Appendix A

About COG

For more than 50 years, the Metropolitan Washington Council of Governments, known as COG, has helped develop regional solutions to issues including the environment, affordable housing, growth and development, public health, child welfare, public safety, homeland security, and transportation. Founded in 1957, COG is comprised of elected officials from 21 local governments, members of the Maryland and Virginia state legislatures, and members of the U.S. Congress. COG and its 21 member governments seek to create a more accessible, sustainable, prosperous, and livable National Capital Region.

The organization's overall mission is expressed in our vision plan titled Region Forward, which is a comprehensive framework that resulted from the Greater Washington 2050 Initiative. Endorsed by each of COG's 21 local member jurisdictions, Region Forward creates a coordinated approach for identifying, tackling, and measuring regional issues that are likely to improve the accessibility, sustainability, prosperity, and livability of communities throughout the region.

In addition to the Region Forward vision, COG has used its far-reaching relationships to create regional reports on a number of issues. The 2008 *National Capital Region Climate Change Report* addresses short- and long-term goals to reduce greenhouse gas emissions, ultimately to 80 percent below 2005 levels by 2050. The COG Transportation Planning Board's (TPB's) *The Vision* from 1998 lays out eight broad goals and a host of objectives and strategies to guide the region's transportation investments. The *2006 COG Energy Strategic Plan* focuses on actions that COG and its members can take to help the region adjust to rising demand and tightening supply of global energy. The *Bicycle and Pedestrian Plan for the National Capital Region*, the *National Capital Region Freight Plan*, and the *Update of the Ground Access Element of the Washington–Baltimore Regional Airport System Plan*, all from 2010, show how the TPB is incorporating many transit modes and approaches into their comprehensive planning for the region.

The COG TPB is the federally designated Metropolitan Planning Organization for the region and serves as the regional forum for transportation planning. With participation from the District of Columbia and state departments of transportation and the region's local governments, the TPB prepares intermediate and long-range transportation plans and programs.

The TPB prepares the annual Constrained Long Range Plan (CLRP), which identifies all regionally significant transportation projects and programs that are planned in the metropolitan Washington metropolitan region between 2010 and 2040. Numerous technical committees provide information that contributes to recommendations and actions in the CLRP. The Transportation Improvement Program (TIP) is a six-year financial program that describes the schedule for obligating federal funds to state and local projects. The program is updated each year to reflect priority projects in the CLRP. The TIP serves as a schedule of accountability to the Federal Highway and Federal Transit Administrations.

In April 2009, the COG Board created the Climate Energy and Environment Policy Committee (CEEPC) to be its principal policy adviser on climate change, energy, green building, alternative fuels, solid waste and recycling policy issues. CEEPC is responsible for managing implementation of the *2008 National Capital Region Climate Change Report* mentioned above. That includes developing a regional climate change strategy to meet regional greenhouse gas reduction goals adopted by the COG Board.

In early 2011 retailers began selling electric vehicles in the metropolitan Washington region. COG organized an EV Forum to network and determine if the region was prepared to support electric vehicles. The consensus of participants at COG's EV Forum was that the Washington region needed to coordinate infrastructure planning for EVs, CEEPC determined that a regional electric vehicle (EV) strategy is a top priority for the region. Elected local government leaders who participated in COG's EV Forum were very interested in working with the Greater Washington Region Clean Cities Coalition and with the stakeholders who attended the forum—original equipment manufacturers, electric vehicle supply equipment manufacturers, Pepco, and Virginia Dominion Power, in particular. The Regional Electric Vehicle Planning workgroups were formed and began meeting in the fall of 2011.


Frederick County
City of Frederick
Montgomery County
City of Gaithersburg
City of Rockville
Loudoun County
City of College Park
City of Takoma Park
City of Greenbelt
District of Columbia
Town of Bladensburg
City of Falls Church
Arlington County
City of Fairfax
City of Bowie
City of Manassas
Fairfax County
City of Alexandria
Prince George's County
City of Manassas Park
Prince William County
Charles County

Appendix B
Glossary of Terms and Acronyms

AC (alternating current)—A type of electric power commonly found in households or businesses where the electric charge constantly and cyclically reverses directions.

Activity Clusters The Regional Activity Clusters depict groupings of Regional Activity Centers as well as the concentrations of housing and jobs immediately surrounding the Centers and along major transportation facilities. The Regional Activity Centers and Clusters have been developed by Metropolitan Washington Council of Government's Metropolitan Development Policy Committee as a tool to help guide land use and transportation planning decisions.

alternative fuel—As defined by the Energy Policy Act (EPAct) of 1992, the following fuels are defined as alternative fuels: pure methanol, ethanol, and other alcohols; blends of 85 percent or more of alcohol with gasoline; natural gas and liquid fuels domestically produced from natural gas; liquefied petroleum gas (propane); coal-derived liquid fuels; hydrogen; electricity; pure biodiesel (B100); fuels, other than alcohol, derived from biological materials; and P-Series fuels.

AFV (alternative fuel vehicle)—A vehicle that runs on any form of alternative fuel, whether it is electricity, solar energy, ethanol, biodiesel, etc.

amperage—The strength of an electrical current measured in amperes (amps).

automatic start/shutoff—An engine that automatically shuts off when the vehicle comes to a stop and restarts when the driver accelerates so energy isn't wasted during idling.

battery electric vehicle (BEV)—A battery-operated all-electric vehicle (electricity is stored in the batteries). BEVs generally have the highest all-electric range (e.g., 60–300 miles) and the largest battery capacity (e.g., 25–35 kWh). Includes Toyota RAV4 EV, Honda EV Plus, GM EV1, and Ford Ranger EV, which have been discontinued. Also includes Tesla Roadster, Nissan LEAF, and Ford Transit Connect.

DC (direct current)—A type of electric power commonly found in batteries and solar cells where the electricity charge flows in one direction.

DC Fast Charging—A direct-current charging that uses a 480-volt connection to provide 50kW to EV batteries. It provides a full charge in less than 30 minutes, enabling charging along heavy traffic corridors and at public charging stations. The DC fast charging connector has not yet been standardized. Most DC fast chargers today are using the CHAdeMO connector, produced in Japan. However, in May 2012 the International Society of Automotive Engineers (SAE) designated a new plug design as the standard for American and European models.

electric motor assist—Technology whereby the electric motor provides additional power to the engine during acceleration, passing, and hill climbing, and uses a smaller, more efficient energy conversion unit (engine).

electric motor drive—Technology whereby the electric motor alone provides the power for lower-speed driving.

EV (electric vehicle)—A vehicle comparable to the conventional gasoline-fueled vehicle, except that refueling is done through electricity and stored in a battery instead of a tank. Power is then transmitted to the wheels via an electric motor, rather than a traditional internal combustion engine.

EVSE (electric vehicle supply equipment)—Equipment used in charging electric vehicles.

extended-range electric vehicle (E-REV)—An electric vehicle with a relatively large battery (e.g., 16–27 kWh) capable of relatively long all-electric ranges (e.g., 40–60 miles) and with a back-up source of power such as gasoline or E85 ethanol. Includes Chevy Volt.

heavy duty motor vehicles—A vehicle over 10,000 lbs. gross vehicle weight rating (GVWR).

HV (hybrid vehicle)—A vehicle that uses two or more power sources, usually with one fuel source such as gasoline and the other often a form of electricity stored in a battery.

instantaneous demand—The maximum electric demand at the instant of greatest load.

kW (kilowatt)—A unit of power measurement (1 watt = 1 joule/second; 1,000 watts = 1 kilowatt).

kWh (kilowatt-hour)—A unit of energy measurement equal to one kilowatt acting for one hour; kWh is frequently used as a unit of electrical consumption by which domestic energy use is measured.

Level 1 charging—Standard 120 volts AC (VAC) branch circuit, which is the lowest common voltage level found in both residential and commercial buildings. Typical voltage ratings can be from 110 to 120 volts AC. Typical amp ratings for these receptacles are 15 or 20 amps. (Amanda's proposal-adapted from San Diego)

Level 2 charging—Typically described as the "primary" and "preferred" method for the EVSE for both private and publicly available facilities. Level 2 specifies a single-phase branch circuit with typical voltage ratings from 220 to 240 volts AC. (Amanda's proposal- adapted from San Diego)

Level 3 charging—A charging type that is still in development but is expected to provide a faster AC charging option at public stations. It would operate at a higher voltage and current than Level 2 EVSE. Level 3 charging is expected to deliver a full charge in less than 30 minutes.

light duty motor vehicle—A passenger car or light duty truck at or under 8,500 lbs. GVWR.

li-ion (lithium ion)—A rechargeable battery technology that uses the mineral lithium as a catalyst against various other materials to store and then deliver electrical energy.

Medium duty motor vehicle—A motor vehicle between 8,500 lbs. and 10,000 lbs. GVWR.

NEV (neighborhood electric vehicle)—A battery-charged EV with a given amount of speed of up to 25 mph in designated neighborhood areas; NEVs are great for small communities. Includes Columbia ParCar Mega, Dynasty IT, GEM E4, Miles ZX40S, Miles ZX40ST, and Zenn Standard.

NiMH (nickel metal hydride)—A rechargeable battery technology that uses the mineral nickel and a hydrogen-storing alloy to store and then deliver electrical energy.

Plug-in hybrid electric vehicle (PHEV)—A hybrid vehicle that runs on an internal combustion engine with batteries that can be recharged by plugging into an external electric power source. They have larger batteries than traditional hybrid vehicles (e.g., 5–22 kWh), allowing for a longer all-electric range. Because they have hybrid engines, they effectively have an unlimited driving range.

Private charging stations—Charging stations located on private property and available only to specified vehicle owners or specified vehicles. (Amanda's proposal)

Publicly accessible charging stations—A charging station that is available to the wider public (which could be located on public or private property or operated by a public or private firm).

Public charging station—A station installed or operated by a public entity, whether publicly available or not. (Amanda's proposal)

Regenerative braking—Technology whereby energy normally lost during coasting and braking is converted into electricity and stored in the battery.

V (voltage)—A measure of electric potential, which is the condition that causes electric energy to flow; measured in volts.

ZEV (zero emissions vehicle)—A vehicle that produces no tailpipe emissions, no evaporative emissions, and no emissions from gasoline refining or sales, according to California's Air Resource Board, which also produced the standards for the super ultra low emissions vehicle and the partial zero-emissions vehicle.

Appendix C
Resources/Links

Leading Planning Initiatives

City of Houston. *Electric Vehicle Charging Long Range Plan for the Greater Houston Area.* Available at http://www.greenhoustontx.gov/ev/pdf/longrangeevplan.pdf

Building Codes, Zoning, Permitting, and Inspections

City of Raleigh. *Electric Vehicle Charging Station Installation.* 2012. Available at http://www.raleighnc.gov/search/content/CityMgrDevServices/Articles/HowToElectricVehicleCharging.html

City of Raleigh. *Installing Public Charging Stations* [YouTube video]. Available at http://www.youtube.com/watch?v=jvPLvsg9y2o

City of Raleigh. *How-To Charge Your Electric Car at Home* [YouTube video]. Available at http://www.youtube.com/watch?v=_x4YezUX8lo&lr=1&uid=makWAtCIzgsRXZUNczyNEA

Oregon Building Codes Division (BCD). *Minor Label Program.* Available at http://www.bcd.oregon.gov/programs/minorlabel/minor_label_programs.html#2

North Carolina Advanced Energy Corporation. *Charging Station Installation Handbook for Electrical Contractors and Inspectors*. 2011. Available at http://www.advancedenergy.org/transportation/evse/Charging%20Handbook.pdf

Mecklenburg County, NC Code Enforcement. *Fourteen Years of Change: Key Initiatives 1996–2010.* May 25, 2010, rev. September 2010. Available at http://charmeck.org/mecklenburg/county/CodeEnforcement/AboutUs/Documents/BDC14yrsof%20change.pdf

U.S. Department of Justice. *2010 ADA Standards for Accessible Design.* September 15, 2010. Available at http://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards_prt.pdf

State of Washington Department of Commerce and Puget Sound Regional Council. *Electric Vehicle Infrastructure: A Guide for Local Governments in Washington State*. July 2010. Available at http://www.psrc.org/assets/4325/EVI_full_report.pdf

ECOtality North America. *EV Project: Accessibility at Public EV Charging Locations* [Prepared for the U.S. Department of Energy]. October 10, 2011. Available at http://www.theevproject.com/downloads/documents/EV%20Project%20-%20Accessibility%20at%20Public%20EV%20Charging%20Locations%20(97).pdf

Sustainable Transportation Strategies. *EV Charging for Persons with Disabilities.* February 2012. Available at http://www.vacleancities.org/wp-content/uploads/EV-Charging-ADA-Version-1.0s.pdf

Electric Utility Policy

The EV Project. *EV Project EVSE and Vehicle Usage Report*. Available at http://www.theevproject.com/documents.php

Office of Governor Martin O'Malley. *Governor O'Malley Names Members to the Electric Vehicle Infrastructure Council* [press release]. August 4, 2011. Available at http://www.governor.maryland.gov/pressreleases/110804.asp

Electric Vehicle Infrastructure Council. *Interim Report*. January 1, 2012. http://www.msa.md.gov/megafile/msa/speccol/sc5300/sc5339/000113/014000/014354/unrestricted/20120165e.pdf

Virginia Clean Cities. *Virginia Get Ready: Initial Electric Vehicle Plan*. October 13, 2010. Available at http://www.virginiaev.org/wp-content/uploads/2010/11/EV-VGR-FINAL-October-13-2010.pdf

Maryland House Bill 1280, 2012. Public Utilities—Electric Vehicle Users and Charging Stations—Exclusions. Available at http://mlis.state.md.us/2012rs/billfile/hb1280.htm

Maryland Senate Bill 997, 2012. Public Utilities—Electric Vehicle Users and Charging Stations—Exclusions. Available at http://mlis.state.md.us/2012rs/billfile/sb0997.htm

Virginia Code § 56-232.2:1. Regulation of Electric Vehicle Charging Service. Available at http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+56-232.2C1

District of Columbia Public Service Commission. Formal Case No. 1096, In the Matter of the Investigation into the Regulatory Providers of Electric Vehicle Charging Stations and Related Services. 2012. Available at http://www.dcpsc.org/edocket/docketsheets.asp?cbofctype=all&CaseNumber=FC+1096&ItemNumber=&orderno=&PartyFiling=&FilingType=&yr_filing=&Keywords=&FromDate=&ToDate=&toggle_text=Full+Text&show_result=Y&hdn_orderNumber=&hdn_chk_whole_search=&hdn_AssesmentType=

Virginia Code §56-1.2:1. Retail Sale of Electricity in Connection with the Provision of Electric Vehicle Charging Service. Available at http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+56-1.2C1

Maryland House Bill 1279, 2012. Motor Vehicle Administration—Plug-In Vehicles—Disclosure of Personal Information. Available at http://mlis.state.md.us/2012rs/billfile/hb1279.htm

Maryland Senate Bill 1279, 2012. Motor Vehicle Administration—Plug-In Vehicles—Disclosure of Personal Information. Available at http://mlis.state.md.us/2012rs/billfile/sb0998.htm

Pepco. *Maryland Standard Offer Service Rate Schedules*. 2012. Available at http://www.pepco.com/business/choice/md/rates/

Maryland Senate Bill 179, 2011. Electric Companies—Pilot Program for Charging Electric Vehicles. Available at http://mlis.state.md.us/2011rs/billfile/sb0179.htm

Maryland Code §7–211. Public Utilities Article. Available at http://mlis.state.md.us/asp/web_statutes.asp?gpu&7-211

Dominion. *Plug-In Electric Vehicles.* Available at http://www.dom.com/about/environment/electric-vehicles.jsp

Best Practices

California PUC Decision on Regulatory Status, Rates, and Notification

Public Utilities Commission of the State of California. *Alternative-Fueled Vehicle Information.* Available at http://www.cpuc.ca.gov/PUC/hottopics/1Energy/090814_ev.htm

Public Utilities Commission of the State of California. Rulemaking 09-08-009, Proposed Decision of Commissioner Ryan. May 21, 2010. Available at http://docs.cpuc.ca.gov/efile/PD/118345.pdf

Public Utilities Commission of the State of California. Rulemaking 09-08-009, Proposed Decision of Commissioner Peevey. Available at http://docs.cpuc.ca.gov/efile/PD/132120.pdf

Public Utilities Commission of the State of California. Rulemaking 09-08-009, Administrative Law Judge's Ruling—Phase 3. Available at http://docs.cpuc.ca.gov/efile/RULINGS/158505.pdf

California—Joint Investor Owned Utility Assessment Report for Plug0in Electric Vehicle Notification

Public Utilities Commission of the State of California. Rulemaking 09-08-009, Joint IOU Assessment Report for PEV Notification. Available at http://docs.cpuc.ca.gov/efile/REPORT/156710.pdf

Austin Energy—"Plug in EVerywhere" Initiative

Austin Energy. *Charge on the Road with Plug-In Everywhere.* 2012. Available at http://www.austinenergy.com/about%20us/environmental%20initiatives/Plug-In%20Partners/chargeOnTheRoad.htm

NRG—eVgo Charging Network

eVgo. *NRG Launches Nation's First Privately Funded, Comprehensive Electric Vehicle Charging Ecosystem* [press release]. November 18, 2010. Available at https://www.evgonetwork.com/News_and_Events/News_Archive/NRG_Launches_Nations_First_Privately_Funded_Comprehensive_Electric_Vehicle_Charging_Ecosystem/

Vehicles and Charging Equipment

U.S. Department of Energy Alternative Fuels and Advanced Vehicles Data Center. *Alternative and Advanced Vehicles*. Available at http://www.afdc.energy.gov/afdc/vehicles/index.html

U.S. Department of Energy Alternative Fuels and Advanced Vehicles Data Center. *All Electric Vehicle Basics.* Available at http://www.afdc.energy.gov/afdc/vehicles/electric_basics_ev.html

U.S. Department of Transportation Federal Highway Administration. *Our Nation's Highways 2008* (Figure 4-5. Percent of Trips and Vehicle Miles by Trip Length). Available at http://www.fhwa.dot.gov/policyinformation/pubs/pl08021/fig4_5.cfm

U.S. Department of Energy Alternative Fuels and Advanced Vehicles Data Center. *Hybrid Electric Vehicle Basics.* Available at http://www.afdc.energy.gov/afdc/vehicles/electric_basics_hev.html

U.S. Department of Energy Alternative Fuels and Advanced Vehicles Data Center. *Light Duty Vehicle Search.* Available at http://www.afdc.energy.gov/afdc/vehicles/search/light/autos/compare?c[]=10420&c[]=10303&c[]=10304&c[]=10357&c[]=10371&c[]=10375&c[]=10378&c[]=10386&c[]=10389&commit=Side-by-Side+Comparison

Coda Automotive
http://www.codaautomotive.com/
Photo: http://inhabitat.com/will-codas-upstart-electric-car-outperform-the-nissan-leaf/

Ford Focus
http://www.ford.com/electric/focuselectric/2012/
Photo: http://www.conceivablytech.com/5030/products/ford-unveils-focus-electric

Ford Azure Transit Connect
http://www.azuredynamics.com/products/transit-connect-electric.htm
Photo: http://www.azuredynamics.com/products/transit-connect-electric.htm

Honda Fit EV
http://automobiles.honda.com/fit/
Photo: http://www.topspeed.com/cars/honda/2011-honda-fit-ev-concept-ar100347.html

Mitsubishi i
http://i.mitsubishicars.com/
Photo: http://evworld.com/news.cfm?newsid=19244

Nissan LEAF

http://www.nissanusa.com/leaf-electric-car/

Photo: http://www.nissanusa.com/leaf-electric-car/specs-features/index#/leaf-electric-car/specs-features/index

Tesla Model S

http://www.teslamotors.com/models

Photo: http://webarchive.teslamotors.com/models/index.php

Wheego LiFe

http://wheego.net/

Photo: http://www.thedailygreen.com/environmental-news/latest/wheego-life-electric-car#fbIndex5

Chevrolet Volt

http://www.chevrolet.com/volt-electric-car/

Photo: http://www.chevrolet.com/volt-electric-car/

Prius Plug In

http://www.toyota.com/prius-plug-in/

Photo: http://www.toyota.com/prius-plug-in/photo-gallery.html

Smart Fortwo Electric Drive

http://www.smartusa.com/models/electric-drive/overview.aspx

Photo: http://www.auto-types.com/images/_autonews/2010-Smart_ForTwo_Electric_Drive_15.jpg

Toyota RAV4 EV

http://www.toyota.com/concept-vehicles/rav4ev.html

Photo: http://www.toyota.com/concept-vehicles/rav4ev.html

Tesla Roadster

http://www.teslamotors.com/roadster/

Photo: http://green.autoblog.com/photos/2009-tesla-roadster-v1-5-1/1110174/

Fisker Karma

http://www.fiskerautomotive.com/en-us

Photo: http://www.fiskerautomotive.com/en-us

BMW ActiveE

http://www.bmwusa.com/ActiveE

Photo: http://www.bmwusa.com/ActiveE

Electric car sales, as of April 2012

http://www.csmonitor.com/Business/In-Gear/2012/0501/Electric-car-sales-fall-in-April

Top Electric Cars 2010
http://www.cleanfleetreport.com/top-electric-cars-2010/

J1772 Connector
Photo: http://www.ittcannon.com/NewProduct.aspx?id=3802

CHAdeMO Connector
Photo: http://evworld.com/news.cfm?newsid=26062

EV Charging Station Inventory
The following sites offer information on available EVSE:

AFDC—http://www.afdc.energy.gov/afdc/locator/stations/?fuels=ELEC
- Mile radius and number of stations in the radius
- Name, address, and phone number
- Filter by public and private; does not include home
- Filter by state
- Map a route
- Slated to become the national clearinghouse for EVSE location information
- GeoEVSE Forum, a public-private partnership, helps to feed data into this map:

Plug share—http://www.plugshare.com/
- iPhone and Android app
- Home and public
- Anyone can add a location
- Name, address, and sometimes phone number
- Type and availability
- Google map base

ECOtality BLINK—http://blinknetwork.com/locator.html

Coulomb ChargePoint America—http://chargepointamerica.com/charging-find-stations.php

SemaConnect's SemaCharge—http://www.semacharge.com/publicstations.php

Go Electric Drive—
http://www.goelectricdrive.com/Charging/ChargingStationLocator.aspx#.TwN65Qa1ezY.email
- Uses AFDC data

Google Maps—maps.google.com
- Is another product of DOE's GeoEVSE forum
- Uses AFDC data
- Search for EV charging station near Washington, DC, on Google maps

Clean Technica—http://alternative-fuel.cleantechnica.com/d/a/Electric

- A database of searchable and comparable EV stations (no map)

Siting

Electric Vehicle Charging Micro-Climate™ Plan for the Greater Houston Area. Available at http://www.greenhoustontx.gov/ev/pdf/micorclimateplan.pdf

Kane County Electric Vehicle Infrastructure Task Force. *Draft Electric Vehicle Infrastructure Ordinance*. November 29, 2011. Available at http://ncrportal.mwcog.org/sites/surveys/EVP/Model%20Ordinances/Nov%20Electric%20Vehicle%20Insfrastructure.pdf

State of Washington Department of Commerce. July 2010. *Electric Vehicle Infrastructure: A Guide for Local Governments in Washington State.* Available at http://www.psrc.org/assets/4325/EVI_full_report.pdf

Center for Climate and Energy Solutions. *An Action Plan to Integrate Plug-in Electric Vehicles with the US Electrical Grid–C2ES.* March 2012. Available at http://electricvehicle.ieee.org/featured-articles/an-action-plan-to-integrate-plug-in-electric-vehicles-with-the-u-s-electrical-grid-center-for-climate-and-energy-solutions/

Mitre Corporation. *Electric Vehicle Charging Infrastructure Recommendations to Fairfax County.* 2011. Available at http://www.mitre.org/work/tech_papers/2011/11_2916/

Advanced Energy. *Charging Station Installation Handbook for Electrical Contractors and Inspectors*. 2011. Available at http://www.advancedenergy.org/transportation/evse/Charging%20Handbook.pdf

Electric Transportation Engineering Corporation. *Electric Vehicle Infrastructure Deployment Guidelines for the Greater San Diego Area.* May 2010. Available at http://www.theevproject.com/downloads/documents/Electric%20Vehicle%20Charging%20Infrastructure%20Deployment%20Guidelines%20for%20the%20Greater%20San%20Diego%20Area%20Ver%203.2.pdf

ECOtality. *Long-Range EV Charging Infrastructure Plan for Greater San Diego.* October 2010. Available at http://www.theevproject.com/downloads/documents/Long%20Range%20EV%20Charging%20Infrastructure%20Plan%20for%20the%20Greater%20San%20Diego%20Area%20Ver%204.1.pdf

Coulomb Technologies. *San Francisco MDU Program: "Multicharge SF"* [PowerPoint presentation]. February 2012. Available at http://www.mwcog.org/uploads/committee-documents/bl1eWlpc20120229071705.pdf

Snohomish County Planning and Development Services. *Snohomish County Electric Vehicle Infrastructure Requirements.* Available at http://www.mwcog.org/uploads/committee-documents/kV1eWlpe20120228145939.pdf

U.S. Department of Transportation, Federal Highway Administration. *Summary of Travel Trends: 2009 National Household Travel Survey.* June 2011. Available at http://nhts.ornl.gov/2009/pub/stt.pdf

The EV Project website: http://www.theevproject.com/index.php

U.S. Department of Energy's Vehicle Technologies Program. *Clean Cities Webinar—Charging Infrastructure Micro Climate Process and Data Collection.* Available at http://www1.eere.energy.gov/cleancities/toolbox/pdfs/ev_charging_infrastructure.pdf

Appendix D

Local Government EV Readiness

To begin understanding the current landscape of electric vehicle (EV) development in the metropolitan Washington region, in January 2012 COG conducted a survey of its member jurisdictions. The survey questions are listed below:

COG EV Survey Questions

1. *Do you track electric vehicle charging permit applications? If yes, please provide the total number of applications submitted.*

2. *How many total electric vehicle charging stations are currently permitted in your jurisdiction?*

    - *Privately owned residential?*
    - *Commercial (retail, offices, etc)?*
    - *Public (on-street or publically owned lots or garages)?*

3. *Describe your jurisdiction's electric vehicle permitting process for residential, commercial, and public charging.*

    - *Apply in-person or online?*
    - *What is the turnaround time?*
    - *What is the cost?*

4. *How long does the inspection process take after a charging station is installed (from scheduling to completion)?*

    - *Privately owned residential?*
    - *Commercial (retail, offices, etc.)?*
    - *Public (on-street or publically owned lots or garages)?*

5. *Has your jurisdiction developed policies related to electric vehicle or electric vehicle charging station deployment? If yes, please describe for each of the following and provide a web link to the policy.*

    - *Building code policy*
    - *Comprehensive planning*
    - *Restrictions on EV parking spaces, ADA restrictions, etc.*
    - *Green building or LEED considerations*
    - *Zoning and/or land use planning*

6. *Does your jurisdiction offer incentives, such as preferred parking, for electric vehicles? Describe the incentives.*

Overview of Results

Of the 21 jurisdictions surveyed, 15 responded. Two jurisdictions reported tracking EV permitting applications, and three, the District of Columbia, Fairfax County and City of Falls Church reported collecting and compiling permitting and inspection data. The three jurisdictions that collect data reported a total of 51 permitted charging stations. (See Tables D1-D4)

Most jurisdictions in the region permit EV charging stations as a standard electric appliance. [1] Since they do not issue special permit applications for EV charging units, they do not collect data on the number of EV charging units permitted, so the low response to the survey is misleading. Exceptions in the region are the City of Frederick, Maryland, and Falls Church, Virginia, which are currently tracking EV charging permit applications.

[1] Standard electrical appliance permit applies to Level 1 (120V, 15 amps, single phase) or Level 2 (208/240V, 30 amps, single phase) charging unit.

Table D1: Types of Permitting

Types of permitting	Residential	Commercial	Public
Online	DC, Fairfax Co.	DC, Fairfax Co.	DC
Paper			Fairfax Co.
Other	Falls Church	Falls Church	Falls Church

Table D2: Permit Turnaround Time

Permitting Turnaround Time	Residential	Commercial	Public
24-48 hrs	DC, Fairfax Co.	DC, Fairfax Co.	DC
More than 7 days	Falls Church	Falls Church	Falls Church, Fairfax County

Table D3: Permit Costs

Permitting Costs	Residential	Commercial	Public
Btwn $10-$50	Falls Church	Falls Church	Falls Church
Btwn $51-$100	Fairfax Co.	Fairfax Co.	NR
Variable	DC	DC	DC

Table D4: Inspection Turnaround Time

Inspection Turnaround Time	Residential	Commercial	Public
24-48 hrs	Falls Church, Fairfax	Falls Church, Fairfax	Falls Church, Fa
Btwn 3-7 days	DC	DC	DC

Electric Vehicle Policy Development

Most jurisdictions have no EV policy development in place. EV policies might include comprehensive plan language for new or redevelopment projects or zoning and land use language for existing development. The District of Columbia and Fairfax County, Virginia, currently have zoning considerations during the permit review process and building code policy and ADA parking restrictions for EV infrastructure development.

Incentives

The District of Columbia; City of Frederick, Maryland; Bowie, Maryland; Fairfax County, Virginia; and Manassas, Virginia offer the following incentives for EVs:

- dedicated on-street public charging near building entrances,
- preferred parking in public parking decks,
- preferred parking for fuel efficient vehicles at government buildings, and
- preferred parking at some LEED (Leadership in Energy and Environmental Design) buildings.

Montgomery County, Maryland; Takoma Park, Maryland; College Park, Maryland; Gaithersburg, Maryland; Rockville, Maryland; Arlington County, Virginia; Falls Church, Virginia; and Prince William County, Virginia do not offer EV incentives at this time.

Appendix E
Applicable EV Incentives, Laws, and Regulations

Federal Incentives

Vehicle Tax Credit for Cars

Purchasers of electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs) with a gross vehicle weight rating (GVWR) of up to 14,000 lbs. that meet specified emission standards receive a tax credit of $2,500 to $7,500, depending on size of battery (4–16 kWh). This tax credit applies to vehicles sold after December 31, 2009. This tax credit will begin to be phased out for each manufacturer in the second quarter following the calendar quarter in which a minimum of 200,000 qualified plug-in electric drive vehicles have been sold by that manufacturer for use in the United States (see the Internal Revenue Service Plug-In Electric Vehicle Credit website.[2]
)

Expired Federal Incentives (as of December 31, 2011)

Two- or Three-Wheelers, 10 percent consumer tax credit for two- or three-wheeled vehicles (up to a maximum of $2,500 tax credit on vehicles costing $25,000 or more). Vehicles must have a minimum of 2.5 kWh of batteries. Efforts are underway to renew this credit.

Conversions. 10 percent tax credit for plug-in conversions with a maximum credit of $4,000 (on a $40,000 conversion expense). This applies to both PHEV conversions and conversions from combustion engines to EVs. Efforts are underway to renew this credit.

Charging Stations. Tax credit on an EV charge station for 30 percent up to $1,000 for consumers and 30 percent up to $30,000 for businesses; this tax credit applies to equipment installed before the end of 2011. Efforts are underway to renew this credit.

Private Incentives

[2] 26 U.S.C. 30D. New Qualified Plug-in for Electric Drive Motor Vehicles. Available at http://www.gpo.gov/fdsys/

Electric Vehicle Supply Equipment (EVSE) Incentive–Coulomb Technologies. Coulomb Technologies' ChargePoint America program offers EVSE at no cost to individuals or entities in the metropolitan Washington region. To be eligible for free home charging stations, individuals living within the specified area must purchase a qualified plug-in EV. In most cases, the EVSE owner will pay for the installation; some cities, states, and utilities provide funding toward installation costs. All participants in the ChargePoint America program must agree to anonymous data collection after installation.

Electric Vehicle Supply Equipment (EVSE) Incentive–ECOtality. Through The EV Project, ECOtality offers EVSE at no cost to individuals in the metropolitan Washington region. To be eligible for free home charging stations, individuals living within the specified areas must purchase a qualified plug-in electric vehicle (PEV). Individuals purchasing an eligible PEV should apply at the dealership at the time of vehicle purchase. The EV Project Incentive Program also covers most, if not all, of the costs of EVSE installation. All participants in the EV Project Incentive Program must agree to anonymous data collection after installation.

Utility Incentives

Plug-In EV Charging Rate Reduction. Virginia Dominion Power. Virginia Dominion Power offers two rates for residential customers who own qualified PEVs: the Electric Vehicle Pricing Plan and the Electric Vehicle + Home Pricing Plan. The Electric Vehicle Pricing plan allows PEV owners to take advantage of lower rates during off-peak hours. Under this plan, customers must install an additional meter specifically for their EVSE; Dominion provides this meter at no charge. The Electric Vehicle + Home Pricing Plan is a whole-house pricing plan in which the customer's EVSE is treated as another appliance. Dominion provides a new meter at no charge to record energy usage in 30-minute intervals, allowing Dominion to apply time-of-use pricing that will encourage customers to charge their PEV during off-peak hours. PEV pricing plans are expected to expire on November 30, 2014. For more information, see the Dominion Plug-In Electric Vehicles website.

State and District Incentives

District of Columbia

Reduced Registration Fee for Fuel-Efficient Vehicles. A new motor vehicle with an EPA estimated average city fuel economy of at least 40 mpg is eligible for a reduced vehicle registration fee of $36. This reduced rate applies to the first two years of registration.[3]

Alternative Fuel and Fuel-Efficient Vehicle Title Tax Exemption. Qualified alternative fuel vehicles (AFVs) and motor vehicles with an EPA estimated average city fuel economy of at least 40 mpg are exempt from the excise tax imposed on an original certificate of title. The District of Columbia Department of Motor Vehicles determines which AFVs qualify for this exemption.[4]

Alternative Fuel Vehicle Exemption from Driving Restrictions. Certified clean fuel vehicles are exempt from time-of-day and day-of-week restrictions and commercial vehicle bans, if these vehicles are part of a fleet that operates at least 10 vehicles in an ozone nonattainment area, as defined by the Clean Air Act. This exemption does not permit unrestricted access to HOV lanes, except for covered fleet vehicles that have been certified by EPA as Inherently Low Emission Vehicles (ILEVs) and continue to be in compliance with applicable ILEV emission standards.[5]

[3] District of Columbia Code 50-1501.03. Available at http://government.westlaw.com/linkedslice/default.asp?SP=DCC-1000

[4] District of Columbia Code 50-2201.03(j). Available athttp://www.dccouncil.washington.dc.us/dcofficialcode

[5] District of Columbia Code 50-702 and 50-714. Available at http://www.dccouncil.washington.dc.us/dcofficialcode

Laws and Regulations

Alternative Fuel Vehicle Acquisition Requirements. Fleets that operate at least 10 vehicles in an ozone nonattainment area, as defined by the Clean Air Act, must ensure that 70 percent of newly purchased vehicles with a GVWR of 8,500 lbs. or less and 50% of vehicles with a GVWR between 8,500 lbs. and 26,000 lbs. are clean fuel vehicles. Clean fuel includes diesel, ethanol (including E85), hydrogen, liquefied petroleum gas, natural gas, reformulated gasoline, or other power source (including electricity) used in a clean fuel vehicle that complies with standards and requirements applicable to such vehicles. Certain exemptions apply.[6]

Maryland

EVSE Tax Credit. Effective July 1, 2011, the Maryland Energy Administration (MEA) offers an income tax credit equal to 20 percent of the cost of qualified EVSE that meets the definition of qualified alternative fuel vehicle refueling property as set forth in the Internal Revenue Code. The credit may not exceed $400 or the state income tax imposed for that tax year, whichever is greater. The tax credit is limited to one EVSE system per individual and 30 EVSE systems per business entity. Individuals and businesses must apply to MEA for the credit. Unused credits may not be carried over.[7]

Laws and Regulations

Plug-In Electric Vehicle Tax Credit. Purchasers of qualified EVs and PHEVs may apply for a tax credit of up to $2,000 against the imposed excise tax. The tax credit is limited to one vehicle per individual and 10 vehicles per business entity. Vehicles must be registered in Maryland, unless the vehicle manufacturer conforms to applicable state or federal laws or regulations governing clean-fuel vehicles or EVs during the year in which the vehicle was purchased or the vehicle was originally registered in another state. A qualified vehicle must meet the following criteria:

- Has a GVWR below 8,500 lbs.;
- Can achieve a maximum speed of at least 55 mph;
- Is a two-, three-, or four-wheeled vehicle;

[6] District of Columbia Code 50-702–50-703. Available at http://www.dccouncil.washington.dc.us/dcofficialcode
[7] Maryland House Bill 163, 2011, and Maryland Tax General Code 10-729. Available at http://mlis.state.md.us

- Is propelled to a significant extent by an electric motor that draws electricity from a battery with a capacity of at least four kilowatt hours in the case of a four-wheeled motor vehicle or at least 2.5 kilowatt hours in the case of a two- or three-wheeled motor vehicle;
- Has not been modified from original manufacturer specifications; and
- Was purchased between October 1, 2010, and July 1, 2013.

Electric Truck Purchase Vouchers. MEA provides vouchers for the purchase of new all-electric trucks. Eligible vehicles must have a GVWR over 10,000 lbs. and be registered for on-road use in the state of Maryland. Vouchers of $20,000 are available for qualified vehicles purchased from a dealership in Maryland or directly from a manufacturer located outside of Maryland. Vouchers of $15,000 are available for qualified vehicles purchased through a dealership located outside of Maryland. Application are limited to five vouchers per motor carrier. The voucher program ends December 31, 2013. See the Maryland Electric Truck Voucher Program website for more information.

Hybrid Electric Vehicle (HEV) Exemption from Vehicle Testing Requirements. Qualified HEVs are exempt from certain mandatory motor vehicle emissions and inspection testing requirements until September 30, 2012, if the vehicle obtains a fuel economy rating from EPA of at least 50 mpg during city driving. A qualified HEV must meet the current vehicle exhaust standard set under the federal Tier 2 program for gasoline-powered passenger vehicles and be able to draw propulsion energy from the following on-board sources of stored energy: (1) gasoline or diesel fuel and (2) a rechargeable energy storage system. Zero emissions vehicles are also exempt from certain mandatory motor vehicle emissions and inspection testing requirements.[8]

Provision for Plug-In Electric Vehicle Charging Incentives. By June 30, 2013, the Maryland Public Service Commission (PSC) must establish a pilot program for electric customers to charge all-electric (EVs) and plug-in hybrid electric vehicles (PHEVs) during off-peak hours. The pilot program must include at least two electric companies and provide incentives for residential, commercial, and governmental customers to charge EVs and PHEVs. The incentives should increase the efficiency and reliability of the electric distribution system and lower electricity use at times of high demand. The incentives may include time-of-use pricing, credits on distribution charges, rebates on the cost of charging systems, demand response programs, or other incentives approved by the PSC.[9]

[8] Maryland Transportation Code 23-206.3–206.4. Available at http://mlis.state.md.us
[9] Maryland Senate Bill 279, 2011; Maryland Public Utilities Code 7-2011. Available at mlis.state.md.us

Virginia

Alternative Fuels Grants and Loans. The Alternative Fuels Revolving Fund is used to distribute loans and grants to municipal, county, and commonwealth government agencies to support AFV programs; pay for AFV maintenance, operation, evaluation, or testing; pay for vehicle conversions; or improve alternative fuel infrastructure. Eligible alternative fuels include electricity, hydrogen, and natural gas. Projects with a funding match are given priority in the evaluation process.[10]

High Occupancy Vehicle (HOV) Lane Exemption. AFVs displaying the Virginia Clean Special Fuels license plate may use Virginia HOV lanes, regardless of the number of occupants, until July 1, 2012. For HOV lanes serving the I-95/I-395 corridor, only registered vehicles displaying Clean Special Fuels license plates issued before July 1, 2006, are exempt from HOV lane requirements. For HOV lanes serving the I-66 corridor, only registered vehicles displaying Clean Special Fuels license plates issued before July 1, 2011, are exempt from HOV lane requirements. Eligible vehicles include dedicated AFVs and some hybrid EVs; see the Virginia Department of Motor Vehicles website for a complete list of qualifying vehicles. The annual fee for Clean Special Fuels license plates is $25, in addition to the prescribed fee for commonwealth license plates.[11]

Alternative Fuel Vehicle and Fueling Infrastructure Loans. The Virginia Board of Education may use funding from the Literary Fund to provide loans to school boards that convert school buses to operate on alternative fuels or construct alternative fueling stations.[12]

[10] Virginia Code 33.1-223.4 and 33.1-223.7. Available at http://leg1.state.va.us/000/src.htm
[11] Virginia Code §33.1-46.2 and 46.2-749.3. Available at http://leg1.state.va.us/000/src.htm
[12] Virginia Code §22.1-146. Available at http://leg1.state.va.us/000/src.htm

Alternative Fuel and Hybrid Electric Vehicle Emissions Testing Exemption. The Virginia emissions inspection program, which requires biennial inspections of motor vehicles, does not apply to vehicles powered by compressed or liquefied natural gas, liquefied petroleum gas (propane), hydrogen, a combination of compressed natural gas and hydrogen, or electricity. Qualified HEVs with EPA fuel economy ratings of at least 50 mpg (city) are also exempt from the emissions inspection program unless remote sensing devices indicate that the HEV may not meet current emissions standards.[13]

Laws and Regulations

Authorization for Plug-In Electric Vehicle Charging Rate Incentives. The Virginia State Corporation Commission (SCC) directs public utilities to evaluate time-differentiated rates and other incentives to encourage off-peak EV and PHEV charging. The SCC may authorize public utilities to conduct pilot programs to determine the feasibility and implications of offering off-peak rates and other incentives. Pilot programs may include voluntary load control options, rate structures with financial incentives, rebates, or other incentives that offset the cost of purchasing or installing EVSE for users who elect off-peak rate structures. An electric utility that participates in an approved pilot program may be entitled to recover annually the costs of its participation in any pilot program conducted on or after January 1, 2011.[14]

Retail Electric Vehicle Charging Regulations. Retail PEV charging services provided by an individual who is not a public utility, public service corporation, or public service company, do not constitute the retail sale of electricity if the electricity is used solely for transportation purposes and the person providing the PEV charging service has procured the electricity from an authorized public utility. The Virginia SCC may not set rates, charges, or fees for retail PEV charging services provided by nonutilities.[15]

[13] Virginia Code §46.2-1177–46.2-1178. Available at http://leg1.state.va.us/000/src.htm

[14] Virginia House Bill 2105, 2011. Electric Vehicle Charging Service. Available at http://legis.state.va.us/ and Virginia Code 56-232.2. Available at http://leg1.state.va.us/000/src.htm

[15] Virginia Code 56-1.2 and 56.232.1:1. Available at http://leg1.state.va.us/000/src.htm

Provision for Alternative Fuel Vehicle Tax Reduction. Local governments may reduce personal property taxes paid on AFVs, specifically vehicles that operate using natural gas, liquefied petroleum gas or propane, hydrogen, or electricity, including low-speed vehicles.[16]

Sources

U.S. Department of Energy Alternative Fuels & Advanced Vehicles Data Center website (www.afdc.energy.gov).

Electric Auto Association Plug In America website (www.pluginamerica.org/incentives).

[16] Virginia Code 58.1-3506. Available at http://leg1.state.va.us/000/src.htm

Appendix F
Municipal Policy Attachments

Below is some sample text from Fairfax County, Virginia, that can be used for promoting electric vehicle (EV) planning in a comprehensive plan:

a) *"Encourage the provision of charging stations and related infrastructure for EVs within new development and redevelopment proposals."*

- Establishes general support by the Board of Supervisors for EV charging; however, it does not impose a requirement.

b) *"Encourage the provision of charging stations and related infrastructure for electric vehicles within new development and redevelopment proposals, particularly for residential proposals where other vehicle charging opportunities would not be available."*

- Emphasis on residential projects.

c) *"Encourage readiness for charging stations and related infrastructure for electric vehicles within new development and redevelopment proposals."*

- Emphasis on EV-ready design

d) *"Ensure that zoning proposals will incorporate the provision of charging stations and related infrastructure for electric vehicles."*

- Establishes an expectation for installation of EV charging facilities for all development proposals, without identifying specific thresholds.

e) *"Ensure that zoning proposals for multifamily residential development at or above the mid-range of the Plan density range will incorporate the provision of charging stations and related infrastructure for electric vehicles."*

- Establishes an expectation for installation of EV charging facilities for certain development proposals, without identifying specific thresholds.

f) *"Ensure that zoning proposals will incorporate the provision of charging stations and related infrastructure for electric vehicles. There should be at least one charging station provided for every XXXX parking spaces; charging stations should have charging times no*

longer than those of Level 2 charging stations as described in '{insert name of guidance document}."

- Establishes an expectation for installation of EV charging facilities for all development proposals, with specific thresholds established.

Appendix G
Utility Policy Attachment—Best Practices

California Public Utilities Commission (PUC) Decision on Regulatory Status, Rates, and Notification

The California Public Utilities Commission (PUC) began its decision-making process for electric vehicle (EV) policy in late 2009.[17] The case, titled Rulemaking 09-08-009, considered tariffs, infrastructure, and policies needed for California investor-owned electric utilities to prepare the electricity system for projected growth in the light-duty, plug-in vehicle market across the state.

The rulemaking proceeded in three phases. Phase 1 concerned the status of EVs in the state's Public Utilities Code.[18] The PUC decided that EV charging stations should not be regulated as public utilities.

Phase 2 delved into a number of deeper policy issues, including rate design, notification, separate metering, utility cost recovery policy, and education and outreach programs.[19] The decision was as follows:

- Directs electric utilities to collaborate with automakers, state agencies, and other stakeholders to develop a notification process for the purposes of infrastructure planning, and to create a data clearinghouse that contains relevant data about existing electric vehicles in the state;

- Affirms that the electric utilities' existing residential PEV rates are sufficient for early PEV market development;

[17] Public Utilities Commission of the State of California. *Alternative-Fueled Vehicle Information.* Available at http://www.cpuc.ca.gov/PUC/hottopics/1Energy/090814_ev.htm

[18] Public Utilities Commission of the State of California. Rulemaking 09-08-009, Proposed Decision of Commissioner Ryan. May 21, 2010. Available at http://docs.cpuc.ca.gov/efile/PD/118345.pdf

[19] Public Utilities Commission of the State of California. Rulemaking 09-08-009, Proposed Decision of Commissioner Peevey. Available at http://docs.cpuc.ca.gov/efile/PD/132120.pdf

- Each utility offers at least two options for PEV pricing, including rates that increase as the customer's monthly cumulative usage increases and time-of-use rates that increase in peak usage hours. The existing PEV rate schedules vary in regard to requiring a second meter for EVSE.
- However, for separately metered residential PEV customers, the Commission recommends opt-in, nontiered, time of use pricing. That is, the rates (1) should be voluntary for the customer, (2) will not increase with cumulative monthly consumption, and (3) will reflect peak versus nonpeak consumption.

- Similarly, affirms that existing commercial and industrial rates, which include time-of-use pricing, are sufficient in the early PEV market for nonresidential EV charging stations;

- Supports offering a variety of EV metering options to residential customers;
  - The PUC decided that to promote customer choice and to avoid requirements that might in the future become unnecessary; both single metering and separate metering of EV charging should be allowed.
  - However, to ensure that minimum data and technological functionality is preserved, the PUC decided that all meters should, at a minimum, be Advanced Metering Infrastructure (AMI) and Health Alert Network (HAN) enabled.
  - In addition, the cost of a separate PEV meter should be borne by the customer, not the rate base. The PUC supports a monthly charge to recoup this cost.
  - Submetering may offer a lower-cost alternative, but utilities will need to develop a technical protocol for PEV submeters before they are allowed.

- Determines that, on an interim basis—until June 30, 2013, when a report on the grid impacts of PEVs is due to the commission—the costs of any distribution or service facility upgrades necessary to accommodate residential PEV charging will be treated as a shared costs; and

- Acknowledges that utilities have a unique role in communicating information to current and potential EV owners due to their existing relationship with the customers. While it is not appropriate for utilities to actively promote PEV adoption, they should engage in customer education about metering arrangements, rates, demand response programs, EVSE equipment, EVSE installation, safety, reliability, and off-peak charging.

The Commission reserved a number of issues for Phase 3 and subsequent rulemakings, including whether to adopt uniform national standards for EVs and the impact of EVs on state greenhouse gas and renewable energy policy.[20]

California—Joint Investor Owned Utility Assessment Report for Plug-in Electric Vehicle (PEV) Notification

Pursuant to the California PUC's Phase 2 EV Decision, three major California Investor Owned Utilities submitted a joint report analyzing notification options for EVs.[21] The report was filed in December 2011.

The following are key features of EV notification data that were identified in the report:

- **Exhaustiveness.** Notification data should cover as many charging locations as possible to ensure distribution system stability.
- **Granularity.** Notification data should include street-address-level information and charging rate to conduct all necessary infrastructure assessments on impacted distribution equipment (the investor-owned utilities [IOUs] expect impacts from charging PEVs mainly on neighborhood distribution infrastructure).
- **Timeliness.** Notification data and processes should allow time for the IOUs to conduct infrastructure assessments and execute necessary upgrades as soon as possible.

[20] Public Utilities Commission of the State of California. Rulemaking 09-08-009, Filed August 20, 2009. *Administrative Law Judge's Ruling—Phase 3.* Available at http://docs.cpuc.ca.gov/efile/RULINGS/158505.pdf

[21] Public Utilities Commission of the State of California. Rulemaking 09-08-009, Filed August 20, 2009. *Joint IOU Assessment Report for PEV Notification.* Available at http://docs.cpuc.ca.gov/efile/REPORT/156710.pdf

- **Scalability.** Notification processes and systems should be scalable to PEV market growth.
- **Costs.** Notification processes and systems should carry the least internal and external costs.

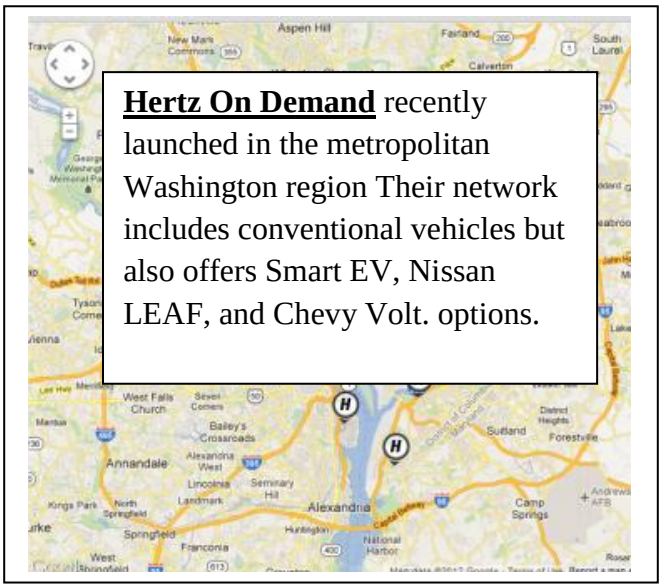
In California, utilities found that no single EV notification source provided data that met all of the above criteria. Therefore, a combination of notification methods is recommended to meet these information needs.

The utilities anticipate that they could eventually source PEV notification data primarily from the Department of Motor Vehicles and supplement the data through a combination of secondary sources, including original equipment manufacturers, local government, customers, and possibly load scanning capabilities.

Appendix H
Car Sharing Programs in the National Capital Region

Car-share parking spaces are located in various underutilized existing lots, making the most of scarce urban and suburban real estate. According to one company's website, each shared car takes several personally owned vehicles off the road and 10 percent of the population is expected to adopt car sharing as their primary mode of transportation. Car-share electric vehicles (EVs) could help serve urban residents or those living in multifamily developments. Three companies offer car sharing in the region:

Zipcar has over 9,000 vehicles in the region's fleet. Zipcar has piloted EVs in other locations including California and Massachusetts. Factors influencing Zipcar's use of EVs in a given city include presence of zero emission vehicle requirements and grant funding.

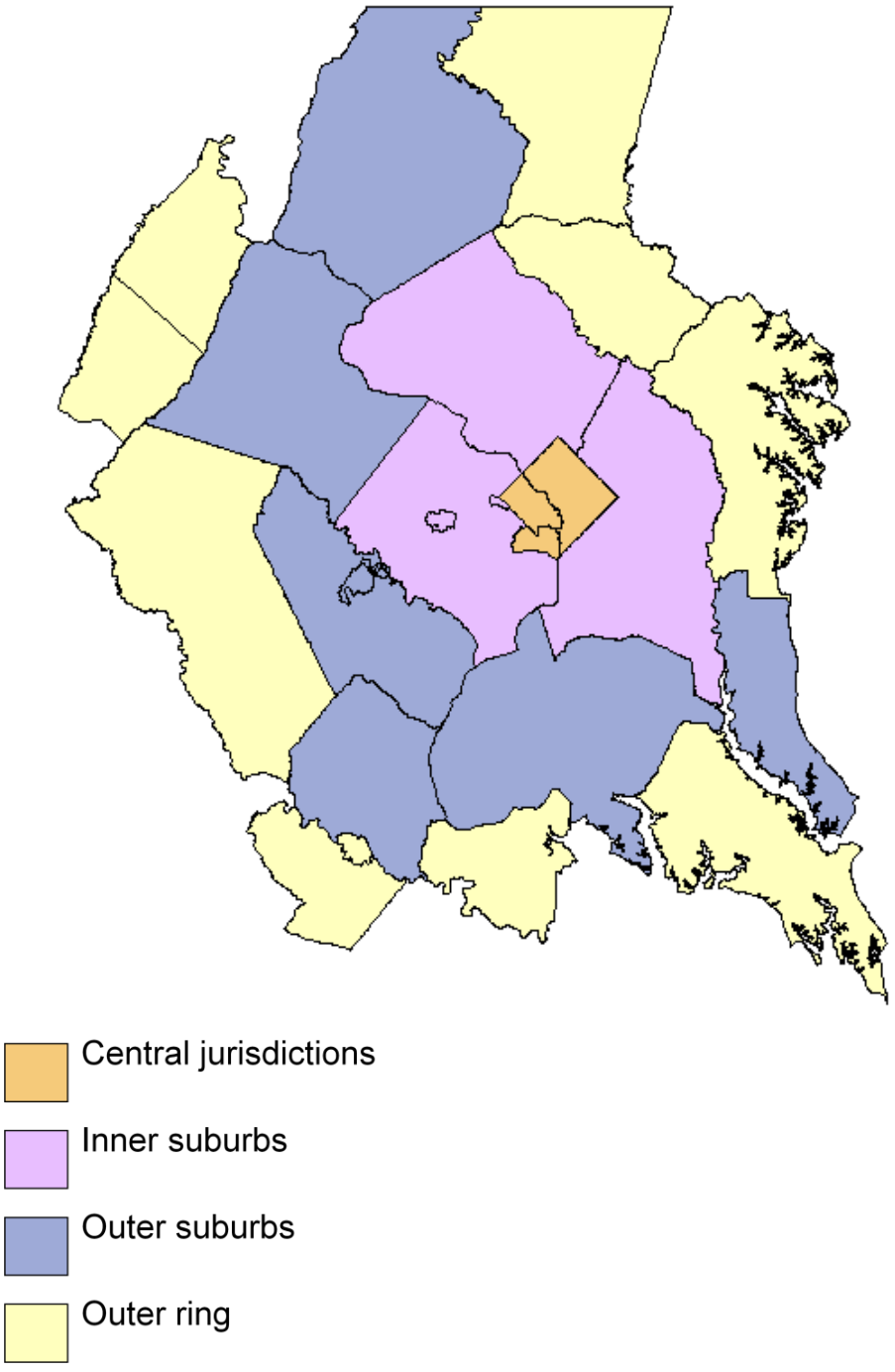


Hertz On Demand recently launched in the metropolitan Washington region Their network includes conventional vehicles but also offers Smart EV, Nissan LEAF, and Chevy Volt. options.

car2go is a car-sharing network of conventional fortwos. car2go does not offer EVs at this time.

Appendix I
Metropolitan Washington Region Travel Patterns and Household Travel Demand

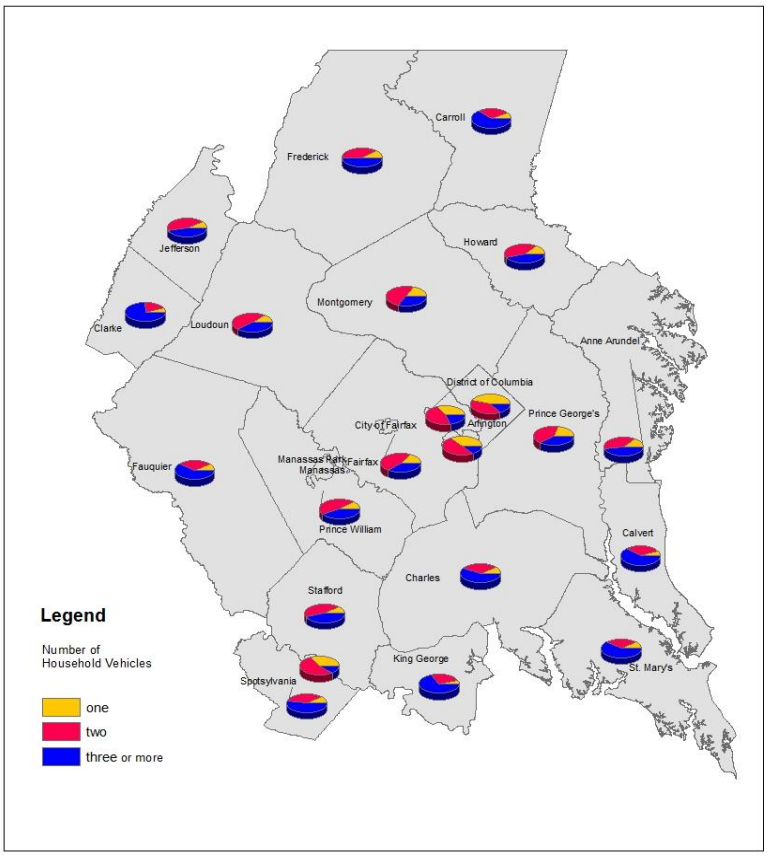
Figure I1. Jurisdiction Categories Used by COG DTP to Evaluate Travel Patterns



Vehicles by Household

The COG Department of Transportation Planning (DTP) conducted a household travel demand survey in 2007–2008. The results are used in planning for future transportation needs. Figure I1 shows the jurisdictional categories that DTP used when evaluating travel patterns. Figure I2 shows vehicle ownership by household and provides some indication of the spatial distribution of potential electric vehicle (EV) demand. Due to EV range restrictions and access to private garages for home charging, EVs may be most suitable as the second car in two or more vehicle households located in suburban, car-dependent areas. Outer suburbs and exurbs may require more frequent long trips that are out of the range of electric vehicles. Core urban areas may be served by alternative transportation and car-shared EVs and may contain more one-car or no-car households.

Figure I2. Number of Household Vehicles in the Metropolitan Washington Region

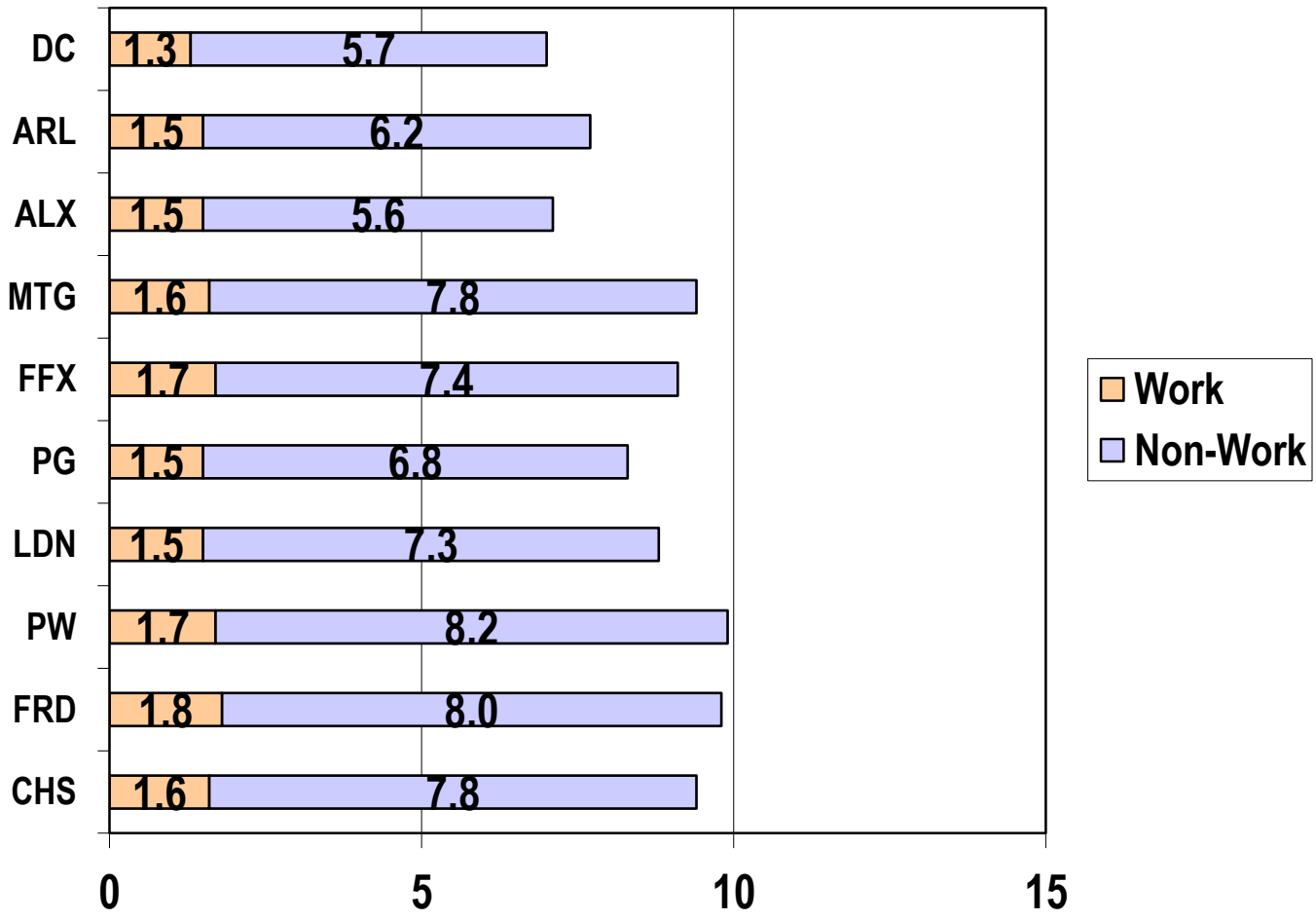


Source: COG Department of Transportation Planning, *2007/2008 Household Travel Survey*.

Daily Trips

As noted in Figure I3, households generally take six to 10 trips per day, and most of those trips are for non-work-related purposes. [22]

Figure I3. Average Daily Trips per Household by Jurisdiction and Purpose (# of trips), Metropolitan Washington Region

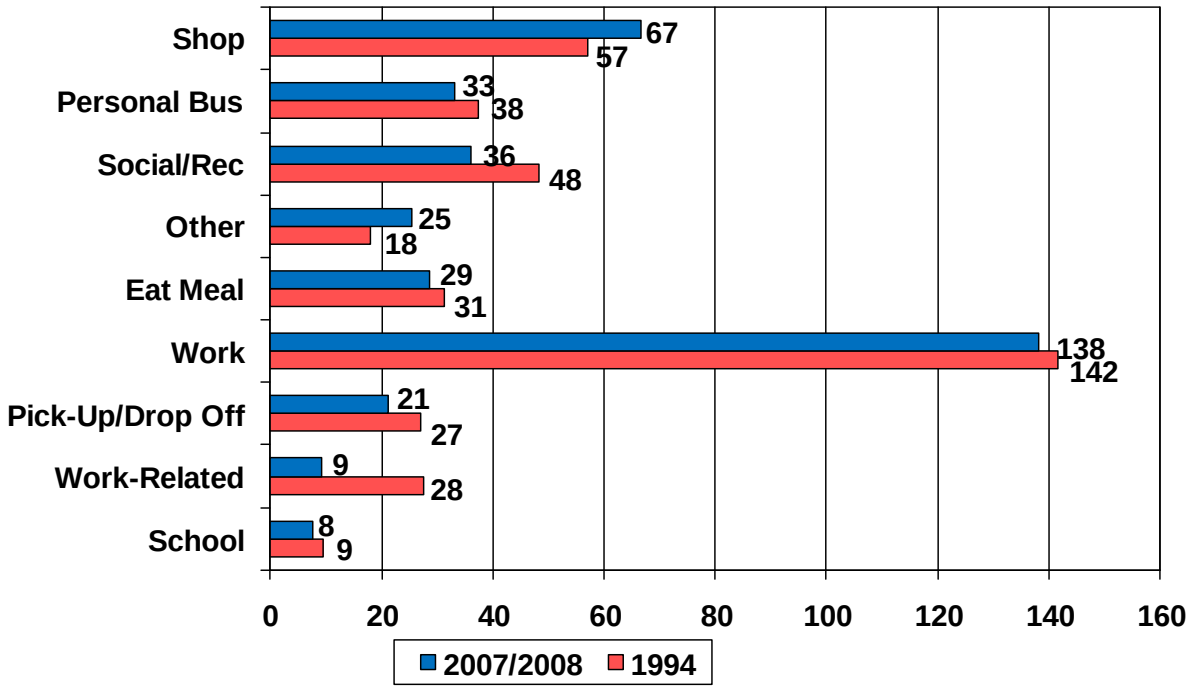


[22] COG Department of Transportation Planning. 2010. *Household Travel Survey for the Metropolitan Washington Region*. Presentation by Robert E. Griffiths, Technical Services Director, National Capital Region Transportation Planning Board, Metropolitan Washington Council of Governments. For the National Capital Planning Commission Meeting. April 15, 2010.

Trip Purpose

For individuals between 25 and 34 years old, most trips in the metropolitan Washington region are related to work. Shopping, personal business, and social/recreational trips are also prevalent. For senior citizens, most trips are related to shopping, personal business, and recreation (see Figure I4).

Figure I4. Number of Daily Trips by Trip Purpose per 100 Persons (ages 25 to 34 years)



Trip Length

The median vehicle trip in the metropolitan Washington region is less than 10 miles. Many trips are less than 2–5 miles.[23] Figure I5 shows how median length of trip varies by trip purpose.

Figure I5. Trip Length Distribution by Purpose (distance in miles)

Purpose	Median Trip Length
Work	9.3
To Work after Other Stop (JTW)	4.8
Work-Related	5.6
School	2.1
Soc/Rec	2.9
Shop/Meal	2.1
Pick-Up	2.2
Personal Bus	3.5
Other	1.5

[23] COG DTP 2010. *Household Travel Survey for the Metropolitan Washington Region*. Presentation by Robert E. Griffiths, Technical Services Director, National Capital Region Transportation Planning Board, Metropolitan Washington Council of Governments. For the National Capital Planning Commission Meeting. April 15, 2010.