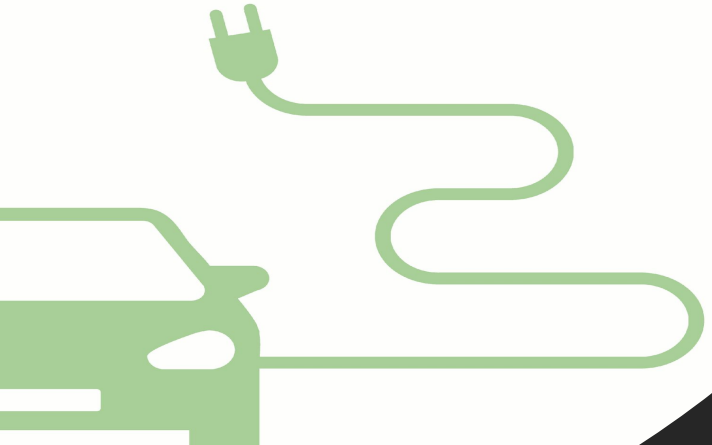
EVSE 101 Workshop



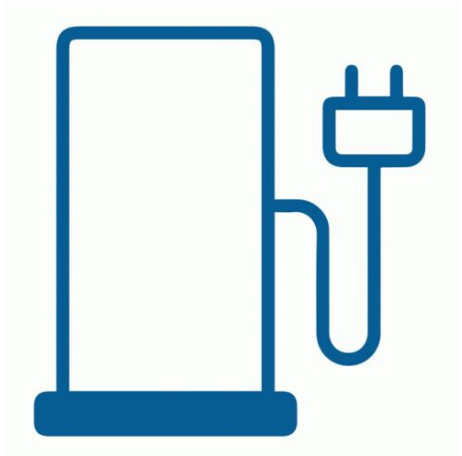
MARYLAND ZERO EMISSION Vehicle Infrastructure Plan

Workshop Goals

Goal of Today's Presentation: Present information to give the community a better understanding of EV basics, including charging, resources, and statewide EV plans and goals.

- **Understand** types of **Electric Vehicle terms**
- **Review** National EV Infrastructure (NEVI) Plans
- **Learn** about **EV Chargers**, Costs and **Mapping Routes**
- **Identify** ways to **Save Money** and apply for rebates
- **Discuss** Free Technical 1x1 **Advising Sessions**

Where is the nearest EV Charger to you right now? (Type in the Group Chat!)



Who owns an Electric Vehicle?

USE THE CHAT- Type YES!

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EVSE - Charging

EV Terminology

1. **A - amp**
2. **AC - alternating current**
3. **BEV - battery electric vehicle**
4. **CCS - Combined Charging System**
5. **DC - direct current**
6. **DCFC - DC fast charger**
7. **EV - electric vehicle**
8. **EVSE - electric vehicle supply equipment**
9. **LD - light-duty**
10. **V - volt**

https://afdc.energy.gov/glossary

Basics: Electric Drive Vehicles

Hybrid Electric Vehicle (HEV)
- Powered by an engine and electric motor
- Does not use electric vehicle supply equipment (EVSE) to charge the battery
- 10 – 50 miles added fuel economy

Plug-In Hybrid Electric Vehicle (PHEV)
- Powered by an electric motor and engine
- Uses EVSE and regenerative braking to charge the battery
- 20-50 miles electric range

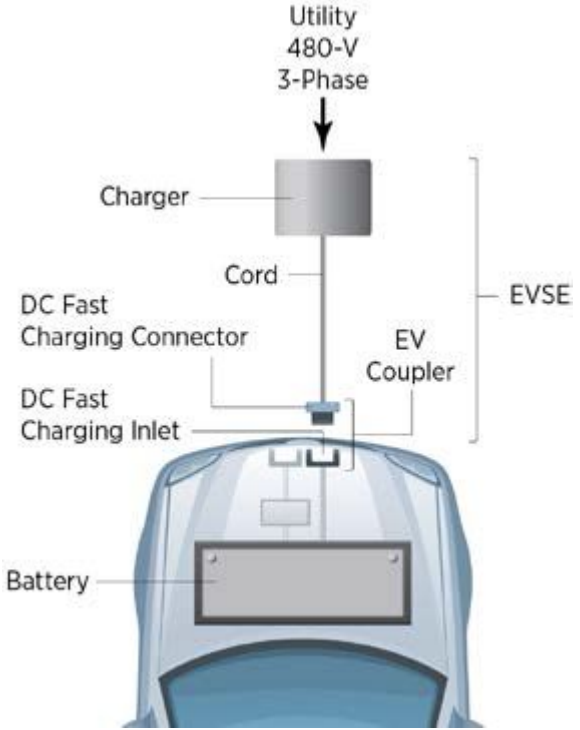
All-Electric Vehicle (BEV)
- Powered by an electric motor
- Uses EVSE and regenerative braking to charge the battery
- 80 – 500 miles electric range

Charging Infrastructure

Electric Vehicle Supply Equipment (EVSE): All the equipment needed to deliver electrical energy from an electricity source to a PEV battery

- **EV Charging Port:** An EV charging port provides power to charge only one vehicle at a time even though it may have multiple connectors.
- **Connector:** A connector is what is plugged into a vehicle to charge it. Multiple connectors can be available on one EV charging port, but only one vehicle will charge at a time.

Connectors are sometimes called plugs.



Level 2

DC Fast Charger

DC and
Level 2

Maryland Energy Administration

IRS

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION

Maryland Department of the Environment

ACCELERATING MARYLAND'S CLEAN CITIES TRANSPORTATION FUTURE

MARYLAND ZERO EMISSION Vehicle Infrastructure Plan

Level One
120V
Electrical source from a regular home outlet.

Charge Time
2-5 miles of range per 1 hour of charging.

Charging Electric Vehicles at Home:

Most EVs **Charge Overnight** via **Level 1**

Outlet Type	**Regular** GFI **Outlet**, available in your home
Charge Cost	Nissan Leaf (15 ¢/kWh): **$9.00**
Speed of Charge	2 to 5 miles of range per hour of charging (12-24 hours) Approx 72 miles per full charge
Primary Location	Residential
Other Locations	• On Street • Multi unit dwelling • Single family residential • Garages and driveways

Charging Electric Vehicles at Home & Public

Requires permitting and licensed contractors for installation. **LEVEL 2**

Outlet Type	Charging Infrastructure (need electrician)
Charge Cost	Nissan Leaf (15 ¢/kWh): **$9.00** per session $1.5-5k+
Speed of Charge	**10 - 20 miles of range per hour of charged** (3-8 hours)
Primary Location	Residential Commercial
Other Locations	On Street Multi unit dwelling Single family residential Garages and driveways

DC Fast Charge
208 or 480V 3-Phase AC Electrical source from a public station.

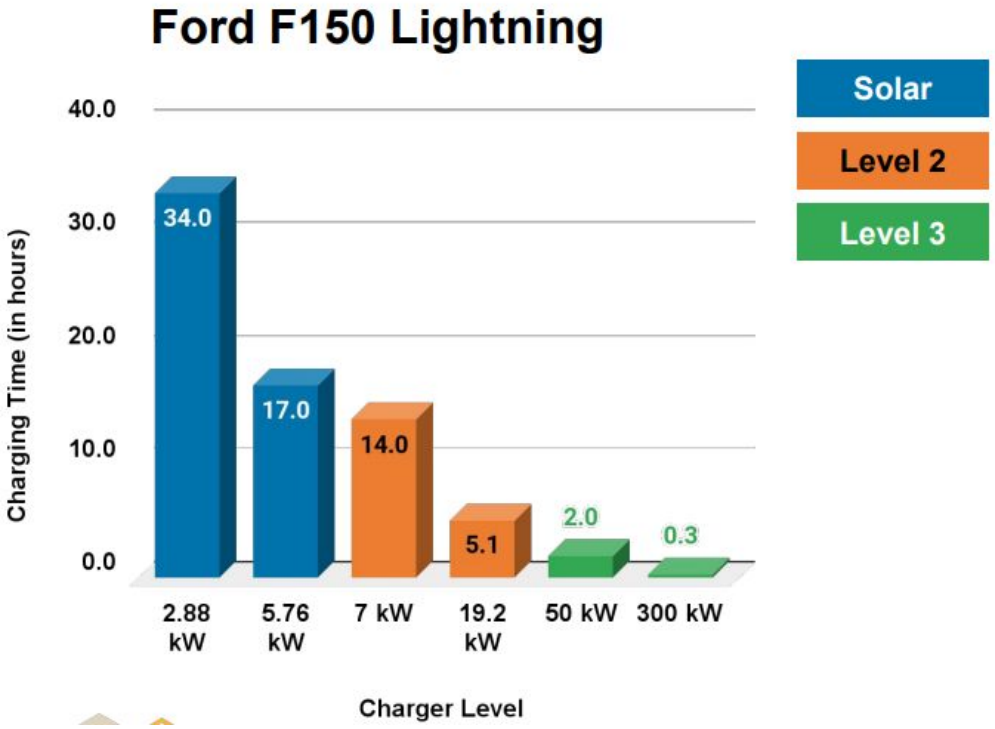
Charge Time
60-80 miles of range per 20 minutes of charging.

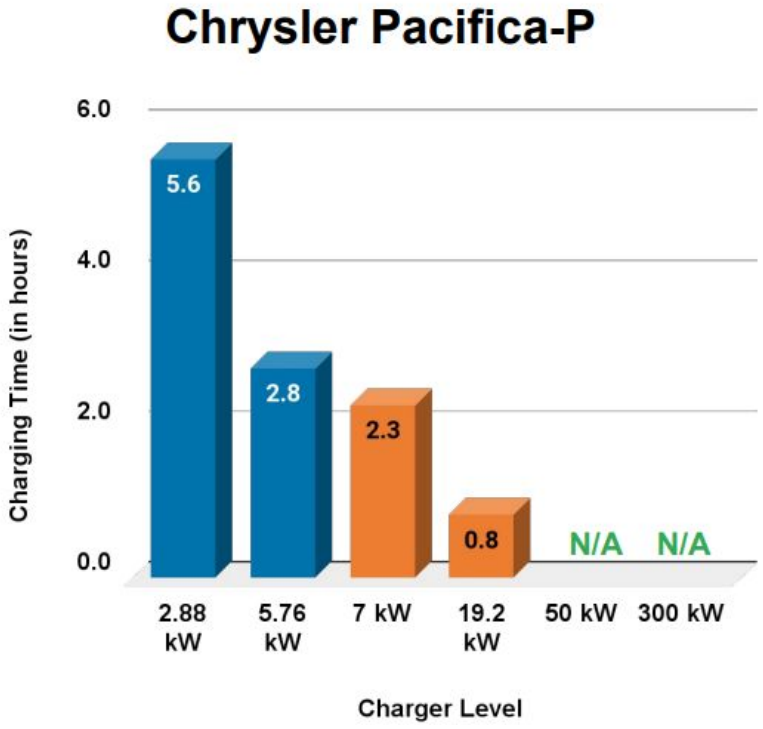
Charging Electric Vehicles - Public / Vacation

Requires permitting and licensed contractors for installation. **LEVEL 3**

Outlet Type	Charging Infrastructure (need electrician)
Charge Cost	Nissan Leaf (23-35 ¢/kWh): **$15.00-$25.00** per session
Install Cost	$80k-$120k+
Speed of Charge	80-200 miles of range per hour of charged (30min-1 hour)
Primary Location	Commercial Only
Other Locations	Parking lots/garages Public/municipal Transportation hubs Hotels Retail/Workplaces Office parks or Industrial facilities Fleets

How long does it take to charge my vehicle?





Determine EV and EVSE Costs

Hardware Costs	Software/Networking Costs
Physical charging stations, ports, panels, transformers, etc., including wiring/conduit.	**Provides data and analytics to fleet managers to inform charging decisions.**
Look for several bids. Main differentiators are the connector types, speed and price. • Signage • Safety, ADA and Accessibility • Additional Lighting Requirements • Standing Water/Flood Issues • Installation Meets Building Code Requirements • Installation Meets Local Zoning Requirements	Software can be built-in to chargers or purchased from third-party vendors. This enables cost-effective charging management, along with integration of distributed energy resources (DERs) and grid services. • Networks can be closed or open. • Different station management systems dependent on provider

MARYLAND ZERO EMISSION Vehicle Infrastructure Plan

Vehicle Electrification in Maryland

Amanda Hinh, NEVI Program Manager

August 2024

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION

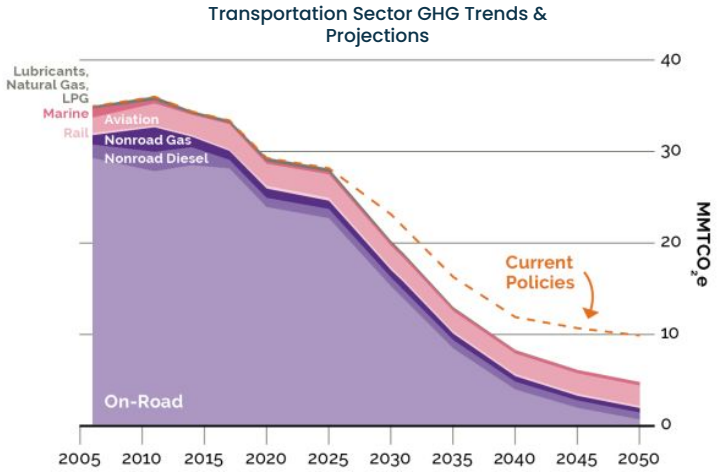
Why Is Maryland Working On EVs?

Climate Pollution Reduction

- Impacts of Climate Change
- Greenhouse Gas (GHG) Emission Reduction Target
  - 60% reduction from 2006 levels by 2031
  - Net zero by 2045
- Policies:
  - Climate Solutions Now Act (CSNA)
  - Advanced Clean Cars II (ACCII)

Federal Investment

- Infrastructure Investment and Jobs Act (IIJA)
  - NEVI - $5 Billion
  - CFI - $2.5 Billion



The Transportation sector accounts for **over one third** of all GHG emissions in Maryland

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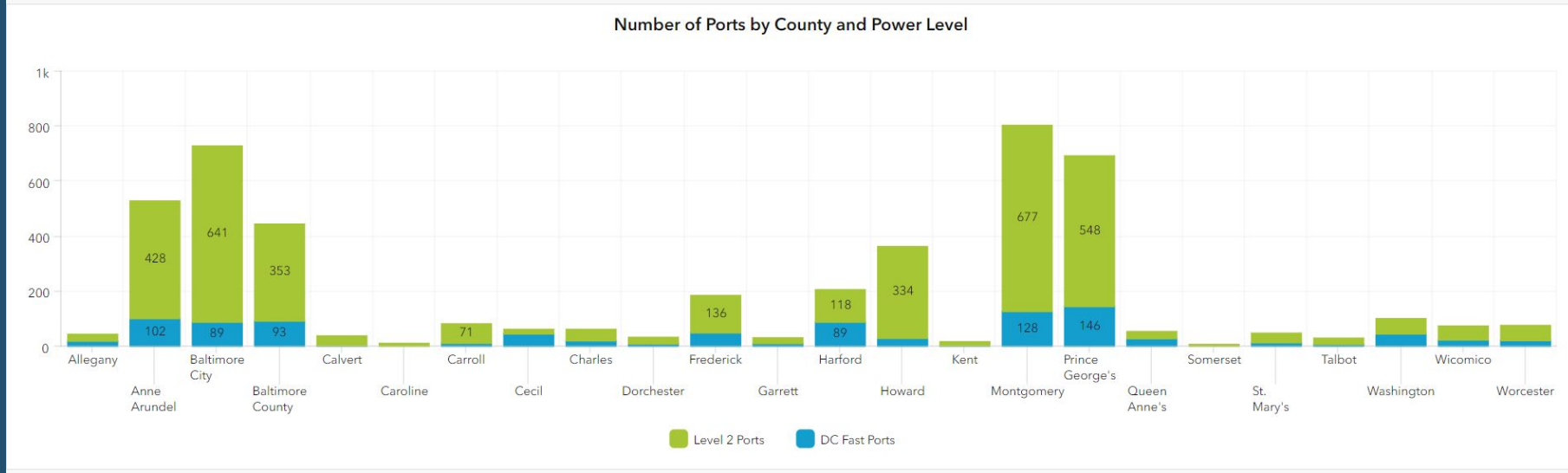
EV Registration Growth in Maryland

108,584 EVs Registered in Maryland as of June 30, 2024

Public Charging Stations in Maryland

Data as of June 30, 2024

Registration | **Charging Stations** | Charging Network



1,664
Charging Stations (Sites)

3,753
Level 2 Ports

995
DC Fast Ports

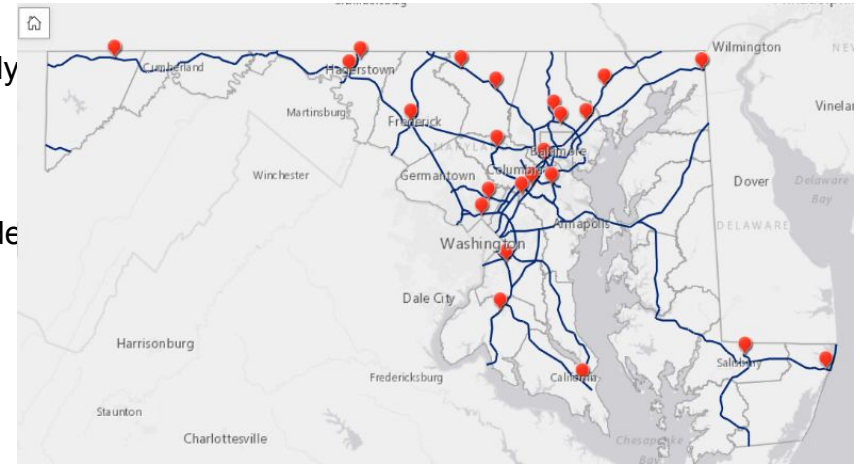
0.77
Total Ports per 1,000 people

MARYLAND ZERO EMISSION Vehicle Infrastructure Plan

National Electric Vehicle Infrastructure (NEVI) Program

Overview/Purpose

- Authorized under the Infrastructure Investment and Jobs Act (IIJA)
- $5 Billion to State DOTs from 2021-2026 to strategically deploy EV charging infrastructure
  - Approximately $63M allocated to Maryland
- Establish an interconnected network to support a convenient, affordable, reliable, and equitable statewide and national EV network



NEVI Round 1

- Conditional awards issued on July 10th
- 23 projects spanning 15 counties
- Sites include travel centers, shopping malls, gas stations and convenience stores
- Leverages over $12.1M in federal funds and $5.6M in private match
- Projects to begin operations by Fall 2025

Resources

Maryland NEVI Plan and Program

- https://evplan.mdot.maryland.gov/

MarylandEV

- https://marylandev.org/

MDOT EV Dashboard

- https://experience.arcgis.com/experience/d8d908d9e62f4054b14ec8f6cbb5392b/page/Dashboard-%26-Metrics/?views=Registration%2CEV-Registered

Zero Emission Electric Vehicle Infrastructure Council (ZEEVIC)

- https://www.mdot.maryland.gov/tso/pages/Index.aspx?PageId=81

Contact Information

MARYLAND DEPARTMENT OF TRANSPORTATION

Amanda Hinh, NEVI Program Manager
Email: ahinh@mdot.maryland.gov

MARYLAND ZERO EMISSION Vehicle Infrastructure Plan

EVSE Checklist

Factors for Improved Performance

- Consider location of EVSE units. ($1000 per foot of trenching)
- Review climate in the area (canopy/garage for -20℉)
- Catalogue types and sizes of EVs that will be using the EVSE.
- Estimate expected demand for EV charging.
- Review availability of grid power, solar and battery capacity

FULL LIST HERE: Charging Infrastructure Procurement and Installation

EVSE Safety Charging an EV is safe and easy!

Before buying an EV, have a qualified electrician install:

- A new, dedicated circuit for your EV charging device. Older home wiring may not be suitable for use with EV supply equipment.
- Level II charging devices (if that is your preferred charging method).

Scan to learn more!

Charging EVs:

- Follow manufacturer's guidelines when charging your vehicle. Check with your local dealer if you need additional information.
- Purchase a charging device that is certified by a nationally recognized testing laboratory.
- Plug Level I EV chargers directly into an outlet designed to handle the amperage of the charging device. Never use a multiplug adapter or extension cord.
- Install a residual current device with the charging unit. It will turn off the power if a fault is detected and help prevent a fire.
- Place all charging device components out of reach of children when not in use.
- Maintain the components of your charging station according to the manufacturer's maintenance guidelines. Signs of excessive wear may indicate a potential shock hazard. Never use an EV charger with obvious signs of damage.
- Cover the EV charging station outlet to stop water from entering. Check the manufacturer's guidelines to make sure it is safe to charge your EV in wet conditions.

Charging an EV is safe when done with certified equipment. By following these tips, you can lower your risk of having an associated fire or an electric shock injury.

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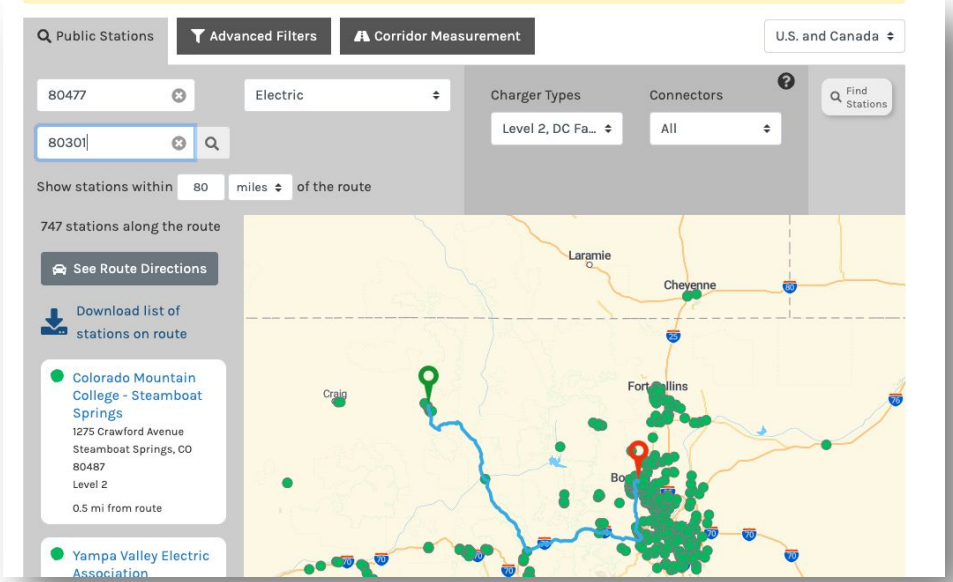

U.S. DOE Alternative Fuel Data Center (web only):
https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC

Near us shows location
https://afdc.energy.gov/fuels/electricity-locations#/find/nearest?fuel=ELEC&location=baltimore+

Map a route
https://afdc.energy.gov/fuels/electricity-locations#/find/route?fuel=ELEC&start=baltimore+&end=washington+dc+&ev_levels=dc_fast

Check out the AFDC EV Station Locator and Map a Route to locate electrification sites

Finding a Public Station

State Programs, Tax Incentives, and Other Resources

Incentives for EVs and EVSE

- Federal Income Tax Credit up to $7,500 for the purchase of a qualifying Electric Vehicle or Plug-in Hybrid.
- Maryland Excise Tax Credit of $3,000 for qualifying zero-emission plug-in electric or fuel cell electric vehicles.
- **Maryland offers a rebate of 50% of the cost of Electric Vehicle Charging Equipment and Installation.** The rebate is up to $700 for individuals; and $5,000 for businesses.
- Federal EVSE credit of up to 30% or $1,000 for charging station equipment.
- Plug-in vehicles qualify to access High Occupancy Vehicle (HOV) lanes, regardless of the number of passengers. MVA issues a permit that must be displayed on the car for access.
- Pepco and Baltimore Gas and Electric Company offer customers who own a plug-in vehicle the option for time-of-use charging rates. The programs offer a reduced electric rate during off-peak hours to save PEV drivers even more.
- Utilities may offer rebate programs for the purchase of Electric Vehicle Charging Equipment:
  - Potomac Edison EV Driven Program
  - Pepco Charger Rebate
  - BGE Charger Rebate
  - Delmarva Charger Rebate

Successful EVSE Projects

Annapolis Unveils New EV Charging Station

Annapolis has installed its first federally-funded DC rapid charger, capable of charging electric vehicles up to 150kW. The charger is located in the surface parking lot behind the Visit Annapolis & Anne Arundel headquarters. This new charging station is part of BGE's EVsmart program and is aimed at promoting electric vehicle adoption in the city.

Next Steps:

- **Contact us for free 1x1 advising on all things EV!**
  - Contact local government for policies
  - Contact utility
  - Review vehicles and infrastructure needs
  - Review local, state and federal incentives

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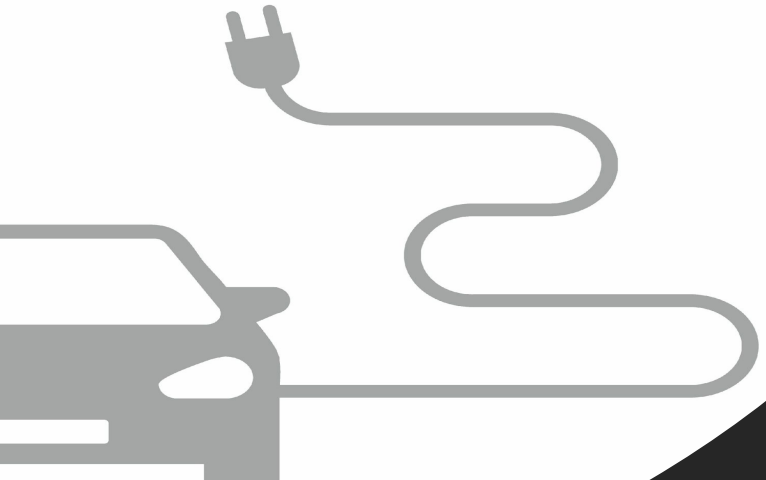
Questions? Want more information on future emails?
Email:
transportation.mea@maryland.gov



Thank you!