# Calvert County Environmental Commission

## Electric Vehicles

1. What's the connection between electric vehicles and Calvert County's environment?

Electric vehicles have zero direct emissions of greenhouse gases (carbon dioxide, nitrous oxide, methane) that contribute to global warming and zero direct emissions of other gases (carbon dioxide, hydrocarbons, aldehydes, volatile organic compounds, sulfur dioxide) and particulates that diminish air quality. So, driving electric vehicles can help to reduce the impacts of climate change and also protect the health of county residents.

2. What are electric vehicles?

Powered by electric motors and batteries, plug-in Electric Vehicles (or EVs) are available in a variety of models with different travel ranges and capabilities. EVs are sometimes call Battery Electric Vehicles (or BEVs), to distinguish them from Plug-in Hybrid Electric Vehicles (or PHEVs) and Hybrid Electric Vehicles (or HEVs) that both have gasoline engines to augment battery power.

3. What are some makes and models of EVs and how much do they cost?

Compared to just a few years ago, there are now several makes and models of EVs on the market that range in price from $30,000-$40,000 to more than $90,000. In order from the least to most expensive, these 2020 makes and models of EVs are available:

- Chevrolet Bolt
- Hyundai Kona
- Hyundai Ioniq
- Nissan Leaf
- Volkswagen e-Golf
- MINI Cooper SE
- Kia Niro
- Tesla Model 3
- Honda Clarity
- BMW i3
- Tesla Model Y
- Jaguar I-Pace
- Audi e-tron Sportback
- Tesla Model S
- Tesla Model X

- Porsche Taycan
- Fiat 500e

Here's Every New Electric Vehicle Model for Sale in the U.S. (2021) (caranddriver.com).

4. What are the advantages of EV's over conventional vehicles powered by gasoline or diesel engines?

In general, EVs produce fewer direct and life-cycle (or well-to-wheel) emissions that contribute to global warming, climate change, smog, and health problems. Direct emissions from gasoline-powered vehicles are emitted through tailpipes, through evaporation from the fuel system, and during the fueling process. EVs have zero direct emissions. Of course, there usually are emission s associated with the generation of electricity at power plants, although not as much as from gasoline - powered vehicles. Most of the electricity supplied by SMECO comes from plants fueled by natural gas and coal, although wind farms and nuclear power plants also contribute to SMECO's overall fuel mix.

Life cycle emissions associated with electric vehicles include all emissions related to fuel and vehicle production, processing, distribution, use, and recycling/disposal. All vehicles produce life cycle emissions. The amounts can vary depending upon the electricity sources where the vehicles are produced and used. Typically, EVs produce fewer life cycle emissions than conventional vehicles because emissions are lower for electricity generation than from burning gasoline or diesel fuel. EV owners can minimize their vehicles' life cycle emissions by using electricity generated from renewable sources like solar and wind to charge their EV battery. Some local energy suppliers offer "green energy" electricity programs to households and businesses which provide electricity in part or entirely from renewable energy sources.

5. What are the typical annual emissions of carbon dioxide (a major greenhouse gas) per vehicle for EVs versus gasoline-powered vehicles in Maryland?

Average emissions per vehicle for EVs in Maryland are about 3,000 pounds of CO2 equivalents per year compared to about 12,000 pounds for gasoline-powered vehicles.

6. Do EVs offer any other benefits?

Yes. Because electric motors react quickly, EVs are very responsive with good torque. They are also quiet, fun to drive, and require less maintenance than conventional gasoline/diesel vehicles. Drivers of EVs titled and registered in Maryland are allowed to use all HOV lanes in the State regardless of the number of passengers, provided the driver obtains and displays an HOV permit on the vehicle. In addition, buyers of new EVs can apply for a Federal Income Tax Credit of $2,500 to $7,500 based on battery capacity and driving range. Form 8936 (Rev. January 2021 (irs.gov)).

The State of Maryland offers state excise tax credits of up to $3,000 for EV purchases. However, the State only sets aside a fixed amount each year. As of mid-2020, the funds for excise tax credits had been exhausted.

7. Do electric vehicles use regenerative braking systems and what do they do?

Yes. Electric vehicles across the board use regenerative braking to improve their overall efficiency. The technology behind regenerative braking systems captures the otherwise-wasted kinetic energy produced during the vehicle's deceleration and stores it as usable energy in the on-board battery, to be sent back to the electric motor when needed to drive the vehicle's wheels. In addition to the regenerative braking system, all electric vehicles have conventional hydraulic brakes. Because the regenerative braking system is also slowing down an electric vehicle, the conventional brakes don't have to work as hard. Therefore, new brakes are usually required less often on electric vehicles than on regular vehicles.

8. How are EV batteries charged?

EV batteries are charged by electricity from an external source. To get the most out of an EV, the battery must be charged at regular intervals. EV chargers are classified according to the speed at which they can recharge an EV's battery. The classifications are Level 1, Level 2, and Level 3 (or Direct Current Fast Charge).

Level 1 chargers come with most EVs and use a standard household (120 volts) outlet to plug into the EV. Charging time for about 75-80 miles of driving range takes over 8 hours. Level 1 charging is typically done at home or at one's workplace. Level 1 chargers can charge most EVs on today's market. No installation of additional charging equipment is required.

Level 2 chargers are an optional accessory and require a specialized station which can provide 240 volts (for residential) or 208 volts (for commercial) of power. They can charge an EV battery for 75- 80 miles of driving range in about 4 hours. Level 2 chargers are typically found at workplaces and public-accessible stations.

Level 3 (or DC fast charge) is currently the fasted charging station in the EV market. Level 3 chargers use 480 volts of power and can charge an EV battery for up to 90 miles of driving range in about 30 minutes. One disadvantage of Level 3 charging is that the different and specialized plug types required may be confusing to potential EV buyers and charging station operators.

In addition to these three types of battery chargers, wireless charging using an electro-magnet to transfer electricity to an EV battery is being developed.

9. How can I find an EV charging station?

There are several websites and apps that can help you locate EV charging stations. These tools can provide an EV owner with information on charger level, charging costs, parking fees, and availability/accessibility of the charger at the time you need to use it. Google Maps also show locations of EV charging stations.

Here are links to several websites that offer maps showing the locations of EV charging stations:

Alternative Fuels Data Center: Alternative Fueling Station Locator (energy.gov)

Maryland Fast Charger Network Interactive Map | PlugInSites

EVgo: Electric Vehicle (EV) Charging Stations | EV Fast Charging

PlugShare - EV Charging Station Map - Find a place to charge your car!

10. How many publicly-available EV charging stations are there in Calvert County?

As of October 2020, there are seven, all Level 2, charging stations in the County.

EERE: Alternative Fuels Data Center Home Page (energy.gov).

The seven charging stations are located at these addresses:

- 10839 Town Center Blvd, Dunkirk MD 20754 (next to the MTA commuter bus stop in the Park-and-Ride lot on the N side of Town Center Blvd. behind the Urgent Care Center with a dedicated spot)
- 9125 Chesapeake Avenue, North Beach MD 20714 (in the SW corner of the parking lot on the E side of Chesapeake Avenue across the street from the North Beach Professional Center with a dedicated parking spot)
- 30 Duke Street, Prince Frederick MD 20678 (at the S side of the middle parking lot behind the Community Resources Building)
- 13200 Dowell Road, Dowell MD 20629 (at the right end of the Ruddy Duck Brewery & Grill parking lot as you're facing the entrance)
- 11745 Rousby Hall Road, Lusby MD 20657 (on the W side of Walgreen's with a dedicated parking spot)
- 13920 H.G. Trueman Road, Solomons MD 20688 (on the side of the Southern Library near the back of the building)
- 129 Williams Street, Solomons MD 20688 (on the campus of the UMES Chesapeake Biological Laboratory in the parking lot between the R.V Truitt Laboratory and Nice Hall with dedicated parking spots)

SMECO submitted a filing with the Maryland Public Service Commission (PSC) requesting authorization to install up to 60 EV charging stations throughout Southern Maryland that would be available to the public over a five-year period. The PSC approved this request. SMECO plans to work with state, municipal, and local governments to determine the best locations for mostly Level 2 chargers and some DC Fast Chargers. Installation of the EV charging stations will be fully funded by SMECO, at no cost to the counties. According to SMECO, there is much interest from county government entities in having more EV charging stations available for public use. SMECO is talking with county staff now and anticipates starting the pilot project in 2021.

There are other Level 2 EV charging stations installed at businesses/residential complexes around Calvert County (e.g., Calvert Cliffs Nuclear Power Plant, Beechtree Apartments in Prince Frederick that are available to employees and residents but not the general public.

11. Is there a State of Maryland rebate available for installing EV charging stations?

Yes. The Maryland Energy Administration (MEA) offers a rebate of 40% of the equipment and installation costs for a Level 1 or Level 2 or DC Fast Charge station up to a limit of $700 (for

residential) and $4,000 (for commercial) and $5,000 (for retail service stations) for systems purchased and installed between July 1, 2020 and June 30, 2021. Rebates will be issued on a first- come, first-served basis as funds are available.

To apply for this rebate, complete the Electrical Vehicle Supply Equipment (EVSE) forms on the MEA website.

Electric Vehicle Supply Equipment (EVSE) Rebate Program (maryland.gov).

Grants are also available from MEA for solar photovoltaic canopies installed at parking garages where the array is charging at least four EV charging stations.

To apply for this grant, click on this link

Parking Lot Solar PV Canopy with EV Charger Grant Program (maryland.gov).

Go to the "Parking Lot Solar PV Canopy with EV Charger Grant Program" web page and complete the grant application forms.

12. How long do electric vehicle batteries last?

All batteries installed in electric cars sold in the United States come with a warranty that extends for a minimum of 8 years or up to 100,000 miles. Replacing the battery will typically be the largest maintenance expense for an electric vehicle. For example, a replacement battery for the Nissan Leaf costs $5,500.

13. How far will an electric vehicle go on a single charge?

Electric vehicle ranges have markedly improved over the past several years. Almost all new EVs have a range exceeding 100 miles.

14. Where can I find more information on electric vehicles?

Check these links:

ZEV (maryland.gov)

Global EV Outlook 2020 – Analysis - IEA

Electric Cars - Latest News and Upcoming EV Developments - Green Car Reports