Maryland Department of Transportation
The Secretary's Office

Larry Hogan
Governor

Boyd K. Rutherford
Lt. Governor

Pete K. Rahn
Secretary

December 7, 2015

The Honorable Larry Hogan
Governor
State House
Annapolis MD 21401

Dear Governor Hogan:

Pursuant to Senate Bill 714, Chapter 378, Acts of 2015, attached is the first interim report of the Electric Vehicle Infrastructure Council. The language states:

> *"On or before December 1, 2015, December 1, 2016, December 1, 2017 and December 1, 2018, the council shall submit interim reports on its work and recommendations to the Governor and, subject to §2-1246 of the State Government Article, the General Assembly."*

If you have any questions, please contact Ms. Meg Andrews, MDOT Office of Planning and Capital Programming, Environmental Programs Manager, at 410-865-1287. Of course, you may always contact me directly.

Sincerely,

Pete K. Rahn
Secretary

cc: The Honorable Thomas V. "Mike" Miller, Jr., President, Senate of Maryland
The Honorable Michael E. Busch, Speaker, Maryland House of Delegates
Ms. Meg Andrews, Manager, Environmental Programs, MDOT

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President
Senate of Maryland
State House, H-107
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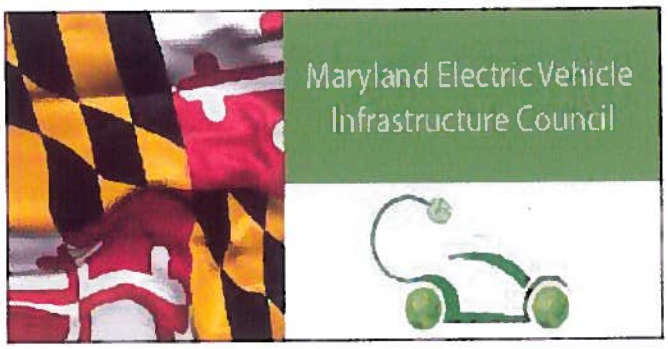

INTERIM REPORT

Presented to

Governor Larry Hogan

and the

Maryland General Assembly

by the

Electric Vehicle Infrastructure Council

(SB 714, Chapter 378, Acts of 2015)

December, 2015

Staffed by the Maryland Department of Transportation

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Table of Contents

I Background of the Council

In 2011, the Maryland General Assembly adopted Senate Bill 176, Chapter 400 Acts of 2011, which established an Electric Vehicle Infrastructure Council (Council). Specifically, this law required the Council to:

1. Develop an action plan to facilitate the successful integration of electric vehicles into the State's transportation network.
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.
3. Develop a recommendation for a Statewide charging infrastructure plan, including placement opportunities for public charging stations.
4. Increase consumer awareness and demand for electric vehicles through public outreach.
5. Make recommendations regarding monetary and nonmonetary incentives to support electric vehicle ownership and maximize private sector investment in electric vehicles.
6. Develop targeted policies to support fleet purchases of electric vehicles.
7. Develop charging solutions for existing and future multi-dwelling units.
8. Encourage local and regional efforts to promote the use of electric vehicles and attract federal funding for State and local PEV programs.
9. Recommend policies that support PEV charging from clean energy sources.
10. Recommend a method of displaying pricing information at public charging stations.
11. Establish performance measures for meeting PEV–related employment, infrastructure, and regulatory goals.
12. Pursue other goals and objectives that promote the utilization of electric vehicles in the State.

The law took effect July 1, 2011 with a sunset date of June 30, 2013. The work of the Council during that period culminated in a Final Report to the General Assembly on December 1, 2012. That report included the required recommendation for a Statewide Charging Infrastructure Plan, along with an Action Plan of thirty-two recommendations intended to provide sufficient support to reach an ambitious goal of 60,000 PEVs on Maryland's roads by 2020. Since that time the tenure of the Council has been extended by the General Assembly several times to oversee the implementation of the recommendations. In the 2015 session, the General Assembly passed Senate bill 714 (Chapter 378) that extended the term of the Council to June 30, 2020.

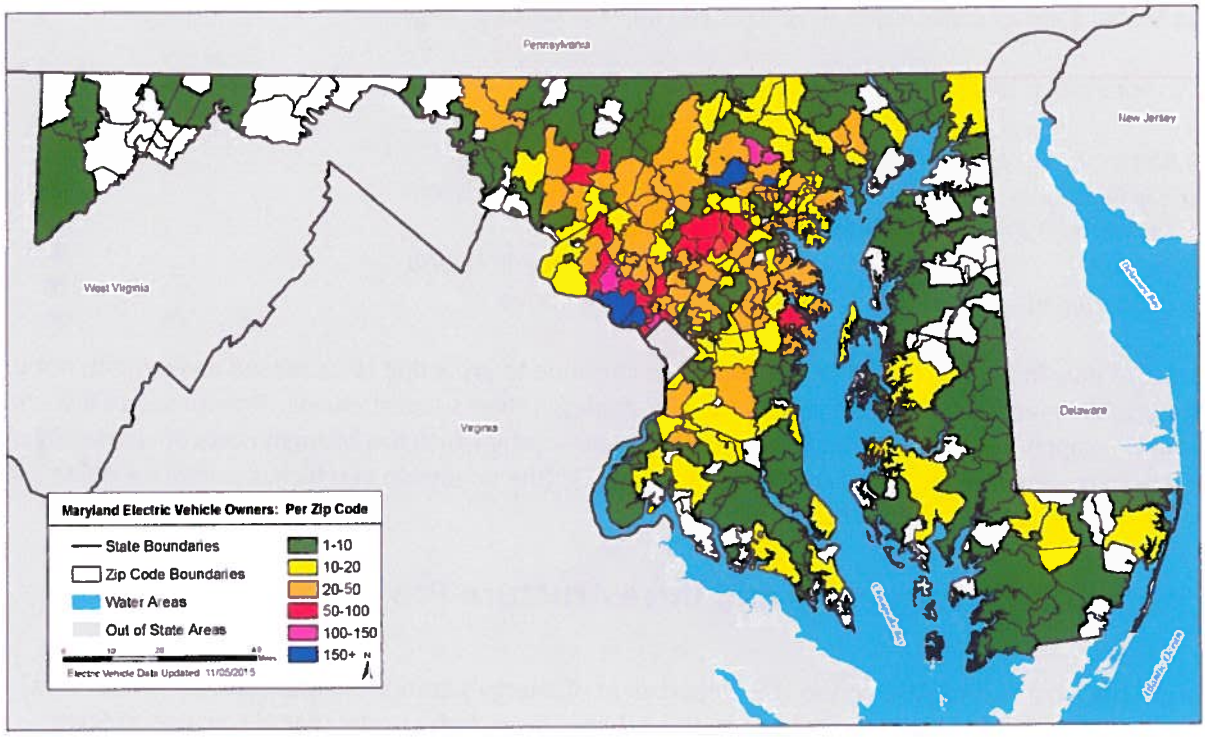
Many of the Council's recommendations were later reflected in the Multi-State Memorandum of Understanding (MOU) signed by the Governors of California, Connecticut, Maryland, Massachusetts, New York, Oregon, Rhode Island, and Vermont in October 2013 committing to coordinated action to ensure the successful implementation of their state zero-emission vehicle (ZEV) programs.

The Council works as a diverse representation of interests, perspectives, and responsibilities, including utilities, State agencies, private enterprise, and non-profit EV advocates. All Council meetings are open to the public. A list of current Council Members is included at **Appendix A.**

II Status of Electric Vehicles in Maryland

In 2014, at the Council's recommendation, the General Assembly extended and revised the incentive for purchasing a PEV. A Maryland excise titling tax credit of $125 per kW of battery capacity, up to $3,000 was made available to buyers and lessees of qualifying new PEVs. The credit is effective July 1, 2014 through June 30, 2017 subject to the availability of funds. Business entities also qualify for the tax credit on up to ten vehicles.

As of October 31, 2015 there are 5,932 PEVs currently registered in Maryland, up from 1,800 PEVs in October 2013. As shown on Figure 1, there are now PEV owners in every Maryland county and Baltimore City.



In 2011, the first year of the Council, only two PEV models (**the all electric Nissan Leaf and the Chevrolet Volt plug-in- hybrid**) were readily available in Maryland. While these two models remain popular, many automobile manufacturers have invested heavily in EV technology as well and have brought several additional models with a range of price points to the market, including:

Audi A3 e-Tron
BMW i3 BEV
BMW i3 REX
BMW i8
Cadillac ELR
Chevy Spark EV
Ford C-MAX Energi
Ford Fusion Energi
Ford Fusion Titanium
Hyundai Sonata Plug-in Hybrid
Kia Soul EV
Mercedes B-Class Electric
Mercedes Benz S550e
Mitsubishi iMiEV
Porsche Panorama SE-Hybrid
Porsche Cayenne S E-Hybrid
Smart for Two Electric
Tesla Model S
Tesla Model X
Toyota Plug-in Prius
Volkswagon EGolf

Additional models are expected to be available in Maryland in 2016 and 2017. Many of the new electric drive vehicles coming to market will have greater battery range compared to the vehicles currently available. The 2016 Chevy Volt has an Environmental Protection Agency (EPA) estimated 53 miles of battery range, a 50% increase in battery miles from the previous model. The 2016 Nissan Leaf has an EPA estimated 107 miles of range, up 27% from the range of the 2011 Nissan Leaf. The 2017 Nissan Leaf, Chevy Bolt (a full electric vehicle) and Tesla Model 3 are all expected to have over 200 miles of battery range.

Future EV models that have been announced include:

Chevy Bolt
Mitsubishi Outlander PHEV
Mercedes-Benz C350 Plug-in Hybrid
Audi Q7 e-tron
Cadillac CT6 Plug-in
Tesla Model 3
Volvo XC90 Plug-in Hybrid
BMW X5 eDrive
BMW 328e Plug-in Hybrid
BMW 740e xDrive

The number of plug-in models available is expected to continue to grow due to increased investment, not only by the automobile manufacturers, but also by the companies in their support chains. Private sector investment throughout the supply chain has continued to increase significantly which has brought costs down rapidly over the past few years. For the first time, the Chevrolet Spark EV (the drivetrain of which is produced in GM's White Marsh facility) is available for sale in Maryland.

III Status of Infrastructure and Infrastructure Projects

According to the most recent data on the U.S. Department of Energy's Station Locator, Maryland now has 704 charging outlets at 308 locations available to the public. This includes outlets for 166 spaces at State owned or leased facilities, including facilities operated by MDOT, the Maryland Department of Environment (MDE), the Department of General Services (DGS), and the University of Maryland system.

Establishing an adequate charging infrastructure is necessary to address one of the prime concerns believed to influence consumer purchase and use of PEVs, "range anxiety." Range anxiety describes a condition in which the consumer is hesitant to buy a PEV due to concerns about being stranded without access to charging infrastructure or being unable to complete a trip given the constraints of the vehicle.

At the recommendation of the Council, in 2014 the General Assembly altered the incentive provided for the purchase of PEV charging equipment. Previously in the form of an income tax credit, this incentive was not

widely used. Reintroduced as a rebate program, the incentive is now available to residents, governments, and businesses for the acquisition and installation of PEV charging equipment.

Rebates are available for 50 percent of the purchase and installation price of the equipment, capped at the following amounts:

- Residential: 50 percent up to $900
- Commercial and government: 50 percent up to $5,000
- Retail Service Station: 50 percent up to $7,500

Between July 1, 2014 and November 2, 2015 this program issued 330 awards for a total of $469,688. Ninety-three of these awards were for commercial installations which will add outlets to the number available to the public in parking garages, private businesses and automobile dealerships. These installations resulted in a private investment of an additional $419,262 after grant awards.

Projects

Three State projects to provide charging infrastructure, begun in 2014, are underway or have been completed.

The first is the PEV@MTA Initiative to place charging outlets at transit stations operated by the Maryland Transit Administration (MTA). This program, funded with proceeds from the Regional Greenhouse Gas Initiative (RGGI) and administered by the Maryland Energy Administration (MEA), has added charging outlets for 17 new spaces at eight new locations.

Prior to this initiative, MTA's existing inventory included chargers at the White Marsh Park and Ride, the BWI-Marshall MARC Parking Garage (June 2011), the Mt. Washington and Falls Road Light Rail Stations (June 2012); and the Dorsey and Odenton MARC Stations (July 2012). These stations have seen consistent usage since 2012. The new locations are: the Milford Mill Metro Station, the Lutherville, North Linthicum and Cromwell Light Rail Stations, and the West Baltimore, Halethorpe, Muirkirk, and Monocacy MARC Stations. Many of the new chargers are dual stations serving two parking spaces.

MTA is in the process of finalizing designs for additional stations at three new locations.

The second project underway is the Electric Vehicle Infrastructure Program (EVIP). The EVIP was a $1 million competitive grant program with the goal of facilitating the development of a network of Level 3 or DC Fast-Charge stations across Maryland in accordance with the Council's Statewide Infrastructure Plan recommendations. This program was funded by settlement proceeds from a Clean Air Act enforcement action by the State. Prior to this grant program, the State's efforts had mainly focused on Level 1 and Level 2 charging stations that can take hours to fully recharge a vehicle. To complement this effort, the EVIP will provide a robust network of DC Fast Chargers which can provide a full charge for an all-electric vehicle in approximately 30 minutes. The program is intended to seed private investment in the build-out of a statewide fast charging network to facilitate travel to and through the State, enabling the flow of people and goods throughout the region. This grant has proven very successful with the State securing over $1 million dollars in matching investment by the private sector. This amounted to the State receiving over a 100% return on its investment.

Awards were made to three vendors on December 1, 2014, Royal Farms Stores, NRG eVgo, and ChargePoint, Inc. This is expected to result in Fast Charge stations at twenty new locations, supplementing existing locations. All construction is underway and three of the Royal Farms locations have been completed.

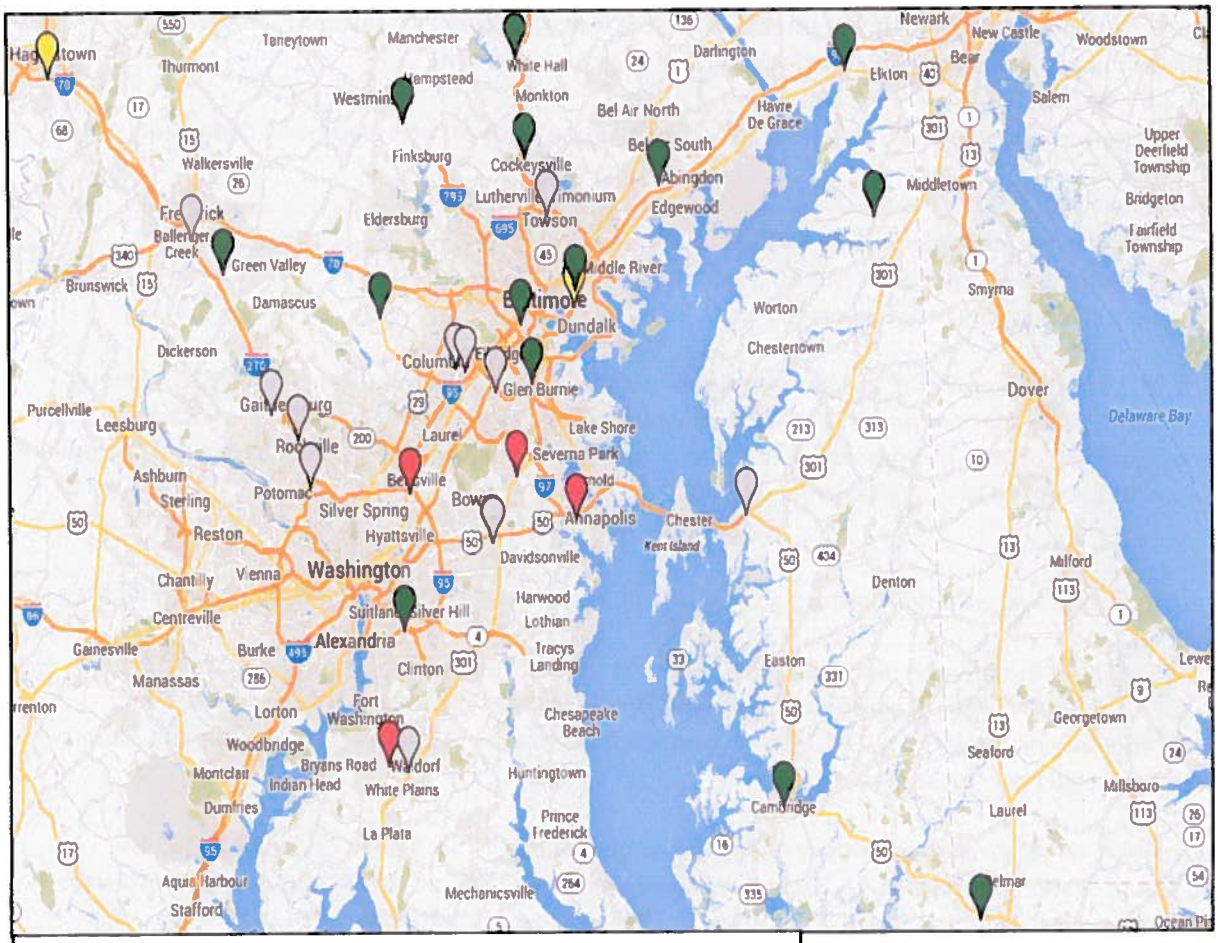


Figure 2: Fast Charging Sites: Grey = Existing Sites, Red=EVGo, Green= Royal Farms, and Yellow = ChargePoint

Finally, DGS has implemented a pilot program with a grant from MEA for 10 Level 1 EV charging outlets in the Annapolis parking garage at 45 Calvert Street. These parking spaces are available to all users of the parking garage. Each space has dedicated EV charging outlets and signage.

Existing Charging Infrastructure

In addition to these recent projects, the University of Maryland maintains chargers at the campuses of Frostburg State University, University of Maryland Baltimore County, University College, Universities at Shady Grove, Coppin State University, Salisbury University, Towson University, University of Baltimore, University of Maryland Baltimore, and University of Maryland College Park.

Chargers are also located at the Montgomery Park Business Center where the Maryland Department of the Environment and the Maryland State Lottery are located.

At the local level, several counties and Baltimore City are providing charging infrastructure in their parking garages or at curbside. These publically operated Level 2 stations supplement a larger number of Level 2 stations available to the public at commercial sites such as Walgreens, MOM's Organic Market, as well as a number of shopping centers and hotels.

Private industry has also made a significant investment in installing Level 3 stations in the State. There are now twenty-five DC Fast-Charging locations across Maryland in addition to those installed through the EVIP Program, including Tesla's Supercharging Network, funded solely by Tesla, for use by the Tesla Model S and Model X vehicles

Utility Electric Vehicle Pilot Programs

The Maryland Public Service Commission (PSC) is working with the utilities to conduct pilots that encourage PEV owners to shift vehicle charging out of peak periods — when system loads are high — to off peak hours. A shift in charging behavior can increase the reliability of the electric distribution system, lower electricity use during periods of high demand and lower energy costs for rate payers.

Both BGE and PEPCO have implemented residential pilot programs aimed at testing demand response and variable pricing programs for PEV owners. These pilots were to report their results by February 1, 2015; however, the Public Service Commission has extended both pilots until December 31, 2015. Preliminary data reported in early 2015 indicated that customers given the option to charge in off-peak periods at a favorable rate did take advantage of that option.

IV Ongoing Council Activity

Full Council meetings in 2015 were used for information gathering and discussion, while smaller sub-groups worked to implement specific recommendations and vet legislative proposals.

Full Council Agendas in 2015

February 19th, 2015	EVIC Presence at Auto Show Maryland – Netherlands G2G Knowledge Exchange Eight State Action Plan Demand Management for Plug in Vehicle Charging(PEPCO)
May 21st, 2015	Time of Use Pricing for Evs (BGE) Legislative Proposals from 2014
September 10th, 2015	Future of EV Markets Next EVIC Priorities Next Steps for HOA Legislation Workgroup Updates
December 17th 2015	TBD

The Council has several workgroups that focus on specific issues related to PEV adoption. One of these workgroups has focused on **Outreach to Local Governments.** As more citizens purchase and drive electric vehicles it is likely that local governments will play a significant role in the oversight of public charging infrastructure. Local comprehensive plans, zoning, building and historic codes, as well as parking ordinances and enforcement are being affected by this

emerging technology. In addition to providing charging infrastructure in their facilities, Montgomery and Howard counties have passed ordinances prohibiting non-charging vehicles from using PEV charging parking spaces. Montgomery County has also added language to its development code to require that all parking facilities of 100 spaces or more built after May 2014 include EV ready spaces.

State and local agencies have also begun to purchase PEVs and PEV charging equipment for their own fleets.

On June 30, 2015, the Council and the Metropolitan Washington Council of Governments (COG) co-hosted the **Regional Electric Vehicle Readiness Workshop**, bringing together experts from the private and public sectors and local leaders for a conversation about the purchase and integration of EV fleets. Participants also had an opportunity to test drive several electric vehicle models.
This well attended event identified a number of areas of opportunity for public and private regional investment in EVs and EV charging infrastructure including:

- Need for focused approach on government incentives towards economic models that sustain for-profit businesses, moving away from grants and tax cuts for EVs and EV charging.
- Local governments can lead by example by setting EV fleet purchase goals, convening stakeholders, installing public charging stations and raising EV awareness and literacy through public outreach events.
- EV-friendly amendments in existing building codes can accelerate EV deployment.
- Building code amendments and EV readiness targets should initially focus on residential charging and expanding options for "orphan cars" or garage-less vehicles.
- Legislation is needed to clarify the rights of members of Home Owners Associations, condos and tenants (both residential and commercial) to invest in EV charging infrastructure.

Another workgroup is focusing on **Education and Outreach** for consumers. As part of these outreach efforts several Council members, with the help of the Electric Vehicle Association of Washington D.C. (EVADC), participated in the Motor Trend International Auto Show in the Baltimore Convention Center. The Council provided attendees with information on vehicles, charging equipment, charging networks, and available applications.
This workgroup is in the process of developing an outreach plan using additional funds from the Clean Air Act Enforcement Action.

The Council also has workgroups on specific legislative proposals. The Council has recommended legislation to the General Assembly in 2012, 2013, 2014 and 2015 to address near- term issues. A list of the legislation enacted along with a brief summary of each bill is included in **Appendix B**.

The Council did not develop new legislation during 2015, but continued work on a bill recommended in the 2015 legislative session that did not proceed from the Judicial Proceedings Committee. This bill was introduced as Senate Bill 762, Real Property - Installation and Use of Electric Vehicle Recharging Equipment. The bill was intended as remedy for the challenges faced by residents in condominiums, rental properties and developments governed by Homeowner Associations (HOAs). Under the Maryland Condominium Act each condominium association may adopt its own bylaws for governing the commons areas. This has had the effect of making the installation of charging infrastructure extremely (and perhaps needlessly) complex. The Council has received complaints from citizens blocked by their HOA from installing chargers, even at their own expense. Also of concern was the ability of tenants to install charging infrastructure at landlord-owned properties if the tenant pays for the installation.

Since most EV charging occurs at home, this presents a significant barrier to EV deployment, particularly given that up to 46% of Maryland residents do not have access to a private electrical outlet for charging an EV. Access also correlates with income, making this a barrier that disproportionately affects lower income residents. Recognizing that

the workplace is the second most popular EV charging venue after residential charging, the work group expanded the bill's scope to include commercial rental properties. The bill is intended to remove barriers to EV charging in each of these venues in a manner that balances the interests of all parties – EV owners, other homeowners or tenants, property developers and landlords – by establishing standards and removing uncertainty regarding the parties' mutual rights and responsibilities. It provides that HOAs, condominium associations and landlords may place reasonable restrictions on the installation of charging stations but must actively process applications and approve them where the applicant meets the requirements of the law and agrees in writing to follow any applicable architectural standards and be responsible for all costs associated with the installation, maintenance, repair and removal of the station and all electricity costs generated from its use.

The workgroup made revisions to the bill to address concerns raised during the last session.

The Council is continuing to pursue the remaining recommendations from the 2012 final report, monitoring the evolution and growth of the PEV market and the complementary relationship of plug-in electric vehicles to the emerging trends in smart transportation and vehicle design.

Appendix A

EVIC Members		
Academic Community; from a Maryland institution of higher education with an expertise in energy, transportation, or the environment (1)	Z. Andrew Farkas, Ph.D.	Director and Professor for National Transportation Center at Morgan State University
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)	Conrad Herling	Council Member, Greenbelt
Baltimore Electric Vehicle Initiative (1)	Jill Sorensen	Baltimore Electric Vehicle Initiative
Electric Companies (2)	John J. Murach, Jr William M. Gausman	BGE PEPCO
Electric Vehicle Manufacturer (1)	Alex Keros	Manager, Advanced Vehicle and Infrastructure Policy for General Motors
Electric Vehicle Charging Station Manufacturer (1)	Colleen Quinn	VP Government Relations, Chargepoint, Inc.
Fleet Operators (1)	Gary Anderson	PHH / Arval
Electrical Workers (1)	Michael A. Wall	Clinton Electric Company/ EV Power Pros.
Environmental Community (1)	Scott Wilson	Electric Vehicle Association of Washington D.C.

Public; with expertise in energy or transportation policy (1)	Steven Arabia	Government Relations Manager, NRG Energy, Inc.
Maryland Automobile Dealers Association (1)	vacant	Travis
Retail Electric Supplier Community (1)	vacant	

Senators (1)	Senator Brian Feldman	District 15, Montgomery County
Delegates (2)	vacant	
	vacant	
Deputy Secretary of Transportation		Deputy Secretary **(Council Chair)**
Maryland Department of Planning	Bihui Xu	Manager, Transportation Planning
Deputy Secretary of the Environment	Ben Grumbles	Secretary
Secretary of Business and Economic Development	Chris Clark	Program Manager, Energy & Sustainability, DBED
Technical Staff of the Maryland Public Service Commission	Kevin Mosier	Wholesale Markets Liason
Director of the Maryland Energy Administration	Chris Rice	Transportation Program Manager

Appendix B

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 - 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