model documents for permitting, siting and design, building codes, and zoning, including historic district overlays, and parking ordinances. <u>Guidance Document for Local Governments</u> on the issues and complexities of providing urban charging and potential solutions. <u>Document on Charging in the Urban & Multi-unit Setting</u> : 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.
	<i>Phase</i> I
	<i>Legislation Required</i> N
	<i>Refer to Workgroup</i> State Agency Workgroup <i>Future Action Required</i> To be determined through workgroup. TCI and other applicable guidance documents have been posted to the EVIC resources website.
17	Outreach Materials should be developed, i.e. brochures, presentations, e-newsletter, and webinars on sub-topics.
	<i>Phase</i> II
	<i>Legislation Required</i> N
	<i>Refer to Workgroup</i> Education & Outreach Workgroup <i>Future Action Required</i> 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.
	<i>Phase</i> I
	<i>Legislation Required</i> N
	<i>Refer to Workgroup</i> State Agency Workgroup <i>Future Action Required</i> 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.
	<i>Phase</i> I
	<i>Legislation Required</i> N
	<i>Refer to Workgroup</i> State Agency Workgroup <i>Future Action Required</i> 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.
	<i>Phase</i> I
	<i>Legislation Required</i> N
	<i>Refer to Workgroup</i> State Agency Workgroup <i>Future Action Required</i> 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.
	<i>Phase</i> I
	<i>Legislation Required</i> N
	<i>Refer to Workgroup</i> Workplace / Urban Charging Workgroup <i>Future Action Required</i> 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.
	<i>Phase</i> II
	<i>Legislation Required</i> N
	<i>Refer to Workgroup</i> Workplace / Urban Charging Workgroup <i>Future Action Required</i> 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.	
	<i>Phase</i>	NA
	<i>Legislation Required</i>	Y
	<i>Refer to Workgroup</i>	Legislative and Education & Outreach Workgroups
	<i>Future Action Required</i>	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.	
	<i>Phase</i>	NA
	<i>Legislation Required</i>	Y
	<i>Refer to Workgroup</i>	Legislative and State Agency Workgroups
	<i>Future Action Required</i>	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.	
	<i>Phase</i>	NA
	<i>Legislation Required</i>	N
	<i>Refer to Workgroup</i>	Legislative and Workplace / Urban Charging Workgroups
	<i>Future Action Required</i>	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.	
	<i>Phase</i>	NA
	<i>Legislation Required</i>	N
	<i>Refer to Workgroup</i>	State Agency Workgroup
	<i>Future Action Required</i>	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.	
	<i>Phase</i>	NA
	<i>Legislation Required</i>	N
	<i>Refer to Workgroup</i>	None
	<i>Future Action Required</i>	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.	
	<i>Phase</i>	NA
	<i>Legislation Required</i>	N
	<i>Refer to Workgroup</i>	None
	<i>Future Action Required</i>	Suggested this measure be tabled for the time being due to technology.

Charging Solutions (Continued)

29	<p>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:</p> <ul style="list-style-type: none"> • 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. 								
	<table border="0"> <tr> <td><i>Phase</i></td> <td align="right">NA</td> </tr> <tr> <td><i>Legislation Required</i></td> <td align="right">N</td> </tr> <tr> <td><i>Refer to Workgroup</i></td> <td align="right">None</td> </tr> <tr> <td><i>Future Action Required</i></td> <td align="right">Suggested this measure be tabled for the time being.</td> </tr> </table>	<i>Phase</i>	NA	<i>Legislation Required</i>	N	<i>Refer to Workgroup</i>	None	<i>Future Action Required</i>	Suggested this measure be tabled for the time being.
<i>Phase</i>	NA								
<i>Legislation Required</i>	N								
<i>Refer to Workgroup</i>	None								
<i>Future Action Required</i>	Suggested this measure be tabled for the time being.								
30	<p>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.</p> <p>Workshop topics should include:</p> <ul style="list-style-type: none"> • Vehicle –to-Grid (V2G) • Vehicle to Home • Potential for use of down-cycled batteries for power storage. 								
	<table border="0"> <tr> <td><i>Phase</i></td> <td align="right">NA</td> </tr> <tr> <td><i>Legislation Required</i></td> <td align="right">N</td> </tr> <tr> <td><i>Refer to Workgroup</i></td> <td align="right">None</td> </tr> <tr> <td><i>Future Action Required</i></td> <td align="right">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.</td> </tr> </table>	<i>Phase</i>	NA	<i>Legislation Required</i>	N	<i>Refer to Workgroup</i>	None	<i>Future Action Required</i>	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.
<i>Phase</i>	NA								
<i>Legislation Required</i>	N								
<i>Refer to Workgroup</i>	None								
<i>Future Action Required</i>	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	<p>Investment: Foster emerging PEV technologies and their potential for a role in electrical grid management through existing financing vehicles, such as InvestMaryland.</p>								
	<table border="0"> <tr> <td><i>Phase</i></td> <td align="right">NA</td> </tr> <tr> <td><i>Legislation Required</i></td> <td align="right">N</td> </tr> <tr> <td><i>Refer to Workgroup</i></td> <td align="right">TBD</td> </tr> <tr> <td><i>Future Action Required</i></td> <td align="right">The State Agency Workgroup determined this was not within the State's role.</td> </tr> </table>	<i>Phase</i>	NA	<i>Legislation Required</i>	N	<i>Refer to Workgroup</i>	TBD	<i>Future Action Required</i>	The State Agency Workgroup determined this was not within the State's role.
<i>Phase</i>	NA								
<i>Legislation Required</i>	N								
<i>Refer to Workgroup</i>	TBD								
<i>Future Action Required</i>	The State Agency Workgroup determined this was not within the State's role.								
32	<p>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.</p>								
	<table border="0"> <tr> <td><i>Phase</i></td> <td align="right">NA</td> </tr> <tr> <td><i>Legislation Required</i></td> <td align="right">N</td> </tr> <tr> <td><i>Refer to Workgroup</i></td> <td align="right">State Agency Workgroup</td> </tr> <tr> <td><i>Future Action Required</i></td> <td align="right">Many incentives currently exist.</td> </tr> </table>	<i>Phase</i>	NA	<i>Legislation Required</i>	N	<i>Refer to Workgroup</i>	State Agency Workgroup	<i>Future Action Required</i>	Many incentives currently exist.
<i>Phase</i>	NA								
<i>Legislation Required</i>	N								
<i>Refer to Workgroup</i>	State Agency Workgroup								
<i>Future Action Required</i>	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.
<i>Phase</i>	NA
<i>Legislation Required</i>	N
<i>Refer to Workgroup</i>	NA
<i>Future Action Required</i>	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.
<i>Phase</i>	NA
<i>Legislation Required</i>	N
<i>Refer to Workgroup</i>	State Agency Workgroup
<i>Future Action Required</i>	To be determined by workgroup.

Appendix C –PEVs Available for Purchase in Maryland

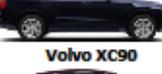


**The Electric Vehicle Association
of Greater Washington DC**
evadc.org



**2016
Electric Vehicle
Information Sheet**



		Base Price (USD) ¹	Net Price (USD) ²	Range (mi) ³	Batt. (kWh)	Speed (mph)	MPG equiv ³	Fuel / Mo. ⁴	QC ⁵
	Zero S								
	Empulse								
	Smart								
	Fiat 500e								
	LEAF								
	Bolt								
	Volt								
	Soul EV								
	Fusion Energi								
	Audi A3 e-tron								
	VTRUX								
	BMW X5								
	Volvo S90								
	Volvo XC90								
	Panamera S E-Hybrid								
	Cayenne S E-Hybrid								
	Porsche 918 Spyder								
	Tesla Model S								
	Tesla Model X								
	BMW i8								
Electric	Zero S ZF9.8	\$10,995	\$9,895	91*	9.8*	95	475*	---	Y
	Victory Empulse TT	\$19,999	\$17,999	94*	10.4	105*	---	\$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	
	Chevy Spark EV	\$25,120	\$17,620	82	21.3	90	119	\$50	Y
	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	
	Fiat 500e	\$31,800	\$24,300	84	24	85	112	\$50	
	Kia Soul EV	\$31,950	\$24,450	93	27	90	105	\$50	Y
	Nissan LEAF SV	\$34,200	\$26,700	107	30*	95	112	\$50	Y
	Chevy Bolt (2017)	\$37,500	\$30,000	200*	60*	91	---	---	
	Mercedes B250e	\$41,450	\$33,950	87	28	101	84	\$67	
	BMW i3 (+ gas opt.)	\$42,400	\$34,900	81	22	93	124	\$46	Y
	Tesla Model S 85	\$80,000	\$72,500	265	85*	140	89	\$62	Y
	Tesla Model X 90D	---	---	257	90*	155	92	\$58	Y
Electric & Gas	Chevy Volt	\$33,170	\$25,670	53+gas	18.4	100	106	\$54	
	Ford C-Max Energi	\$31,770	\$27,763	20+gas	7.6	102	88	\$62	
	Ford Fusion Energi	\$33,900	\$29,893	20+gas	7.6	104	88	\$62	
	Hyundai Sonata	\$34,600	\$29,681	27+gas	9.8	125	99	\$58	
	Audi A3 e-tron	\$37,900	\$33,732	17+gas	8.8	130	86	\$71	
	Chrysler Pacifica hyb	---	---	30+gas	16*	---	80*	---	
	BMW X5 xdrive40e	\$62,100	\$57,432	14+gas	9.2	130	56	\$117	
	Cadillac ELR	\$65,000	\$57,500	40+gas	17.1	106	85	\$75	
	Volvo S90 T8 (2017)	---	---	---	9.2	---	---	---	
	Volvo XC90 T8	\$68,100	\$63,515	13+gas	9.2	140	53	\$112	
	VIA VTRUX (Next)	\$79,000	\$71,500	40+gas	23	85	---	\$76*	
	Porsche Cayenne	\$77,200	\$71,865	14+gas	10.8	151	47	\$142	
	Mercedes C350e	---	---	18+gas	6.4	155	---	---	
	Mercedes S550e	\$95,650	\$91,607	12+gas	8.7	130	58	\$108	
	Porsche Panamera	\$93,200	\$88,448	15+gas	9.4	167	51	\$112	
	BMW i8	\$140,700	\$136,907	14+gas	7.1	155	76	\$96	
	Porsche 918 Spyder	\$845,000	\$841,333	12+gas	6.8	210	67	\$121	Y

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

Appendix D – Related Legislation (enacted 2011-2016)

Legislation Passed

- **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 Public Service Commission (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 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

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 kilowatt hour (kWh) of capacity up to a cap of \$3,000. It also converted the Income Tax Credit for Electric Vehicle Service Equipment (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 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 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.

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 2016 objectives

- **Increase recognition of EVs for stakeholders**
 - **Car dealers** (how to communicate EV benefits to car buyers)
 - **Local governments** (how to do 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 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. (Pumped v. Charged Addendum 1 as example)
 - 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

Addendum 1

Pumped v. Charged 2015-16 EV Outreach Campaign

Who? Define target audience - **millennials**, young, urban residents. Baltimore City:

- Fells Point/Harbor East
- Canton
- Federal Hill
- Homewood
- Station North
- Hampden/Clipper Mill

What? Our goal is to put EVs on the vehicle use/purchase/lease list of the target audience

Why? Economic benefit of EVs; show EVs cost less (lower total cost of ownership/use – TCO), are just as safe, convenient, fun and easy to use as a normal car. Avoid environmental benefit pitch at this point. Just focus on smart money emphasis:



Image courtesy Union of Concerned Scientist - http://www.ucsusa.org/clean_vehicles/smart-transportation-solutions/advanced-vehicle-technologies/electric-cars/electric-vehicle-infographic.html#.VdoToSxVhHw

- Annual fuel savings of \$1200 (average EV electricity cost is \$400/yr compared to \$1600/yr gas cost (assume ICE fuel efficiency of 22 mpg and gallon of gas cost of \$3)
- Low to no maintenance cost
- Possible insurance benefit (10% for EV, Hartford Insurance)
- Low monthly payments (\$159/mo for SmartEV or Ford C-Max), less than a family cell phone plan!

How to reach target audience?

1. Print materials
 - a. Infographic
 - b. Sticker/window cling-on
 - c. Glove box 3x5 cards
 - d. Posters
 - e. EV everywhere brochures
2. Distributed at planned events:
 - September 2015 - National Drive Electric Week
 - October 2015 - Social Media 30 day contest paired with radio coverage (NPR, WTMD): What would you do with an extra \$1200 (savings from driving an EV)? ***
 - Winter 2016 - City sculpture design competition for Plugs on Parade National Drive Electric Week 2016
 - Spring 2016 - Earth Day celebration EV awareness
 - Summer 2016 - EV shuttle service planning

*** EVs = purchase power

What would you do with an extra \$1200/yr?

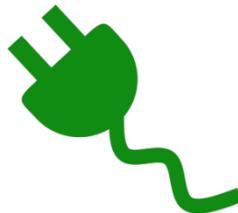
- Buy a new computer
- Visit Paris
- Pay off bills - cell phone, health club, student loans



Pumped - \$1500/yr

- \$1200/yr for gas
- \$300/yr for basic maintenance

v.



Charged - \$300/yr

- \$300/yr for electricity
- \$0 maintenance
- + HOV lane access
- + purchase tax credits
- lower monthly lease or car pymt
- + insurance discount for EV (Hartford Ins - 10%)
- + No tailpipe emissions