INTERIM REPORT

Presented to

Governor Martin O'Malley
and the
Maryland General Assembly

By the

Electric Vehicle Infrastructure Council

(SB 176, Chapter 400
2011 Laws of Maryland)

January 1, 2012

Staffed by the Maryland Department of Transportation

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Table of Contents

Executive Summary

The Maryland Electric Vehicle Infrastructure Council (Council) is comprised of representatives from automobile manufacturers and dealers, electrical vehicle (EV) charging manufacturers, utilities, electrical workers, State and local governments, and environmental and energy experts. Tasked with helping to plan and coordinate the successful integration of electric vehicles into Maryland's communities and transportation system, the Council has met regularly over the past five months to develop near-term recommendations and to begin developing a strategy, with specific objectives, for accomplishing the long-term goals.

This report provides an overview of the Council's activities to date and makes specific recommendations, for immediate action, to help remove current barriers to the emerging EV market. For example, the Council recommends that the Maryland General Assembly adopt two pieces of legislation in the upcoming General Assembly session: (1) provide for the sharing of information between the electric utilities and the Motor Vehicle Administration in order to ensure the safety and reliability of the electric distribution system; and (2) expressly exempt EV charging station owners, operators and service providers from the Public Utilities Article definition of "electricity supplier" and "public service company" in order to eliminate uncertainty currently surrounding the regulatory treatment of EV charging stations. The Council is also charged with developing statewide standards for streamlined permitting and installation of EV charging stations and supply equipment, developing targeted policies to support fleet purchases for electric vehicles, developing charging solutions for existing and future multi-dwelling units, increasing consumer awareness and demand for electric vehicle, and integrating electric vehicles and charging infrastructure into the state's transportation system. Efforts remain ongoing to engage stakeholders and conduct adequate research in order to accomplish each of these goals.

Over the course of the next year, the Council will continue to move forward with the implementation of detailed recommendations, which will play an important role in coordinating State and local policies that make electric vehicle ownership convenient and accessible, encourage job creation, and promote a cleaner, healthier, and more energy independent Maryland.

I. Establishment of the Council

The 2011 legislature of the Maryland General Assembly adopted, and Governor O'Malley signed into law, Senate Bill 176[1], Chapter 400 Laws of Maryland, which establishes an Electric Vehicle Infrastructure Council (Council).[2] Specifically, this law requires 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 EV 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 multidwelling units.
8. Encourage local and regional efforts to promote the use of electric vehicles and attract federal funding for State and local EV programs.
9. Recommend policies that support EV charging from clean energy sources.
10. Recommend a method of displaying pricing information at public charging stations.
11. Establish performance measures for meeting EV–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 and is in effect for a period of two years, through June 30, 2013. The Council has held five meetings to date, chaired by Darrell Mobley, Deputy Secretary of Transportation, beginning with the inaugural meeting on September 12, 2011. As of the submittal of this Report, the Council has been active for just under four months. The enabling law requires an Interim Report to the Governor and General Assembly on or before January 1, 2012, and a Final Report of the Council's work and recommendations to be submitted to the Governor and General Assembly on or before December 1, 2012. All meeting details and other information regarding the Electric Vehicle Infrastructure Council are posted on the Maryland Department of Transportation (MDOT) web site: http://www.mdot.maryland.gov/Planning/Electric_Vehicle/Index.html

II. Purpose of this Report

Governor O'Malley and the Maryland General Assembly have taken significant steps to help position Maryland as a leader in electric transportation, greenhouse gas reduction, renewable energy and green technology workforce development. In furtherance of these goals and objectives, the Council is moving forward with a plan for the successful integration of electric vehicles (EVs) into Maryland's economy and overall transportation system. The purpose of this Interim Report is to:

[1] Senate Bill 176 – Maryland Electric Vehicle Infrastructure Council, Maryland General Assembly (2011), http://mlis.state.md.us/2011rs/bills/sb/sb0176e.pdf

[2] Appendix A: List of Council members

- Provide an update on the Council's activities and progress thus far;
- Document the status of the national electric vehicle industry and infrastructure planning development in order to inform decision-making throughout Maryland;
- Identify issues for further study and resolution in the coming year as the Council works to develop recommendations for a state-wide plan; and
- Recommend immediate actions that will:
    - Encourage the development of a robust market for private sector EV infrastructure development in the short term; and
    - Facilitate necessary data sharing and information gathering with electric utility companies at the outset in order to ensure the safety and reliability of the electricity distribution system.

III. Overview of the Developing Electric Vehicle Market and Associated Infrastructure

In order to provide all Council members with a working knowledge of the electric vehicle industry, various members of the Council and others with subject matter expertise provided introductory briefings on the current status of the developing electric vehicle market. This section provides an overview of the industry and current governmental efforts to promote further growth and investment in the EV industry.

Implications of an Emerging Market for Electric Vehicles

There is growing interest and consumer demand for electric vehicles, as evidenced by the rollout of nearly a dozen new EV models identified in the table below.

Electric Vehicle: Make/Model	Market Entry – Estimated Timeframe
Chevy Volt	December 2010
Nissan leaf	August 2011
Ford eFocus	Late 2011 - 2012
Ford PHEV Escape	2012-2013
Mitsubishi iMev	2012
Toyota PHEV Prius	2012
Toyota eRAV-4	2012-2013
Smith Electric Truck	2011-2012
Bright Electric Truck	2011-2012
Navistar eStar	2011
Ford Transit Connect	2012

Nearly every major automobile manufacturer and several "new" entrants are expected to have product on the road by 2015. A study completed for the North American Independent System Operators (ISO) and Regional Transmission Organizations (RTO) projects up to 60,000 Plug-in Electric Vehicles (PEV) in the Baltimore-Washington metropolitan area by 2020.

Increased market penetration has the following potential, but important implications for utilities, infrastructure, and consumers:

- An increase in the peak electricity demand of a typical household of between 50 -100%, although utilities have seen significant increases in household demand in the past as when air conditioning became prevalent;
- The need for development of strategies by electric utilities to manage the added load to the electric distribution system;
- The possible need for modifications to building codes, and strategies to address perceived barriers in permitting and inspection processes; and
- The need for standardization training on the new technology applications.

Federal EV Goals and Programs

In his 2011 State of the Union Address, President Obama announced an ambitious goal to have 1 million electric vehicles on the road in this country by 2015. To support the President's goal, the U.S. Department of Energy (DOE) has made an unprecedented investment in advanced vehicle technologies to encourage increased utilization of electric vehicles, including:

- A 50% increase in the Vehicle Technologies Program (VTP) budget in the last 2 years, of which approximately half ($150 million) supports vehicle electrification initiatives;
- A $25 billion Advanced Technology Vehicle Manufacturing Loan Program;
- The launch of the Advanced Research Projects Agency—Energy (ARPA-E) within the Department of Energy;
- The award of grants totaling $2.8 billion through the American Recovery and Reinvestment Act (ARRA);
- The investment of $2 billion for an Electric Drive Battery & Component Manufacturing Initiative;
- The award of $400 million for a Transportation Electrification Initiative;
- The award of $300 million for the Clean Cities programs; and
- The award of $115 million for the Super Truck / Advanced Technology Powertrains projects to develop fuel efficient vehicles.

More information on these DOE programs can be found at: http://www.eere.energy.gov

There is a general consensus that the two greatest market barriers to date are Range Anxiety–(access to charging stations and battery driving range) Price–(cost to consumer for the vehicle and charging equipment).

Maryland's Efforts to Promote EVs

Promotion of a robust market for electric vehicles furthers two key Maryland energy goals: (1) to reduce greenhouse gas emissions 25% by 2020 and create 100,000 new green jobs by 2015.
The Maryland Energy Administration's Electric Vehicle Infrastructure grant Program (EVIP)[3], along with recently passed legislation and existing tax incentives, are all aimed at promoting and encouraging EV

[3] Maryland Electric Vehicle Infrastructure Program (EVIP): http://www.energy.state.md.us/Transportation/electric.html

ownership throughout Maryland. In addition to creating the Council during the 2011 legislative session, the Maryland General Assembly has taken several additional important actions, including:

- The authorization of the Public Service Commission to establish pilot programs to encourage off-peak charging and demand response[4];
- The High Occupancy Vehicle (HOV) Lane Use statute, which authorizes the use of HOV lanes by certain EVs [5];
- The electric vehicle excise tax credit[6]; and
- The electric vehicle charging station credit[7].

Lastly, the Council was updated on the Public Service Commission's ongoing review of the potential regulatory treatment for EV charging station owners and operators ("Case 9261")[8].

The Transportation and Climate Initiative (TCI)

There is also an important regional effort underway to facilitate the development of an electric vehicle infrastructure network along the northeast corridor—the Transportation & Climate Initiative of the Northeast and Mid-Atlantic States (TCI)— an effort involving Maryland and 11 other states to reduce greenhouse gases in the transportation sector and help build the clean energy economy.[9] With assistance from the Georgetown Climate Center and a $1 million grant obtained through the New York State Energy Research and Development Authority, the initiative is developing a work plan to promote a regional EV network to connect EV hubs with metropolitan and local EV networks and public transportation systems, including transit, airports and rail.

The Council has collected a library of reports developed by other states, local governments and private industry related to the development of an EV market. These documents are all available for review on the COUNCIL website.[10]

[4] Senate Bill 179 - Electric Companies - Pilot Program for Charging Electric Vehicles, Maryland General Assembly (2011), http://mlis.state.md.us/2011rs/bills/sb/sb0179e.pdf

[5] House Bill 674 - High Occupancy Vehicle (HOV) lanes - use by Plug-in Vehicles, Maryland General Assembly (2010). The law allows plug-in vehicles to travel on High Occupancy Vehicle (HOV) lanes, regardless of the number of occupants in the vehicle. The proposal terminates on September 30, 2013. http://mlis.state.md.us/2010rs/bills/hb/hb0674e.pdf

[6] House Bill 469 - Motor Vehicle Excise Tax Credit for Electric Vehicles, Maryland General Assembly (2010). The law creates a tax exemption of up to $2000 for qualified plug-in electric vehicles. The credit is available for qualified vehicles titled on or after October 1, 2010, and sunsets June 30, 2013. http://mlis.state.md.us/2010rs/bills/hb/hb0469e.pdf

[7] Electric Vehicle Supply Equipment Tax Credit Program: http://www.energy.state.md.us/Transportation/evse/index.html

[8] http://webapp.psc.state.md.us/Intranet/casenum/CaseAction_new.cfm?CaseNumber=9261

[9] http://www.georgetownclimate.org/state-action/transportation-and-climate-initiative

[10] EVIC Documents and Links Library: http://www.mdot.maryland.gov/Planning/Electric_Vehicle/EV_Resources.html

IV. Initial Findings

A. Formation of Work Groups

In order to function as effectively and efficiently as possible, the Council formed four separate Work Groups. Council members each serve on at least one Work Group, but many serve on multiple groups, based upon background, expertise and interest. Each Work Group is tasked with developing recommendations and strategies to bring to the full Council, where they will be synthesized as part of Maryland's overall comprehensive plan to promote EV ownership, investment and infrastructure.

The four Work Groups are as follows:

- Market Development;
- Facilities;
- Messaging and Outreach; and
- Infrastructure Plan/Strategy.

B. Work Group Findings

Several common themes were immediately apparent in the Work Groups' initial findings. The following is a summary of key Work Group findings to date:

- *The need to identify and engage several different stakeholder groups.*

Some groups will need to be part of the effort to facilitate the integration of EVs, and indeed will need to actively collaborate on the solutions to certain issues, while other stakeholders will require different types of outreach and education. (See Appendix D)

- *The need for additional data*.

Initial sales of EVs were fairly modest in 2010, primarily due to limited product availability and uncertain financial times. About 5,000 EVs were sold nationwide in 2011, and less than 100 EVs are registered in Maryland at this writing. Though this is expected to change rapidly, it nevertheless creates challenges in the present when planning for future needs. Predictions on the needs of future EV owners from such a small sample may prove unreliable, especially considering that so called "early adopters" of EVs may have very different purchase and use characteristics compared to the general public. (See Appendix E)

- *The need to compile "best practices" from ongoing efforts*.

Organizations and governments at various geographic and jurisdictional levels across the country have begun to prepare for the advance of electric vehicles. Many of the barriers and opportunities discussed by the Council's Work Groups were identified in other jurisdictions and various solutions have been tried and critiqued that could serve as models for Maryland's efforts.

C. Identification of Challenges to Development of an EV Market

The Council also identified several barriers and challenges that will need to be addressed in order to develop a dynamic and vibrant market for both electric vehicles and EV charging station providers and operators. It was noted that some of these issues could prevent consumers from even considering the option to own or lease an EV, while others are already affecting the way owners/operators of charging stations manage their facilities. Still others have potential impacts on the management of the electrical grid by public utilities. The Council identified two issues that can be addressed relatively quickly, and several others which are more complex and will involve considerable effort and coordination as EVs are introduced throughout Maryland.

Grid Reliability

Uncertainty surrounding the potential impact of home EV charging on the electric grid was introduced as a primary, initial concern. The security and reliability of the power grid is both a state and a national priority. Authorities agree that, at least initially, most EV charging will be done at the owner's place of residence. In general, significant effects on the power grid itself from EV charging are not anticipated; however, home charging by a number of vehicles in any one neighborhood could impact the local distribution system, thus affecting electricity service to surrounding homes. In order to adequately manage the power system and ensure reliability of service, utilities need to be aware of the specific geographic locations where EV home-charging will likely occur. The Council recommends developing legislation to ensure the utilities operate with timely access to that information. Specifically the MVA would provide the address of registered EV owners directly to the utility company servicing their home residence. Since vehicle registration information is protected by statute, this would require an exception under the Government Article, Title 10, of the Annotated Code of Maryland ("the Code") that would allow the MVA to provide street addresses and zip codes of those who register an Electric Vehicle directly to their Public Utility. (*See* Recommendations)

Regulatory Certainty

The next priority identified was the current lack of certainty surrounding the regulation of Electric Vehicle Charging Stations (EVCS). The current definitions of "electricity supplier" and "public service company" contained in the Public Utilities Article of the Code could be construed to include the owner or operator of an EV charging station. This has caused confusion as to whether charging stations might be regulated as if they were public utilities. The Council determined that this uncertainty could be a barrier to the establishment of a robust marketplace of EV charging facilities. Accordingly they are recommending exceptions to those definitions in the law. (*See* Recommendations)

The Council believes that by addressing these two obstacles at the outset there will be increased clarification and a greater degree of certainty for numerous stakeholders involved in promoting and developing a successful electric vehicle network in Maryland. It will be signal to all parties in the electric vehicle business of Maryland's commitment to the development of a vibrant EV market.

The Multi-Unit Dwelling Challenge

A third and more complex issue involves charging opportunities for EV owners who do not have access to a private garage at their home. Urban dwellers, residents of apartments and condominiums and even

suburban dwellers with driveway parking may face barriers to accessible charging stations. Installation of EV chargers and charging stations in and for multi-unit dwellings presents unique challenges, such as:

- restrictive covenants or lease provisions that typically govern land use in common areas;
- challenging wiring and electrical metering configurations; remote parking configurations;
- lack of specifically assigned or designated parking in common parking areas;
- lack of off-street parking; allocation of costs to residents and other issues.

The challenge is to develop strategies for making EV charging easily accessible to those residents that do not have private garage parking at their property and removing barriers for early EV adopters, thus increasing EV market penetration.

Many of these issues may either be resolved through changes to the permitting process, through the establishment of standards, or even through developing legislation to prohibit bans or unreasonable restrictions on the installation of chargers. The Council identified a number of jurisdictions where efforts are currently underway to address multi-unit infrastructure issues. The Council recommends conducting a literature review as part of the process of developing a set of recommended best practices for urban and multi-unit infrastructure.

Permitting

A fourth issue with both high priority and high complexity is streamlined permitting for the installation of chargers. In all Maryland counties and incorporated municipalities, installation of a residential or commercial electric vehicle charger or charging station involving more than a simple 110 volt socket connection typically requires an electrical permit from the local jurisdiction. Each local jurisdiction has established its own permit process.

Permit streamlining has been identified as key to promoting EV market penetration in early adopter states and cities across the country. Ideally, the installation of a residential EV charging station would occur before the purchaser of an electric plug-in vehicle accepts delivery of an EV. At the present time, there is typically a lag between the time a customer places an order for their electric vehicle and the time of delivery. This affords time to have the charging equipment installed. As the manufacturers increase the supply of vehicles and purchasers may be able to select a vehicle directly from the stock on the dealer lot, ensuring timely installation of chargers is expected to become more of a challenge. In order to shorten and simplify the permitting process statewide, the Council's goal is to develop a model permit and permit process that can be implemented by local permitting jurisdictions. This will require a collaborative process involving input from the local governments, electrical contractors and electrical inspectors.

Understanding the existing local government electrical permitting processes is the first step in the process of developing a model permit and process. With this in mind, the Facilities Work Group has commenced outreach efforts to the local governments, electrical contractors and electrical inspectors. They have developed a survey of local permit practices as they relate to EV charging stations for distribution in early January to each of the local permitting jurisdictions through an online survey tool. Following receipt of the completed survey forms, the Work Group intends to follow up with local governments and electrical contractors and inspectors through regional meetings around the State and with individual local jurisdictions as necessary. Through this outreach effort, the Work Group expects to develop an understanding of the current permit processes and time frames, identify any permit barriers to the installation of EV chargers, identify opportunities for streamlining the permit process as needed,

solicit input on best practices and identify any ways in which the Council can provide assistance or support to the electrical inspectors and contractors.

As part of its outreach efforts, the Work Group also intends to solicit input from experienced EV installers and convene a "customer focus group" comprised of EV owners.

These discussions, along with a careful evaluation of a model permit developed by the Department of Energy and streamlined EV charging station permit processes in other states and local jurisdictions (e.g., New Jersey, Massachusetts, Oregon, Los Angeles, San Jose, Raleigh, Houston, Sonoma County, California and Puget Sound), will inform the development of recommendations for a model permit and streamlined permit process in Maryland to present to stakeholders for review and comment.

Communication

Effective communication of Maryland's support for electric vehicles, the benefits to the state and Maryland residents associated with transitioning to EV transportation, and easily accessible consumer information regarding programs and incentives are critical to generating greater awareness and support for EVs throughout the state.

Specifically, increasing consumer awareness and demand for electric vehicles through public outreach is a critical component of the Council's overall mission. Additionally, this area of focus involves a wide variety of stakeholders, including potential EV owners and dealers. However, the Messaging and Outreach Work Group also identified the following entities as groups that will likely play a key role in the dissemination of accurate and up-to-date information surrounding this emerging market: electric utilities, electricians and construction trades, original equipment manufacturers (OEMs) and commercial providers, government regulators, policy makers, and economic development agencies and organizations.

From the outset, all stakeholders will need an easily accessible and understandable resource to find basic information on EVs and EV infrastructure. For example, www.hybridcars.com/electric-car and www.eere.energy.gov/basics/vehicles/electric_vehicles.html are websites that provide clear and basic information. Thus, an early, over-arching recommendation of the Work Group is the development of a "one-stop shop" website, and any associated social media tools, in order to accurately communicate Maryland's EV efforts in a consistent and timely manner. Maryland's EV website would be a comprehensive reference resource for state, regional, and local governments as well as for industry and consumers.

In developing an overall EV outreach strategy, the Council is aware of the various specific and different needs expressed by each stakeholder group. For example, the building and electrical trades should have access to regular updates on any changes to the relevant sections of building codes and permitting processes. In addition, timely information on the various incentives available to their customers and clients would also be of importance to these groups. It is clear that there is great potential for leveraging partnerships by increasing education and access to information among different EV stakeholders. Specifically, effective communication and outreach could leverage partnerships among auto dealers, electric distribution utilities, and EV charging station / equipment providers and result in even greater dissemination of new information and available incentives.

The Work Group recognizes that an effective communication and outreach strategy should aim to encourage local and regional efforts to promote the use of EVs as well as attract federal funding opportunities for state and local EV programs. Coordination with local economic development agencies and organizations will be vital to these efforts. Increased coordination and collaboration with Maryland's Department of Business and Economic Development (DBED) as well as local jurisdictions' economic development offices will create stronger support, promotion and opportunities for growth. Participation in promotional events and demonstration opportunities will generate greater recognition for Maryland as a state that embraces the emerging EV market and is working toward its smooth integration into the overall transportation infrastructure plan.

Infrastructure Planning

Over the course of the last year alone, Maryland has made significant progress in preparing for and providing electric vehicle public charging infrastructure. Additional public investment in charging stations may be necessary relative to equipping built architecture, such as parking lots and garages. These locations are likely to provide EV charging to (a) EV drivers who may not be able to supply adequate charging from their homes or access private sector charging at destinations and/or (b) government fleets that, in the near future, could be converted to EVs to save on fuel and maintenance costs. Therefore, further investments in public charging should be prudent and well-planned to reduce government operating budgets, minimize "range anxiety" and help Maryland reach its renewable energy goals while minimizing the potential for negative impacts on the electricity distribution system. EV infrastructure planning and development promises to create meaningful construction, traffic and energy management jobs. Ultimately, a strong public planning foundation in EV infrastructure should leave room for private markets to emerge, innovate and thrive throughout Maryland.

The Infrastructure Plan and Strategy Work Group recognizes that electric vehicles, charging stations and supporting infrastructure relate critically to the ability to transition Maryland from a primary dependence on coal to a strong use of renewable energy resources, such as wind and solar power. The group also recognizes that economic development, transportation system, land use planning impacts and renewable energy sources must be considered.

Furthermore, the Work Group recognizes that the potential for public-private partnerships should be explored as a way to encourage more private markets to develop EV infrastructure, thereby facilitating job-creation, reduced energy costs and advancement of Maryland's renewable energy portfolio standards.

As the Council continues to develop the overall infrastructure plan and long-term strategy, the Work Group recognized that several of the Council's goals could be accomplished in the near term by adding existing electric vehicle passenger, bus and truck options to the state General Services Administration (GSA) authorization of purchases / acquisitions for state, county and municipal fleets.

V. Recommendations for Immediate Action[11]

While the Council is moving forward with developing an overall plan for the successful integration of electric vehicles into the State's economy and transportation system, the following two issues have been identified as priorities, which should be resolved in the near term through the development and adoption of appropriate legislation:

1. Motor Vehicle Administration—Sharing Information with Utilities: The Utilities have expressed a need to know the electric vehicle purchaser's street address and zip code in order to ensure public safety and maintenance of transformers.

   The legislation should ensure protection of consumer privacy and include a prohibition on the use of the use of the information for marketing purposes.

2. Amendments to the 1999 Electric Industry Restructuring Act to exempt Electric Vehicle Charging Station (EVCS) owners, EVCS service companies and EVCS service providers from the definition of "electricity supplier" and "public service company" in the Public Utilities Article.

Proposals for these bills are attached in Appendix C.

[11] Public Service Commission Staff did not participate in the preparation of, nor provide any comment upon, and expresses no opinion with regard to any proposed legislation included in this Interim Report.

Appendix A Membership of the Electric Vehicle Council

The Electric Vehicle Council is a twenty-five (25) member Council representing various, interests from around the State of Maryland, as required by law and outlined in the table below. Governor O'Malley appointed Mr. Darrell Mobley as Chairman of the Council. The Maryland Department of Transportation provides staff support.

Academic Community; Maryland institution of higher education with expertise in energy, transportation, or the environment	Z. Andrew Farkas, Ph.D.	Director and Professor for National Transportation Center at Morgan State University
Maryland Association of Counties; rural region	Robert N. Rollins, Jr.	Division Chief, Fleet Maintenance & Management, Calvert County Government
Maryland Association of Counties; urban or suburban region	Theodore Atwood,	Director, General Services, Baltimore City Government
Maryland Municipal League; rural region	Hon. Kelly M. Russell	Alderman for City of Frederick
Maryland Municipal League; urban or suburban region	Daryl Braithwaite	Public Works Director, City of Takoma Park
Baltimore Electric Vehicle Initiative	Jill Sorenson	Baltimore Electric Vehicle Initiative
Electric Companies	John J. Murach, Jr.	BGE
	William M. Gausman	PEPCO
Electric Vehicle Manufacturer	Jim Kiley	Regional Director, State Relations for General Motors
Electric Vehicle Charging Station Manufacturer	Colleen Quinn	VP Government Relations, Coulomb Technology
Fleet Vehicle Operator	Chris Lepp	GE Industrial
Electrical Workers	M. Nolan Duncan, Jr.	Generator Sales and Project Manager, Holt Electrical Contractors
Environmental Community	Frederick H. Hoover, Jr., Esq.	Former Director of Maryland Energy Administration

Public; with expertise in energy or transportation policy	Steven Arabia	Government Relations Manager, NRG Energy, Inc.
Maryland Automobile Dealers Association	Marisa Shockley	President of the Maryland Automobile Dealers Assn. (Shockley Honda)
Retail Electric Supplier Community	Gary Skulnik	Co-founder of Clean Currents, LLC
Senators	Senator Robert Garagiola	
Delegates	**Delegate James Malone**	
	Delegate Brian McHale	
Deputy Secretary of Transportation	**Darrell Mobley**	**Chair**
Maryland Department of Planning	Bihui Xu	
Deputy Secretary of the Environment	Kathy Kinsey	
Secretary of Business and Economic Development	**Christian S. Johansson**	
Executive Director of the Technical Staff of the Maryland Public Service Commission	Gregory V. Carmean	
Maryland Energy Administration	Chris Rice	

Appendix B Work Group Reports

Market Development

Chair: Formerly Fred Hoover, Currently Steve Arabia

Members:

Gregory Carmean	Colleen Quinn	Andrew Farkas
William Gausman	Philip Dacey	Arabia, Steven
Jill Sorensen	Marisa Shockley	Gary Skulnik
John Murach		

Charges:

- Developing recommendations regarding monetary and non-monetary incentives to support EV ownership and maximize investment in EVs.
- Developing targeted policies to support fleet purchases of electric vehicles.
- Identifying other goals and objectives that promote EVs in Maryland.

Stakeholders Identified:

Motor Vehicle Administration (MVA)
Public Service Commission Case 9261 Working Group
Electric Utilities
Electric Vehicle Charging Station providers
Fleet operators
Maryland Energy Administration
Maryland Department of the Environment
Local governments

Obstacles and opportunities Identified:

The Market Development Work Group initially focused on two potential barriers to the promotion and development of electric vehicles in Maryland. These two issues were deemed priorities and the Council has recommended moving forward with legislation in the upcoming General Assembly session. [12]

First, the Market Development Work Group identified an obstacle to embracing the EV industry relevant to the electric utilities. Without access to the specific home address of EV owners, and assuming home-charging will occur, the utilities are unable to adequately protect and ensure the reliability of the power system. Home charging by a number of vehicles in a neighborhood could impact the local distribution system thus affecting electricity service to surrounding homes. Therefore, it was recommended that the Work Group work with members from the Motor Vehicle Administration (MVA) and electric utilities to develop a recommendation for legislation to address this barrier. Ultimately, the MVA would share driver registration information with the utility in order to best ensure public safety and maintenance of the transformers. If adopted, this legislation also guarantees that the information not be used for marketing purposes and is only intended to provide specific geographic information to the utilities for preventative maintenance and reliability of the system.

Second, the Market Development Work Group recognized that the current lack of certainty surrounding the treatment and regulation of electric vehicle charging stations (EVCS) as electricity suppliers is an

[12] Public Service Commission Staff did not participate in the preparation of, nor provide any comment upon, and expresses no opinion with regard to any proposed legislation included in this Interim Report.

obstacle to potential EV growth and development in Maryland. To that end, the Market Development Work Group recommends a legislative solution in order to remove potential confusion from the current legal definition of "electricity supplier" and provide certainty for current and future EVCS owners, EVCS service companies and EVCS service providers. Specifically, the Work Group recommends developing legislation to amend the 1999 Electric Industry Restructuring Act and provide exemptions for electric vehicle charging station owners.

The Market Development Work Group believes that by addressing these two obstacles at the outset there will be increased clarification and a greater degree of certainty for numerous stakeholders involved in promoting and developing a successful electric vehicle network in Maryland. It will be a signal to all parties in the electric vehicle business of Maryland's commitment to developing a vibrant EV market.

In addition to developing and recommending legislation to remedy the above mentioned obstacles, the Market Development Work Group will continue to discuss various opportunities for increased EV ownership and investment. Specifically, the Work Group will identify opportunities for the conversion of state fleets and private electric vehicle fleet purchases; incentives for cargo vehicles (i.e. trucks, buses, taxis); the potential for continuing EV eligibility in HOV lanes; and potential incentives for minimizing emissions in air quality management districts or non-attainment areas throughout the state.

The Market Development Work Group will assist in the introduction and advocacy of the aforementioned two pieces of legislation recommended for the 2012 General Assembly session, which aim to provide greater clarification and certainty within the EV market. Once the legislative process is underway, the Work Group will re-direct its focus and further explore the opportunities already available for EV promotion and investment. Outreach to stakeholders and information gathering will better inform the group's understanding of the potential for recommending various monetary and non-monetary incentives to support EV-ownership and to encourage fleet purchases.

Data Needs:
The electric utilities need driver registration information from the Motor Vehicle Administration.

Next Steps:
The Market Development Sub-Committee will assist in the introduction and advocacy of two pieces of legislation recommended for the 2012 General Assembly session, which aim to provide greater clarification and certainty within the EV market. Once the legislative process is underway, the sub-committee will re-direct its focus and further explore the opportunities already available for EV promotion and investment. Outreach to stakeholders and information gathering will better inform the group's understanding of the potential for various monetary and non-monetary incentives to support EV-ownership and to encourage fleet purchases.

"Recommendations for Immediate Action"
While the Council is moving forward with developing an overall plan for the successful integration of electric vehicles into the State's economy and transportation system, it has identified the following two issues as priorities to be resolved legislatively in the near term.

1. Motor Vehicle Administration—Sharing Information with Utilities: The Utilities have expressed a need for the electric vehicle purchaser's street address and zip code. They want to know where the cars are located in order to ensure public safety and maintenance of their transformers.

The legislation will include a guarantee that the information would not be used for marketing purposes and will protect the consumers' privacy.

2. Exemption to the 1999 Electric Industry Restructuring Act. The legislation would exempt Electric Vehicle Charging Station (EVCS) owners, EVCS service companies and EVCS service providers from the definition of "electricity supplier" and "public service company."

Facilities

Chair: Kathy Kinsey

Members:

Chris Rice	William Gausman	Rob Stewart
John Murach	M. Nolan Duncan, Jr.	Robert N. Rollins, Jr.
Colleen Quinn		

Charges:

- Statewide standards for streamlined permitting and installation of residential and commercial EV charging stations and supply equipment;
- Charging solutions for existing and future multi-family dwelling units and urban parking;
- Policy recommendations to support EV charging from clean energy sources; and
- Recommendations for the display of pricing information at public EV charging stations.

The Workgroup has initially focused its attention primarily on streamlined permitting because of the important role that a uniform statewide "user friendly" permitting process plays in increasing EV market penetration, and on resolution of issues associated with multi-unit dwellings because of the complexity of the issues.

Permit Streamlining

In all Maryland counties and incorporated municipalities, installation of a residential or commercial electric vehicle charger or charging station involving more than a simple 110 volt socket connection typically requires an electrical permit from the local jurisdiction. Each local jurisdiction has established its own permit process.

Permit streamlining has been identified as key to promoting EV market penetration in early adopter states and cities across the country. Ideally, the installation of a residential EV charging station would occur before the purchaser of an electric plug-in vehicle accepts delivery of an EV. At the present time, there is typically a lag between the time a customer places an order for their electric vehicle and the time of delivery. This affords time to have the charging equipment installed. As the manufacturers increase the supply of vehicles and purchasers may be able to select a vehicle directly from the stock on the dealer lot, ensuring timely installation of chargers is expected to become more of a challenge. In order to shorten and simplify the permitting process Statewide, the Council's goal is to develop a model permit and permit process that can be implemented by local permitting jurisdictions. This will require a collaborative process involving input from the local governments, electrical contractors and electrical inspectors.

Identified Stakeholders. The primary stakeholders in the permitting process are the local government electrical permitting authorities, the electrical contractors who will be responsible for pulling permits

and installing the EV charging stations, electrical inspectors who approve the installation, the electric distribution utilities (utilities), who need to know where EV charging stations are being installed for purposes of system reliability, and finally, the EV purchasers themselves.

Additional stakeholders that will be highly interested, but perhaps not always direct participants in the process, include the Electric Vehicle manufacturers and their dealers and the Electric Charging equipment and network suppliers as either of these may be facilitating or initiating the installation process on behalf of the customer.

Obstacles and Opportunities. Understanding the existing local government electrical permitting processes is the first step in the process of developing a model permit and process. In this regard, members of the Work Group have commenced outreach efforts to the local governments, electrical contractors and electrical inspectors and developed a survey of local permit practices as they relate to EV charging stations for distribution in early January to each of the local permitting jurisdictions through an online survey tool. Following receipt of the completed survey forms, the Workgroup intends to follow up with local governments and electrical contractors and inspectors through regional meetings around the State and with individual local jurisdictions as necessary. Through this outreach effort, the Work Group expects to develop an understanding of the current permit processes and time frames, identify any permit barriers to the installation of EV chargers, identify opportunities for streamlining the permit process as needed, solicit input on best practices and identify any ways in which the Council can provide assistance or support to the electrical inspectors and contractors.

As part of its outreach efforts, the Work Group also intends to solicit input from experienced EV installers and convene a "customer focus group" comprised of EV owners. These discussions, along with a careful evaluation of a model permit developed by the Department of Energy and streamlined EV charging station permit processes in other states and local jurisdictions (e.g., New Jersey, Massachusetts, Oregon, Los Angeles, San Jose, Raleigh, Houston, Sonoma County, California and Puget Sound), will inform the development of recommendations for a model permit and streamlined permit process in Maryland to present to stakeholders for review and comment.

One issue of particular importance to electric utilities that could be addressed through the permitting process is early notification of applications for EV charging station installations. Electric utilities need early notice of EVCS installations in order to ensure reliability of the electricity system within communities. Establishing a process whereby local permitting authorities would flag EV charging station permit applications and provide notification to the electric utilities serving that jurisdiction upon receipt of an application is one approach to ensuring that electric utilities get early notice. Another possible option includes EV purchaser opt-in notice to utilities by dealerships.

The Facilities Work Group is aware that similar discussions on the issue of utility notification are under consideration in the Maryland PSC Case 9261 Working Group currently underway. Several Facilities Working Group members are also on the PSC Case 9261 Working Group and will help to facilitate the exchange of information by participants in both processes.

Installation of EV Charging Stations—Siting and Design Recommendations

There are many issues associated with the siting and design of EV charging stations—lighting, signage, location and spacing of the charging equipment, and accessibility for the disabled, among others. The Work Group intends to make recommendations on best practices for siting and design of residential, commercial and public charging stations. A number of other states and local jurisdictions have

developed a set of siting and design best practices for EV chargers and charging stations. Developing a complete understanding of current siting and design requirements in each of the local jurisdictions through meetings with appropriate local government officials is the first step in the development process, to be followed by review of best practices in other jurisdictions and input from manufacturers of EV charging stations.

Additional Stakeholders. Additional stakeholders with an interest in siting and design requirements include appropriate local government planning and land use officials, historic preservation organizations and advocates for disabled drivers and passengers.

Multi-Unit Dwelling Units and Urban Parking

Installation of EV chargers and charging stations in and for multi-unit dwellings present unique challenges because of restrictive covenants or lease provisions that typically govern land use in common areas, challenging wiring and electrical metering configurations, remote parking configurations, lack of off street parking, allocation of costs to residents and other issues. The "urban" parking challenge is to develop strategies for making EV charging easily accessible to those residents that do not have off-street parking at their property.

Based on an initial survey, the Work Group has identified a number of jurisdictions that are actively working to address multi-unit infrastructure issues. For example, the Electric Power Research Institute is developing guidelines to support multi-unit EVCS infrastructure. The City of San Francisco, along with the California Energy Commission and Coulomb Technologies, Inc., a manufacturer of EV charging stations, is preparing to launch a major campaign to support the development of multi-unit EVCS infrastructure in that city. The Workgroup has identified other jurisdictions working on these issues and is performing a literature review as a first step toward developing a set of recommended best practices for multi-unit infrastructure.

Additional Stakeholders. Additional stakeholders with an interest in multi-unit infrastructure include homeowners associations, owners and residents of multi-unit housing, property management companies, Baltimore City Special Benefits Districts and community associations. Stakeholder outreach and involvement will be particularly important in the effort to build a consensus on recommended best practices for multi-unit infrastructure. Of particular concern are barriers resulting from restrictive covenants, lease provisions, and lack of off street parking, as discussed below.

Obstacles and Opportunities. Many renters and homeowners in multi-unit developments are subject to covenants or lease provisions restricting use of common areas. These restrictions are a potentially significant barrier to the development of multi-unit EVCS infrastructure. Single family homeowner communities with home owner associations can also be subject to restrictive covenants. Legislation prohibiting bans and unreasonable restrictions on installation of EVCSs in multi-unit developments may be advisable. There is precedent for such legislation in Maryland. In 2008, the General Assembly enacted legislation to prohibit bans and unreasonable restrictions on residential solar installations. In 2011, California enacted S.B. 209, which renders bans or unreasonable restrictions on the installation of EVCS in the governing documents of common interest developments void and unenforceable. Other jurisdictions are considering similar legislation.

Stakeholder outreach and input is critically important both in assessing the need for such legislation in Maryland and in developing any future legislative proposal. In this regard, the Workgroup is presently identifying barriers and other issues affecting the development of multi-unit EVCS infrastructure and

reviewing recommended best practices in other jurisdictions, in advance of proceeding with stakeholder outreach on the need for legislation or other measures to address restrictive covenants and lease provisions.

Many renters and owners of urban residences park on the street and do not belong to a homeowner, condominium or tenant association. EV charging in urban communities that do not have a common governing structure raises a distinct set of technical, equity, and vandalism issues related to sidewalk or other charging options in public spaces. The city or local government planning regulations may also come into consideration. The Work Group's literature review includes a best practices survey of EV charging in these communities. Stakeholder outreach to community associations and special benefits districts (Baltimore City), landlords, parking lot/parking garage owners and others will be critical to building consensus for charging solutions in the urban setting.

Promoting Charging with Clean Energy Sources

The Workgroup is aware of at least three Maryland companies that are collaborating to manufacture and install solar powered charging stations. In addition, General Motors is installing solar powered charging stations on dealership lots and at its Allison Transmission plant in White Marsh, where it is gearing up to manufacture EV motors for the Chevy Volt and other plug-in cars.

The Work Group intends to confer with these companies on recommendations for workable business models that will facilitate the advancement of solar and other clean energy supplies to charging stations, considering incentives such as power purchase agreements, net metering, bundling and sale of solar renewable energy credits to finance installation and others the Working Group might identify. The Workgroup intends to consider other models for clean energy integration with EV charging.

Methods of Displaying Pricing Information at Public Charging Stations

Because of the complexity and importance of addressing permit streamlining and multi-unit dwelling unit infrastructure issues, the Workgroup has made these areas its first priority. In the meantime, Workgroup members intend to survey the existing options and the practices in other jurisdictions as a first step toward a recommended set of best practices with respect to display of pricing information.

Data Needs

The Workgroup has thus far identified three data needs: (1) projections on the availability of electric vehicles; (2) projections for electric vehicle sales; and (3) a breakdown of the number of residents in multi-unit dwellings by county and city.

Messaging and Outreach

Chair: Jill Sorensen

Members:	Kelly Russell	Daryl Braithwaite	Bihui Xu
	John Murach	Marisa Shockley	Fred Hoover
	Gary Skulnik		

Charges:

- Increasing consumer awareness and demand for electric vehicles through public outreach.

- Encouraging local and regional efforts to promote the use of EVs and attract federal funding for State and local EV programs.

Identified Stakeholders are:

- EV purchasers, sellers, and prospective drivers
- Utilities
- Electricians and construction trades
- Original Equipment Manufacturers (OEM[13]) and Commercial (product/service) providers
- Government offices and agencies, PPPs, local, state and federal planning and economic development entities
- Educators

Obstacles and Opportunities across stakeholder sets:

What do various stakeholders need and want?

All Stakeholders need basic knowledge of EVs and EV infrastructure; essentially "EV 101". For example, www.hybridcars.com/electric-car and www.eere.energy.gov/basics/vehicles/electric_vehicles are websites that provide clear and basic information at a glance. The primary needs of EV purchasers needs are relatively simple. Purchasers need information about vehicle and charging options, impact (dollar, environmental and life-style), incentives and consequence of not choosing an EV. Purchasers need financing options and coordination amongst service and product providers.

Government entities will be developing governmental policies, regulations and laws to help and facilitate the use of EVs and building EV infrastructure. Information on the current federal, state, regional and local EV initiatives should be gathered for this stakeholder set. This should also include incentives, including grants/loans, goals and policies if any, as well as the best practices cross the nation and abroad.

Trade workers such as electricians and construction workers are directly involved in the estimating, permitting and installation processes. These stakeholders need a brief glossary of terms so that any differences in local trade jargon and the state information may easily be recognized and resolved. This report assumes the fundamental building code requirements for each locality are already provided through various trade and industry channels and would not need to be communicated in detail on the state EV information resource. These stakeholders will need an awareness and easy reference or link to any code or regulatory requirements that may be applicable above and beyond the national, state and local codes. Importantly, they need a user friendly means to find information on, and if appropriate, access to, any fast track or streamlined permitting process or state mandated reporting or application process.

[13] Originally, an OEM was a company that supplied equipment to other companies to resell or incorporate into another product using the reseller's brand name. For example, a maker of refrigerators like Frigidaire might sell its refrigerators to a retailer like Sears to resell under a brand name owned by Sears. A number of companies, both equipment suppliers and equipment resellers, still use this meaning. More recently, OEM is used to refer to the company that acquires a product or component and reuses or incorporates it into a new product with its own brand name.

Trade workers need to be aware of any financial or other incentives the state and others may be providing that may affect the design, product selection, installation, reporting and pricing of EVSE installations. Examples of this information may include descriptions of state and other rebate or financial incentive information and links to forms, information and resources. Similarly, as EV developments advance, the stakeholders will need to be aware of EV related programs and offers from electric distribution companies and others that may impact the choice of EVSE product to install or require additional action on the part of the installer of contractor.

There are several areas of interest to these stakeholders that fit the "could want" category or that could be very helpful. These include a news page for information on changes in regulation or processes that may affect either the process or pricing for EVSE work. They may find links to national programs or offers that might be applicable to their work to be helpful. In addition, they may also appreciate links to other resources like GoElectricDrive.com and others for additional information and references.

EV Dealers are also important stakeholders in the process. They are the key stakeholder at the point of customer decisions to buy an electric vehicle and in the initial consideration of whether or not to upgrade to Level 2 charging at the time of purchase. These dealers will need to be advised of any registration, titling or fee requirements or incentives associated with electric vehicles sales or leases. Several major auto manufacturers are providing a service to the customers to procure and install EV charging equipment in the home or business for the customer with the sale of the electric vehicle. With that, the manufacturers and dealers will need to have access to the same information noted above for the installing contractor community, particularly information and resources on any special applications and reporting requirements, and any special programs and incentives available to the customer offered by state or local jurisdictions and the electric distribution utilities. Similar to the EVSE installers, this stakeholder group would also appreciate news on any pending changes to requirements and programs and updates on any process issues or offer limits.

Electric distribution utilities (utilities) provide the electric distribution service to the properties that choose to install electric vehicle chargers. With this, the utilities monitor sales and installation data to plan for any increases in the distribution load and the potential for reliability issues. The utilities have a fundamental role in educating customers about electric vehicles and charging and in helping customers understand and manage the potential impact to their energy use and bills. The utilities may develop and offer electric vehicle Time-of-Use rates and load management programs for EV customers. In addition, some utilities may find themselves in the position of providing charging equipment to customers, providing programs and services to help manage the potential system load impacts and reliability and, in the near future, developing ways to interface with the EV charging through the utility Smart Grids to provide advances services to the customers and in support of the grid. Utilities will need much of the same information as outlined for the EVSE installer community above, particularly, any state specific process or reporting requirements, state programs or incentives and new or information on pending changes to programs or regulations. As utilities develop EV specific programs and services for their customers, they may become providers of information to the state's messaging and outreach resource.

What media are best suited for outreach and communication?

A "one stop-shop" website and social media tools are highly recommended to avoid competing information and inconsistencies in this critical emerging market with such potential for consumer confusion. This could be a reference resource for state, regional and local governments, as well as for

entities and private companies' websites. These resources could be connected to the information center, and vice versa, to help to spread the message. Some examples are the Governor Office's Smart, Green and Growing web-page (http://www.green.maryland.gov/index.html), MPOs' websites, and local governments/local sustainability offices, and utility companies' websites.

In addition to these electronic communication tools, governments and regional entities could host EV forums, workshops, and events to get the messages out. Several cities, states and other entities have developed sites that can be used as learning opportunities for the development of the Maryland resource. In addition, targeted information, in the form of mailings, news briefs, and other direct contact channels may be appropriate and needed for particular stakeholders, such as the building trades or the auto dealers, with information specific to them, particularly on new regulatory or process requirements.

Who should "own and operate" the public repository of EV information?
There are several state agencies that are or will be directly involved in the advancement of electric vehicles and assessing the impact to roads, highways and traffic management, emissions impacts, consumer energy use and demand impacts and fuel tax revenues. Among these agencies, several could be the sponsor or host to manage and maintain the information repository, assuming appropriate staff and resources can be made available.

The Maryland Energy Administration has a strong connection to Clean Cities and the promotion of alternative fueled transportation and is typically is a driver of programs and incentives affecting EV advancement in the state. The MEA is also strongly connected to driving the state's Empower Maryland efforts which could create an interest in helping promote programs and services to help manage EV related energy use and demands. The MEA also "feels" like it has an open scope of responsibility that can easily accommodate the needs of all the supporting state agencies.

The Maryland Department of the Environment might also be considered if the state focus is primarily driven by the agencies core issues concerning air, water and environment.

The Maryland Department of Transportation could also be considered given its role in infrastructure support and promoting adequate services for Maryland vehicle operators and in the vehicle registration and use fees, as well as potential incentives.

How should state and local standards for EV charging be communicated?
For most stakeholders, communications are most effective using conventional web-based and print media. For trade workers and utilities, the fundamental code requirements and changes are routinely communicated to the installing trades through multiple industry and trade associations and channels. Code, standards, processes and requirements specific to Maryland and above the core codes should be communicated via the web resource and through notifications to the local and regional trade organizations and channels. If appropriate, there may be a need to provide speakers at local and regional trade and industry events and associations meetings or to host special forums with news and information for the interested trade stakeholders.

How can we incentivize and increase consumer awareness and demand for EVs through public outreach?
Effective communication of the state's support for electric vehicles, the benefits to the state and to Maryland residents by transitioning to electric transportation, along with easy consumer access to

information on programs and incentives that support EV's in Maryland are critical to increasing awareness and support. Communication outreach could leverage partners among auto dealers, electric distribution utilities and EVSE providers to share the information at the wide range of channels and outreach opportunities each engages in. For example, a green mortgage instrument could be explored which would allow for refinancing of any existing primary or home equity line of credit to a fixed long term rate of under 3%, with financing calculations to include value for S-RECs (Solar Renewable Energy Credit) both for the EV and any related renewable EV equipment such as wind or solar installations.

How should we communicate targeted policies to support fleet purchases of EVs?
While EV and EV equipment manufacturers have the most interest and benefit to support fleet purchases of EVs, governments and organizations that support EVs could also help to promote fleet purchases of EVs by:

(a) Helping to develop and publicize clean energy financing such as green mortgages;
(b) Supporting targeted demonstration projects and programs like the Maryland Hybrid Truck Initiative[14];
(c) Incorporating and advertising the use of electric vehicles in the state's vast fleet of transportation vehicles;
(d) Communicating and advertising incentives; and
(e) Providing policy support for local jurisdictions conversions to electric vehicles.

The state could also consider providing targeted incentive programs for fleet purchases, such as Maryland's Electric Truck Voucher Program[15], reaching out to private and public entities that operate fleets, and demonstrating the economic and environmental benefits of fleet purchases. Such benefits include lower lifetime costs for fuel and maintenance, less range anxiety because these companies have depots or parking lots where chargers could be installed and possible custom-made batteries for fleets. Governments could provide additional incentive programs to support EVs. As we know, Maryland provides credits for purchasing EVs and charging installations and allows EVs on HOV lanes as single-occupant. Other states have done other incentives on EVs, for example, discounted vehicle registration tax/fee, carpool parking for EVs, free parking for EVs, and others.

To get the information on these incentives out to the public, governments could contribute information for use in utility companies' monthly newsletters, as part of the monthly billing statement, and other internal means. This same information would be on the state EV website. Brochures and pamphlets detailing EV incentives could be distributed at MVA and its offices.

7. How should we communicate charging solutions for existing and future multi-dwelling units?
Local governments will set regulations and standards on charging stations for existing and future multi-dwelling unit neighborhoods. Potentially, the State, MPOs, and localities could work together to develop **models and guidelines** on this issue. MEA may be tasked to take the lead to develop these models & guidelines for this and other issues with regard to EV related local regulations and standards, such as building codes and zonings. Other workgroups in the Council are developing strategies to address these issues. Relevant information can be posted to the web resource described above.

[14] http://www.marylandhti.com/
[15] http://www.mde.state.md.us/programs/Air/MobileSources/DieselVehicleInformation/Documents/Electric%20Truck%20and%20Idle%20Reduction%20Grants%20Press%20Release_1.pdf

How should we communicate and build on local and regional efforts to promote the use of EVs and attract federal funding for State and local EV programs?

a. MEA, MDE or MDOT needs to take the lead to build a network of local and regional contacts;
b. Provide information on Best Practices on local and regional efforts;
c. Provide federal funding information to related local and regional entities, and collaborate with MEA, MDE or MDOT to assist/partner localities and regional agencies to apply federal grants;
d. Relevant information can be posted to the web resource described earlier.

How should we inform and connect EVI supports to renewable energy information and resources?
Provide the information on renewable energy for EVI at the EV center website and encourage or require certain percentage of EVI to use renewable energy by enacting policies and/or local and regional EV plans.

How should we set, share and maintain the best information about EV pricing and rules of the road (way-finding)?
The website will be the primary source for providing accurate and up to date information.

How should we stage performance benchmarking related to EVI goals and actions?
We need to develop and communicate EVI goals, actions, and performance measures in the State's EVI plan; monitor the progress on performance measures through the annual or multi-year attainment report, and include this information on the website.

How can we promote local economic development opportunities and EV events information?
With coordination and collaboration with DBED as well as local jurisdictions and Economic Development offices, we can reach the business audience that can provide support and opportunities. Support of the current EV industry in Maryland is crucial, as well as promotion and support of expansion or additional EV industry opportunities when they arise. Participation in state promotional events and demonstration opportunities will be an important component for promotion. Efforts to identify and bring these opportunities to Maryland will build our reputation as a state that wants and encourages the EV industry.

Infrastructure Planning/Strategy

Chair:	Dr. Andrew Farkas		
Members:	Chris Lepp	John Murach	T. Atwood
	Paul Skorochod	William Doane	Steve Arabia
	Colleen Quinn	Jim Kiley	Jill Sorensen

Charges:

- Develop an action plan to facilitate the successful integration of EVs into Maryland's transportation network;
- Develop a recommendation for a statewide charging infrastructure plan, including placement opportunities for public charging stations;
- Establish performance measures for meeting EV-related employment, infrastructure and regulatory goals.

The Work Group saw its charge as overarching to embrace the Council's goals as a whole and manifest them in an action plan for integrating EVs into the transportation network, an infrastructure plan for placing charging stations and performance measures for monitoring deployment and its impacts. Recognizing the challenges of developing recommendations for these goals, the workgroup will focus initially on best practices, assessments, and data acquisition. The group then expects to identify a plan study approach, strategies and performance measures.

Stakeholders Identified

There are several audiences that the report will address, but the main stakeholders for the plan and performance measures are the Governor and the General Assembly. Other stakeholders are local jurisdictions, EV owners, major EV trip attractors (employers, retailers and others) and public and private charging service providers.

Obstacles and opportunities Identified

> While private investment should be encouraged throughout the PEV market system, some public investment in charging stations may be necessary, but should be prudent, equitable, and well planned. Poorly planned public charging investments could lead to stranded assets or negative public perception. If left to chance, public charging could potentially have negative impacts on the electricity distribution system, and as PEV sales increase, contribute to peak electricity demand.[16]

In addition unplanned or poorly planned locations for charging stations could have negative impacts on urban form, trip distribution, and mode choice and also have implications for local zoning and land use. These concerns and potentially wide-ranging impacts should promote in-depth assessment and thoughtful development of recommendations.

Objectives

1. Develop parameters for a statewide charging infrastructure plan that estimates overall demand and market penetration for EVs through time; identifies areas of EV trip generation, corridors of EV trip-making and areas and facilities of trip attraction; and optimizes public charger locations at trip destinations, taking into account state's infrastructure plans, best practices of public and private sectors' EV/charger deployment, energy storage and distribution, local zoning, building codes and land use plans.
2. Recommend processes and regulations for inclusion of interrelationships between EVs/charger deployment with urban form, land use, alternative and renewable energy sources, and job creation in state's transportation, economic development and land use planning.
3. Recommend policies on EV use to mitigate traffic congestion, including, for example, preferential use of HOV/HOT lanes, intermodal connections with transit, preferential parking and ride-share promotion.
4. Identify performance measures and recommend a process for monitoring performance in meeting goals.

Data Needs

a. for statewide plan:

[16] TAKING CHARGE: Establishing California Leadership in the Plug-In Electric Vehicle Marketplace; Plug-in Hybrid & Electric Vehicle Research Center, University of California at Davis: http://library.constantcontact.com/download/get/file/1103337706528-19/TAKING+CHARGE+-+PEV+Leadership.pdf

household education levels by area unit
hybrid vehicle registrations by area
purchases of solar panels by area
number of vehicles owned by household by area
projected EV sales under various assumptions and sensitivity analyses
locations of major employment centers and intermodal hubs
locations of retail, recreation and entertainment centers
locations of higher education institutions
locations of trip destinations

b. for other objectives:
data on congestion mitigation/demand management best practices
data on state performance measures as applied to transportation and economic development

Next Steps

1. Continue reviewing EV charging infrastructure plans from other jurisdictions for applicable strategies and best practices that could help frame a Maryland plan.
2. Identify appropriate resources and mechanism within MDOT to support a charging infrastructure plan study, either through existing consulting arrangements or master research agreements with University of Maryland College Park and/or Morgan State University.
3. Advise MDOT in developing RFP for a statewide charging infrastructure plan that will:
    a. survey sample of residents in potential areas of EV trip generation
    b. estimate EV trips between generators and attractors and distribute through network
    c. determine site characteristics, local zoning requirements, and any significant electricity infrastructure constraints.
    d. identify high potential areas for public charging station location.

4. Develop processes, policies, performance measures and recommendations for final report, including congestion mitigation, statewide planning, performance monitoring, and PPPs for public charging,

Appendix C Draft proposed legislation[17]

State Government Article
Title 10. Governmental Procedures
Subtitle 6. Records
Part III. Access to Public records
§ 10-616. Required denials – Specific records
(p) Motor Vehicle Administration records containing personal information

New subparagraph:

(5)(XVI) FOR USE BY AN ELECTRIC COMPANY, AS DEFINED IN § 1-101 OF THE PUBLIC UTILITIES ARTICLE, BUT ONLY:

1. INFORMATION RELATING TO REGISTRATION OF PLUG-IN VEHICLES, AS DEFINED IN § 25-108 OF THE TRANSPORTATION ARTICLE, LIMITED TO VEHICLE INFORMATION AND ADDRESS OF REGISTERED OWNER;

2. FOR PURPOSES OF PLANNING FOR POWER AVAILABILITY AND RELIABILITY; AND

3. PROVIDED THAT THE PERSONAL INFORMATION IS NOT PUBLISHED, REDISCLOSED, INCLUDING TO ANY AFFILIATES, AS DEFINED IN § 7-501 OF THE PUBLIC UTILITIES ARTICLE, OR USED FOR MARKETING OR SOLICITATION.

Public Utility Article, Section 1-101(j)

(j)(1) "Electricity supplier" means a person:
(i) who sells:
1. electricity;
2. electricity supply services;
3. competitive billing services; or
4. competitive metering services; or
(ii) who purchases, brokers, arranges, or markets electricity or electricity supply services for sale to a retail electric customer.
(2) "Electricity supplier" includes an electric company, an aggregator, a broker, and a marketer of electricity.
(3) "Electricity supplier" does not include:
(i) the following persons who supply electricity and electricity supply services solely to occupants of a building for use by the occupants:
1. an owner/operator who holds ownership in and manages the internal distribution system serving the building; or
(ii) a person who generates on-site generated electricity.

[17] Public Service Commission Staff did not participate in the preparation of, nor provide any comment upon, and expresses no opinion with regard to any proposed legislation included in this Interim Report.

(iii) A PERSON THAT OWNS OR OPERATES EQUIPMENT USED FOR THE PURPOSE OF CHARGING ELECTRIC VEHICLES, COMMONLY REFERRED TO AS AN ELECTRIC VEHICLE CHARGING STATION (EVCS) OR ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE), AN ELECTRIC VEHICLE CHARGING STATION SERVICE COMPANY OR AN ELECTRIC VEHICLE CHARGING STATION SERVICE PROVIDER.

PUA Section 1-101(x)

"Public service company" means a common carrier company, electric company, gas company, sewage disposal company, telegraph company, telephone company, water company, or any combination of public service companies.

(1) "PUBLIC SERVICE COMPANY" DOES NOT INCLUDE
   i. A PERSON THAT OWNS OR OPERATES EQUIPMENT USED FOR THE PURPOSE OF CHARGING ELECTRIC VEHICLES, COMMONLY REFERRED TO AS AN ELECTRIC VEHICLE CHARGING STATION (EVCS) OR ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE), AN ELECTRIC VEHICLE CHARGING STATION SERVICE COMPANY OR AN ELECTRIC VEHICLE CHARGING STATION SERVICE PROVIDER.

Appendix D Stakeholders

Some groups will need to be part of the effort to facilitate the integration of EVs, and indeed will need to actively collaborate on the solutions to certain issues, while other stakeholders will require different types of outreach and education.

Public Service Commission (PSC) Staff
Motor Vehicle Administration (MVA)
Maryland Department of the Environment
Maryland Department of Transportation
Maryland Energy Administration
Maryland Department of General Services

Local governments

- Land use planning officials
- Public Works Departments
- Historic Preservation organizations
- ADA reps
- Permitting departments
- electrical inspectors
- Baltimore Special Benefits Districts

Electric Utilities
Electric Charging equipment and network suppliers
Electrical contractors and other construction trades

Homeowner Associations
Community Associations
Commercial Property Managers
Residential Property Managers
Residents of multi-family complexes

Electric Vehicle manufacturers and their dealers
Electric Vehicle purchasers
Fleet operators

Educators

Appendix E Data Needs

The following data needs were identified by workgroups:

Projections for:
Availability of EVs in Maryland and surrounding area
Vehicle sales

Current data for:
EV sales
Owner addresses
Lessee addresses
Commuting routes & traffic patterns

Survey data
Owner/Lessee's plans for recharging, specifically including:
- Employment and public charging utilization
- Residents without dedicated garage access

Population data:
Number of residents in multi-family or multi-unit dwellings by jurisdiction
Household education level by area unit
Hybrid vehicle registrations by area unit
Number of vehicles owned by household by area
Purchases of solar panels by area

Location and geographic data
Population centers
Employment centers
Activity Centers –retail, recreation, entertainment, etc.
Locations of higher education institutions
Intermodal hubs
Commuting routes

Emerging Technologies
Battery banking
AC-DC operation
Fast charge
Induction charging
Vanadium and metal-oxide super cooling batteries
Solar EV charging
Cell tower and signal boosting
Interoperability
Smart grid applications

Other data needs
Data on congestion mitigation/demand management best practices
Data on state performance measures as applied to transportation and economic development.

Appendix F - Electric Vehicle Council Acronyms

BEVI	Baltimore Electric Vehicle Initiative
EV	Electric Vehicles
EVIC	Electric Vehicle Infrastructure Council
EVSE	Electric Vehicle Supply Equipment (EV Recharging Equipment
J1772	A North American standard for electrical connectors for electric vehicles, maintained by the Society of Automotive Engineers and having the formal title "SAE Surface Vehicle Recommended Practice j1772, SAE Electric Vehicle Conductive Charge Coupler". It covers general physical, electrical, communication protocol and performance requirements for the EV conductive charge system and coupler.
LCSF	Low Carbon Fuel Standards
Level 1	120 Volt EVSE (J1772 is standard)
Level 2	240 Volt EVSE (J1772 is standard)
Level 3	DC EVSE (No standard)
MDE	Maryland Department of the Environment
MDOT	Maryland Department of Transportation
MDP	Maryland Department of Planning
MEA	Maryland Energy Administration
OEM	Original Equipment Manufacturer
PHEV	Plug in Electric Vehicles
PSC	Public Service Commission
RGGI	Regional Green House Gas Initiative
SHA	State Highway Administration
TCI	Transportation and Climate Initiative of the Northeast and Mid- Atlantic States

Appendix G Document library

STATE REPORTS:

Virginia Initial Electric Vehicle Plan

State of Connecticut Electric Vehicle Infrastructure Council Final Report

Electric Vehicle Infrastructure: A guide for local governments in Washington State

Electric Vehicles: Connecting Michigan's Past and Future

Electric Vehicle Charging Infrastructure Deployment Guidelines for the State of Tennessee

Plug-In Electric Vehicles: A Practical Plan for Progress (Indiana University)

Electric Vehicle Initiatives in Other States

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