

ELECTRIC VEHICLES IN METROPOLITAN WASHINGTON

Understanding the Region's
Current EV Readiness and
Options for Expanding Their Use



Metropolitan Washington
COUNCIL OF GOVERNMENTS

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Electric Vehicles in Metropolitan Washington

EXECUTIVE SUMMARY

This report seeks to provide a framework for establishing a regional readiness plan for the deployment of electric vehicles (EVs) in the metropolitan Washington region. While total EV ownership in the region is relatively low (compared with other cities such as Portland, Oregon, or Los Angeles), consumer interest in EVs is growing and more EV models are being introduced in the regional market. However, the metropolitan Washington region's charging infrastructure and EV policy frameworks are not yet positioned to accommodate greater market penetration of these vehicles. This report contains recommendations for stakeholders to promote a consistent set of practices across the region that will remove barriers to EV adoption and infrastructure planning while mitigating potential impacts on the electrical grid. This coordinated planning effort will help ensure that the region can receive the health, environmental, and sustainability benefits that EV technology offers.

BENEFITS OF EV DEPLOYMENT

EV adoption presents environmental, economic, and energy security benefits to the country and to the region. The U.S. Department of Energy (DOE) sees the electrification of vehicles as one of the highest impact strategies for reducing greenhouse gas emissions between now and 2030.¹ Due to the relatively low greenhouse gas emissions profile of the Washington region's electrical grid, EVs charged in most parts of the region produce fewer greenhouse gasses than any currently available hybrid vehicle (equivalent to 50 mpg or greater).² And as renewable portfolio standards and other policies increase the proportion of low- and no-emissions electricity available on the grid, the environmental impact of EVs will continue to improve.

EVs can play an important role in achieving the region's air quality goals by reducing vehicle emissions. In the metropolitan Washington region, transportation emissions accounted for 55 percent of NO_x emissions and 16 percent of fine particle (PM_{2.5}) emissions in 2007. Because EVs produce no tailpipe emissions, they are good candidates to help significantly reduce pollution from mobile sources.

¹ U.S. Department of Energy Office of Energy Efficiency & Renewable Energy. *Vehicle Technologies Program Multi-Year Program Plan (2011-2015)*. http://www1.eere.energy.gov/vehiclesandfuels/pdfs/program/vt_mypp_2011-2015.pdf

² Union of Concerned Scientists. *State of Charge: Electric Vehicles' Global Warming Emissions and Fuel-Cost Savings across the United States*. Rev. April 12, 2012. http://www.ucsusa.org/clean_vehicles/smart-transportation-solutions/advanced-vehicle-technologies/electric-cars/emissions-and-charging-costs-electric-cars.html

EVs also offer economic benefits through fuel cost savings. EVs have fuel economy ratings of 75 to over 100 miles per gallon equivalent (MPGe), and cost approximately \$0.04 per mile to operate when charged in the Washington region.³ Conventional vehicles, at an average of 27 mpg, cost nearly \$0.13 cents per mile.⁴ According to a study by the Union of Concerned Scientists, EV drivers in the Washington region could save an estimate of \$950 per year in fuel costs compared to those driving internal combustion vehicles, depending on fuel prices, electricity rates, and miles driven.⁵

Additionally, EVs offer their owners protection against future gasoline price volatility. And because EVs rely on domestically produced electricity rather than on petroleum, a largely imported fuel, they promote energy security.

CHALLENGES TO EV ADOPTION

Despite the benefits of EVs, challenges such as unfamiliarity with the technology, range anxiety, underdeveloped charging networks, limited vehicle availability, and relatively high vehicle cost have hindered their adoption. In addition, the absence of a clear policy framework for EV infrastructure planning—which considers permitting, siting, zoning, utility policy, and other issues—has amplified existing market barriers. A regional strategy is needed to bridge these obstacles and clear the way for wider EV recognition and use.

RECENT COG EV PLANNING INITIATIVES

COG held an EV Workshop in early 2011 to examine successful EV readiness strategies and to begin the conversation at a regional level on how to effectively and collectively deploy EV transportation technology. Participants, including local governments and industry experts, agreed on the need for an EV readiness strategy to facilitate deployment in the metropolitan Washington region.

In 2011, in response to interest in EV planning across the metropolitan Washington region, COG and the Greater Washington Region Clean Cities Coalition embarked on a new regional Electric Vehicle Planning Initiative. The scope of this stakeholder-driven initiative is to identify the issues for regional EV deployment and to make recommendations for the region and local jurisdictions to consider in designing and implementing programs to facilitate EV adoption.

³ In the metropolitan Washington region, EVs are estimated to cost approximately 4.3 cents to 6.6 cents per mile to operate, based on the Pepco Standard Offer Rate. Source: Union of Concerned Scientists, *State of Charge: Electric Vehicles' Global Warming Emissions and Fuel-Cost Savings across the United States*. Rev. April 12, 2012. http://www.ucsusa.org/clean_vehicles/smart-transportation-solutions/advanced-vehicle-technologies/electric-cars/emissions-and-charging-costs-electric-cars.html. See Table 2.1.

⁴ The EPA combined average fuel economy rating of U.S. compact cars in 2010 was 27 mpg, and a gas price of \$3.50 is assumed. See Union of Concerned Scientists report, above.

⁵ See Union of Concerned Scientists report, above.

Under this initiative, the Electric Vehicle Planning Workgroups (referred to herein as the Task Force) were focused on infrastructure development and local government policy. The Task Force considered information on vehicle ownership and usage patterns, as well as best practices locally and from across the United States, to assist in developing considerations, recommendations, and priorities for an EV strategy for the metropolitan Washington region.

Six subgroups were formed to address the specific issue areas of infrastructure siting; comprehensive planning, zoning, and building codes; permitting and inspection; electric utility policy; EV use in fleets; and outreach and education. These subgroups met regularly from February through June 2012 to develop the recommendations put forth in this report.

EV and EVSE DEPLOYMENT PLANNING

COG staff and the EVSE Deployment Planning subgroup sought to provide an assessment of the current state of EV adoption and charging infrastructure (broadly referred to as electric vehicle supply equipment, or EVSE) in the Washington, DC region. Staff used vehicle registration data, survey data on regional driving patterns, and information on publicly accessible EV charging stations to assess the potential for EV expansion. Given these findings, the stakeholder group provided recommendations on strategic locations for charging stations, suggestions for incentives to promote charging expansion, provisions to reduce the cost of future EVSE installation, and considerations for multifamily residential and workplace charging.

Regional Forecast for EV Ownership

According to data provided by Virginia, Maryland, and the District of Columbia Motor Vehicle Departments, there are approximately 500 EVs registered in the metropolitan Washington region. At least three major EV and PHEV models are available in the region, and service to convert hybrids to PHEVs is available.

While it may not be possible to predict exactly how many EVs will be operating in the region in coming years, one means of estimating future EV adoption is to analyze the recent experience of hybrid vehicle adoption. According to data from the Transportation Planning Board (TPB), from 2005 to 2011, the number of registered hybrid vehicles in the region grew more than 600 percent, from approximately 12,000 vehicles to more than 70,000. COG staff determined that a conservative estimate would be 1,500 to 3,000 EVs operating in the region by the end of the decade. The high estimate could see anywhere from 50,000 to 75,000 EVs on the region's roadways by 2020. A projection conducted by the Electric Power Research Institute, based on past hybrid sales, manufacturer production estimates, and other publicly available studies, predicts that there could be 15,000 to over 30,000 EVs in the Washington region by 2015.

Potential for EV Use

COG staff analyzed the potential for EVs in the context of current driving patterns in the region. According to COG's Household Travel Survey, most vehicle trips in the region are relatively short, with an average vehicle trip length of 7.7 miles. This is well within the range of one charge for all EVs in the market today. Therefore, for most daily commutes and other trip purposes, the relatively short length of the trips would not cause significant range anxiety.

Publicly Accessible EV Charging Infrastructure

A growing EV charging infrastructure exists in the metropolitan Washington region as a result of stimulus funding through state governments and private investment. COG staff developed an inventory of EV charging stations for the metropolitan Washington region. Altogether, the inventory identified 332 chargers in 133 publicly available charging station locations, 11 of which are planned stations. The District of Columbia has the most charging stations among COG jurisdictions (36), followed by Arlington County, Virginia (15); Fairfax County, Virginia (18); and Charles County, Maryland (11). The District of Columbia and Arlington County, Virginia, have the highest number of chargers (85 and 62, respectively). About 40 percent of the chargers are Level 1, and the remaining 60 percent are Level 2.⁶ No DC fast chargers were installed when the inventory was developed. The inventory indicates that building managers are installing EVSE in a variety of land uses.

LOCAL GOVERNMENT POLICY

To understand the current EV policy landscape of the metropolitan Washington region, COG conducted a survey of its 22 member jurisdictions in early 2012 about EV permitting procedures and infrastructure planning efforts. Results of the survey indicated that with some exceptions, most jurisdictions reported having no EV policy development in place. Two exceptions are the District of Columbia and Fairfax County, Virginia, which are integrating EV considerations into the permit review process, building code policy, and ADA parking restrictions. The City of Frederick, Maryland, and the City of Falls Church, Virginia, indicated that they are tracking EV charging permit applications. In other jurisdictions, electrical permits do not indicate whether an EV charging station is being installed—thus presenting a barrier to tracking. Additionally, if a dedicated circuit is already installed, EV drivers charging at 120V (Level 1) outlet would not need to obtain a permit.

The Municipal Policy and Permitting/Inspections subgroups emphasized that local governments will play a critical role in the region's EV readiness. To facilitate continued growth of the market and smooth the transition to higher rates of EV adoption, the subgroups recommend that local governments ensure that EV infrastructure development is addressed in comprehensive

⁶ See Section 2 for definitions of EV charging technology.

planning efforts and that zoning, building codes, and permitting and inspection processes provide a pathway to the expeditious installation of charging equipment. Streamlined permitting and inspection processes, EV and charging incentives, infrastructure readiness, low permitting and inspection costs, and nominal installation costs all contribute to reducing barriers to greater EV adoption.

ELECTRIC UTILITY POLICY

The regulatory status of EV charging stations—contained in provisions of electric utility policy—can help or hinder the ability of private companies and utilities to provide EV charging services. Across the region, the regulatory status of EV charging service providers is inconsistent and in some cases unclear. Maryland, Virginia, and the District of Columbia have all taken steps in recent years to resolve areas of uncertainty in their electric utility policy as it relates to EVs and EV charging. However, room for improvement remains, particularly when it comes to notifying utilities about EV charging station locations.

The Electric Utility Policy subgroup found that clear state-level policies are needed to promote private investment in EV charging infrastructure for charging in the for-pay charging market. They recommend that ideally, local and state policy would allow utilities to be notified in advance about the location of EV charging equipment so they can ensure that appropriate infrastructure is in place to accommodate the increased load and avoid service disruptions for their customers.

EVs FOR FLEET USE

A 2012 survey of fleets in the metropolitan Washington region found that EVs are being adopted slowly. The Greater Washington Region Clean Cities Coalition’s survey of 11 fleet managers found that most EVs currently in operation are used onsite, such as trucks used on landfills or campus landscaping equipment.⁷ According to the Coalition, fleet managers cite the cost of EVs and infrastructure as obstacles to purchasing additional EVs.

The Fleets subgroup provided recommendations on promoting partnerships between governments and manufacturers to reduce costs and increase utilization of EVs in fleets, encourage charging infrastructure sharing, and promote cooperative purchasing.

OUTREACH AND EDUCATION

The public’s current level of knowledge about electric vehicles is limited. Education efforts by private and public entities (including nongovernmental organizations, electric utilities, PEV

⁷ Greater Washington Region Clean Cities Coalition. *Clean Cities 2011 Annual Report*. Spring 2012.

service providers, auto dealers, other businesses, and government) are needed to bridge the gap.⁸ To set the stage for EV marketplace success in the metropolitan Washington region, regional partners involved in the Metropolitan COG Electric Vehicle Planning Initiative have identified key target audiences and information needs for those audiences.

In addition to identifying an initial list of resources for EV stakeholders to use in education and outreach efforts, the subgroup provides recommendations on how to increase outreach efforts throughout the region. Continuing to search for and share resources, engaging with regional partners to encourage collaboration and to share experiences, and promoting EV awareness through industry training and curricula should be priorities for the region.

SUMMARY OF RECOMMENDATIONS

Achieving EV readiness in the metropolitan Washington region will require a coordinated approach among all stakeholders, including utilities, players in the EV industry, state and local governments, and nonprofit groups. This report contains recommendations for these stakeholders to promote a consistent set of practices across the region that will remove barriers to EV adoption and infrastructure planning.

The top five recommendations to facilitate EV deployment in the region are as follows:

1. Stakeholder partnerships, such as a Washington Regional Electric Vehicle Partnership, should be formed to develop a business case for EVs, and to assess the potential for community return on investment.
2. Stakeholders should consider offering incentives such as preferred parking, HOV occupancy exceptions, and tax credits to promote EV adoption.
3. Electric permitting procedures should identify EVSE installations and notify electric utilities of their locations.
4. Outreach and education is needed to promote EV adoption and inform the public of its benefits.
5. Comprehensive plans and zoning regulations should guide EV infrastructure development and ensure that the built environment can accommodate future EVSE installations.

Further details are provided in the report and appendices.

⁸ Center for Climate and Energy Solutions. *An Action Plan to Integrate Plug-in Electric Vehicles with the U.S. Electrical Grid*. March 2012. <http://www.c2es.org/docUploads/PEV-action-plan.pdf>