

September 7, 2023

Report to the Baltimore County Planning Board in Response to County Council Resolution 14-23

This report responds to County Council Resolution 14-23 requesting

“Baltimore County Planning Board conduct a review of public electric vehicle charging stations and consider recommendations for possible legislation to integrate this relatively new technology as a permitted use in the Baltimore County Zoning Regulations. This review should include examining the laws, regulations, policies, and best practices of other similar jurisdictions regarding the zoning, siting, and permitting of public electric vehicle charging stations.”

The report was developed by County staff in the Department of Permits, Approvals and Inspections, the Department of Planning, the Office of Government Affairs and the Office of Sustainability.

This review includes benchmarking of the laws, regulations, policies, and best practices of other Maryland counties (Appendix 1) and information from other jurisdictions in the U.S. to formulate several recommendations for zoning, siting, and permitting of publicly accessible (publicly or privately owned) electric vehicle charging stations in Baltimore County.

Background

Greenhouse gas emissions from the combustion of fossil fuels and degradation of organic materials continues to drive changes to the global climate. Increasingly, State and local jurisdictions in the United States are adopting policies to reduce greenhouse gas emissions by transitioning to renewable energy and less polluting technologies. In Baltimore County, efforts toward mitigating the Enterprise’s emissions have included completing a greenhouse gas emissions inventory of County operations and creating a Climate Action Plan in 2020¹ to drive reductions in building energy use and fleet emissions and improve energy efficiency. The County has also driven development of solar energy on County properties and County Executive Olszewski committed by Executive Order 2021-024² to transition at least 10% of the County’s passenger vehicle fleet to high-efficiency hybrid and electric models.

Since January 2021, electric vehicle (EV) sales have tripled in the U.S., and the number of publicly available charging ports has grown by more than 40%³. The State of Maryland also continues to experience significant growth in EV ownership. As of July 2023, there are 75,861

¹ <https://resources.baltimorecountymd.gov/Documents/Executive/sustainability/GHGclimateactionplan.pdf>

² <https://resources.baltimorecountymd.gov/Documents/Executive/orders/executiveorder2021-024.pdf>

³ Fact Sheet: Biden-Harris Administration Driving Forward on Convenient, Reliable, Made-in-America National Network of Electric Vehicle Chargers. June 27, 2023. <https://www.whitehouse.gov/briefing-room/statements-releases/2023/06/27/fact-sheet-biden-harris-administration-driving-forward-on-convenient-reliable-made-in-america-national-network-of-electric-vehicle-chargers/>

registered EVs in the state, 1,368 charging stations and 3,755 charging ports⁴. Baltimore County is experiencing similar growth in both EV registrations and the availability of publicly accessible chargers. Figure 1 depicts growth in EV registrations Countywide between July 2022 and May 2023.

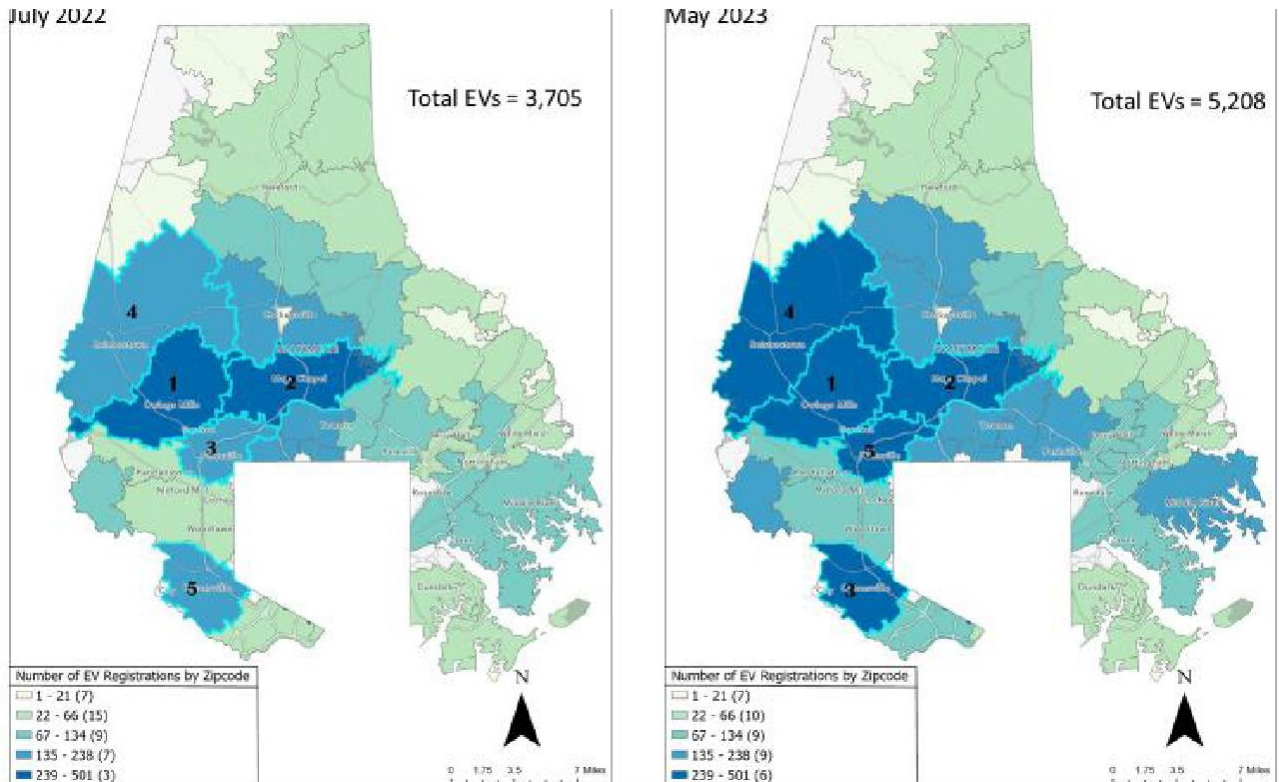


Fig. 1 Baltimore County-owned/installed and BGE EV Charging Station Map (July 20, 2023)

There are three primary types of commercially available Electric Vehicle Supply Equipment (EVSE). Figure 2 compares each, highlighting differences in electrical supply and charging times. A successful charging ecosystem provides a mix of charging types and locations. An analysis by the U.S. Department of Energy found that a national network in 2030 could require approximately 1.2 million publicly accessible charging ports and an additional 26.8 million privately accessible charging ports in the United States⁵.

⁴Ports are the charging nozzles and hoses that connect to a car outlet; one charger may have multiple ports. Collectively, we refer to EV supply equipment (EVSE) throughout this report when referencing chargers, ports, and related electrical infrastructure.

⁵Building the 2030 National Charging Network. NREL Study Identifies Nationwide Charging Needs for Accelerating EV Adoption. June 2023. <https://www.nrel.gov/news/program/2023/building-the-2030-national-charging-network.html>



Fig. 2. MDOT image: <https://www.mdot.maryland.gov/tso/pages/Index.aspx?PageId=34>

Health and Safety of EVSE

Council Resolution 14-23 specifically highlighted an interest in the safety of EVSE stating:

“... the potentially adverse effects of charging stations and other required infrastructure on nearby residential communities – similar to the effects the proliferation of large fuel service stations have had on nearby neighborhoods – is still relatively unknown and should be studied...”

County staff specifically looked for verified information regarding human health or public safety concerns, including fire risk and concerns about electromagnetic fields (EMF). Staff could not find any peer-reviewed science indicating there are legitimate public health concerns associated with EVs or EVSE. As with cell phones, computers, and internal combustion engine vehicles (ICEV), careful operation and maintenance are the key to user safety. A common belief involves a higher likelihood of EV fires due to their Lithium-ion batteries. However, a detailed technical report conducted on behalf of the National Highway Traffic Safety Administration⁶ (NHTSA) concluded:

⁶Stephens, D., Shawcross, P., Stout, G., Sullivan, E., Saunders, J., Risser, S., & Sayre, J. (2017, October). Lithium-ion battery safety issues for electric and plug-in hybrid vehicles (Report No. DOT HS 812 418). Washington, DC: National Highway Traffic Safety Administration. <https://www.nhtsa.gov/document/lithium-ion-battery-safety-issues-electric-and-plug-hybrid-vehicles>

“... that the propensity and severity of fires and explosions from the accidental ignition of flammable electrolytic solvents used in Li-ion battery systems are anticipated to be somewhat comparable to or perhaps slightly less than those for gasoline or diesel vehicular fuels.”

Organizations such as the National Fire Protection Association and the U.S. Fire Administration have raised concerns regarding the dangers from lithium-ion battery fires. While the Baltimore County Fire Department has responded to fires from such batteries, it has been for e-scooters, cell phones, computers and similar products that were overcharged. They report no incidents from EVs or related to EVSE. A recent report by the State Fire Marshal indicated there has been only one EV fire to date in Maryland. However, lithium-ion batteries are known to burn hotter, which could compromise the structural integrity of parking structures and produce more toxic products. They take longer to extinguish and use more resources to do so.

Leaders in the Baltimore County Fire Department have expressed concern about placing EVSE in enclosed structures and do not believe they should be permitted below grade. If installed in parking structures, chargers should be located where there is adequate air flow such as on the ground/first floor of an open-air structure.

Researchers in Sweden found combustion heat and quantities of carbon dioxide and carbon monoxide from vehicle fires were more dependent on car size and mass than propulsion system, and particulate-bound metals were higher in EV soot, but Polycyclic Aromatic Hydrocarbons (PAHs) were slightly higher in internal combustion engine soot.⁷

Other concerns have focused on electromagnetic radiation exposure from EVs. A Norwegian study compared exposure to electromagnetic fields in several electric, gas-, and diesel-powered automobiles and found maximum exposure of 20% of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) levels in electric vehicles (at start-up) versus about 10% for the gasoline and diesel engine cars⁸.

Current Practice and Policy

Currently in Baltimore County, installing EVSE, whether for private or public use, requires an electric permit, and, if it is to be located in a public right-of-way, County approval via a franchise agreement. EVSE are considered accessory uses in most zones in the current draft Zoning Policy Manual, which states:

“The growing demand of electric vehicles (EV) has raised the demand of EV charging spaces. EV charging spaces are within parking lots of office buildings, commercial buildings, retail outlets, convenience stores, restaurants, and manufacturing operations. Charging spaces, if meeting the minimum parking requirements as set forth in Section 419, BCZR will count as provided parking to meet the amount of parking required for the particular use for where they are located.”

Baltimore County does not consider multiple EVSE at the same location to be a fuel service station. Staff research found that other jurisdictions may identify specific zones where Level 3 (DC Fast Charger) EVSE are specifically authorized, but most jurisdictions consider Level 1 and Level 2 EVSE as an accessory to most, if not all, zones

Other Central Maryland counties appear to similarly distinguish between Levels 1 and 2 and Level 3 chargers, allowing or requiring Level 2 EVSE for new residential or parking facility construction to accommodate growing demand. In fact, during the 2023 General Assembly session, Maryland passed [HB830](#) which requires new residential housing units (single-family detached houses, duplexes and townhouses) to have at least one EVSE-installed or one EVSE-Ready parking space, effective October 1, 2023.

Key Recommendations for Baltimore County Zoning and Permitting of EVSE

These recommended changes to the Baltimore County Zoning Regulations should limit case-by-case determinations and clarify where EVSE may be installed. By establishing compatible EVSE by land use, the County can eliminate confusion about what is or is not allowable while also affirming the desirability of EVSE within communities.

1. Level 1 and 2 EVSE should be considered an accessory use in all residential, commercial and industrial zoning classifications and Level 3 EVSE should have a principal use designation and be allowable in specific zones.

Level 1 and Level 2 EVSE should continue to be authorized as an accessory use in all residential, commercial and industrial districts. Level 2 is the most common EVSE requiring the same electrical capacity as a household clothes dryer. They are affordable and well-incentivized by the Federal and State governments.

Level 3 EVSE should be permitted as a principal use on publicly owned land and, at a minimum, in the following zones:

- Office Residential (OR),
- O-3 (Office Park Zone),
- OT (Office and Technology),
- S-E (Service Employment)
- BL (Business Local)
- BLR (Business Local Restricted),
- BM (Business Major),
- BR (Business Roadside),
- ML (Manufacturing Light)
- MH (Manufacturing Heavy)
- IM (Industrial Major) and
- NC (Neighborhood Commons)

Level 3 EVSE should also be considered a principal use in conjunction with other principle uses on the same site, such as EV charging plus automobile parking and EV charging plus convenience store. PAI should be afforded approval discretion based on the principle uses, zoning classification, and percentage of site dedicated to each principal use.

⁷Hynynen, Jonna, [Ola Willstrand](#), [Per Blomqvist](#), and Petra Andersson. 2023. Analysis of combustion gases from large-scale electric vehicle fire tests. Fire Safety Journal.

<https://www.sciencedirect.com/science/article/pii/S0379711223000978#bib1>

⁸<https://www.sintef.no/projectweb/em-safety/project-results/measurement-of-the-magnetic-field-inside-electric->

vehicles/

2. Create a public space permit.

A public space permit should be created for the installation of publicly available chargers at appropriate curbside spaces in the County, such as dense residential blocks, business corridors, and mixed-use zones. Dual-port Level 2 and Level 3 EVSE suitability would be evaluated by PAI and as part of the permit review, a streamlined approach to public right-of-way use should be integrated into such a permit. Bollards should be installed to reduce the likelihood of the EVSE being damaged.

3. Establish EVSE design and safety standards.

To address some of the concerns regarding the safety of EVSE, Baltimore County should require that ALL installed EVSE – for private or public use - must be compliant with applicable electrical and safety standards. Baltimore County currently lists existing safety standards online (<https://www.baltimorecountymd.gov/departments/pai/application/electric-vehicle-charging-station> and <https://www.baltimorecountymd.gov/departments/pai/application/electric-vehicle-charging-station>). These requirements should be periodically reviewed to ensure they represent the most up-to-date state and national requirements for electrical safety.

In addition to electrical standards, the County should establish basic design standards for setbacks, signage, operational life, lighting and other provisions for installation and use of EVSE. General standards would address screening EVSE equipment between properties, bollards to reduce potential damage, ensuring adequate lighting for nighttime access, and ensuring that EVSE hoses and instructions are easily accessible. To ensure charging stations remain working well into the future beyond an initial installation, the County should require that charging stations be in operation for no less than five continuous years. PAI, in coordination with other agencies should establish standards and ensure public and private installations adhere to them.

Additionally, publicly available EVSE parking locations should include appropriate signage restricting use to EVs for the purposes of charging. Nonelectric vehicles should be prohibited from stopping, standing, or parking in an EV-designated parking space. Current Baltimore County Code Section 18-2-212 states:

“A person may not park a vehicle that is not a plug-in vehicle in a space, including a space on private property used by the general public that is 1) designated for the use of plug-in vehicles with a sign approved by the Police Department stating the prohibition and/or 2) provides access to a plug-in vehicle recharging station. A person who violates this section is guilty of a misdemeanor.”

Due to the potential dangers from fires in EVs or structures that house EVSE, the Planning Board recommends that the Baltimore County Fire Department be provided adequate capacity and resources to adequately prepare for such higher-temperature fires.

4. Incorporate EVSE into minimum parking requirements.

Baltimore County, like many other local jurisdictions, requires minimum parking associated with

different uses. As EV use continues to grow, so will the need for designated parking spaces for EVSE. The County should incorporate minimum EV parking standards into calculations of required minimum parking and consider requiring EV-installed and EV-ready ready parking spaces in new commercial, government and multi-family residential construction.

These recommendations are based, in part, on Baltimore County's experience adding electrical capacity to old buildings or space-constrained existing parking facilities. It is far easier to include sufficient electrical capacity for EV charging from the beginning than it is to retrofit buildings with electrical upgrades. As with EVSE, there are different levels of accommodation for EVs within parking facilities. Common distinctions include:

- o **EV Capable** is a parking space with installed electrical panel capacity and conduit raceway for future build-out of EV charging with 208/240v, 40-amp circuits.
- o **EV Ready** is full circuit installation including 208v/240v, 40-amp panel capacity, raceway, wiring, receptacle and overprotection devices equivalent to a standard clothing dryer circuit.
- o **EV Installed** is all electrical components plus EVSE is available for use.

Baltimore County should establish a cumulative minimum requirement that a minimum of 5% of all parking spaces be EV Capable, EV Ready or EV Installed by December 31, 2025 and a minimum of 20% of all spaces by December 31, 2035.

It is further recommended that the required minimum parking ratio should be decreased by the appropriate number of spaces should the size of the parking spaces with an installed EVSE exceed the regular or required size parking space.

The Planning Board acknowledges that fires from lithium-ion batteries burn hotter than standard batteries, and that the U.S Fire Administrator and organizations such as the National Fire Protection Association have issued reports regarding the dangers from these fires and the safety of fire fighters. It is recommended that the appropriate Baltimore County building and fire personnel should review the County's Fire Code relevant to the placement of EVSE in garages and parking structures.

5. Require at least one ADA accessible port when multiple ports are installed.

ADA accessible EVSE spaces should be required in multi-space parking facilities, excluding single-family or duplex residential units. ¹⁰ that include wider parking spaces, access aisles along one or both sides of the parking spot and equipment and payment ports that are reachable by wheelchair users. ADA accessible EV parking spaces should be considered part of any minimum parking standards.

⁹ Electric Vehicles and Building Codes: A Strategy for Greenhouse Gas Reductions. International Code Council. 2021. https://www.iccsafe.org/wp-content/uploads/21-20604_COMM_EV_Strategy_RPT_v5.pdf

¹⁰ <https://www.access-board.gov/news/2022/07/21/u-s-access-board-issues-design-recommendations-for-accessible-electric-vehicle-charging-stations/>

Appendix 1. Maryland Jurisdictional Policy Comparison

County	Permitted Locations	ADA Requirements	Minimum EV Parking Space Requirement	Electrical and Safety, Location and Design Standards
Montgomery	Level 1 and 2 allowed in every zone when accessory to primary use. Level 3 EVSE allowed in commercial, research & development and industrial zones when accessory to primary permitted use.	≥ 1 required in any parking facility required to have an EV parking space. Incrementally increases based on total EV parking spaces.	1 EVSE per 50 parking spaces. EVSE space included in calculation of min total required.	Setbacks, lighting, parking space dimensions, EVSE protection (mounting, bollards, curbing), signage and O&M
Howard	NO	NO	≥1 EV-capable space for each 25 residential units; and 1 EV-ready space per residential unit with a garage, carport, or driveway	
Baltimore City	NO	NO	Where on-site parking is provided: ≥ 2% spaces must be EVSE-installed (L2 or L3) or ≥ 6% of spaces must be EVSE-ready	EVSE must be located within 1/4 mile (400 m) from the building.
Prince George's	Level 1 or 2 allowed curbside in Res. zones may be considered in public ROW when adequate driveway, garage, or parking pad is not available with zoning review, ROW permit, and electrical permit.	NO	A new residential unit with a garage, carport, or driveway shall include ≥ 1 Level 2-ready or EVSE-installed, on a dedicated circuit, within 15 feet of parking location.	EVSC must be permanently connected and fastened with no exposed live parts, rated for outdoor/ indoor use and installed according to manufacturer's specifications and County permit. Additional electrical circuitry, safety and setback requirements per electrical code.
Frederick County	NO	NO	Most new SF units, townhouses and duplexes require EVSE-installed	NO