

HB 834 — Electric Vehicle Charging Reliability Act
Position: **Favorable**

March 28, 2023

Senator Brian J. Feldman
Chair, Senate Education, Energy and the Environment Committee
2 West Miller Senate Office Building
Annapolis, MD 21401

Dear Chairman Feldman and Members of the Committee:

As an electric vehicle driver and ratepayer, I am writing to express my support for HB 834, a bill that requires utilities to report charging station uptime on EV charging stations installed with ratepayer funds. In 2019, the Maryland Public Service Commission approved an EV Pilot Program with assurances from utilities that their public charging stations would have high reliability and quick response to outages and issues. However, four years into the pilot, the promised reliability has not materialized.

Last August and September, I tested all the fast chargers in the BGE-owned and operated EV charging network and found that only 71% of them worked properly. The rest had issues, including being completely dead, error messages on the screen, physical damage to the connectors, and greatly reduced power output. In November, I repeated the testing and found that the percentage of fully functional chargers had declined from 71% to 65%, with many of the same issues I had encountered two months earlier. I documented the issues and sent a detailed report to BGE. It is the responsibility of the utilities to ensure that their charging stations are functioning properly and to identify and repair issues, not the EV drivers.

Furthermore, utilities are losing significant amounts of money on the charging stations, possibly due to low utilization that may be the result of these reliability issues. For Maryland to achieve its goal of 300,000 electric vehicles registered in the state by 2025, the EV charging infrastructure must be affordable, convenient, and reliable. I strongly support HB 834, which mandates utilities to report detailed charging station reliability data to ensure accountability and reliability for ratepayers and EV drivers alike.

I urge a **favorable report** on House Bill 834.

Sincerely,



Lanny Hartmann
Columbia, Maryland

September 12, 2022

Andrew S. Johnston
Executive Secretary
Public Service Commission of Maryland
6 Saint Paul Street, 16th Floor
Baltimore, Maryland 21202

Re: Case No. 9478 - Baltimore Gas and Electric Company (BGE) Semi-Annual EV Pilot Program Progress Report for January 1, 2022 through June 30, 2022.

Dear Mr. Johnston,

I respectfully submit the following comments regarding the Baltimore Gas and Electric Company EV program semi-annual report in Case No. 9478 that was filed on August 1, 2022.

Introduction

In their semi-annual EV pilot program progress reports to the Commission, the utilities claim to have accomplished a very high degree of public charging station "uptime." In general, EV drivers have become skeptical of uptime claims on CCS and CHAdeMO public charging stations. There seems to be a disconnect between the impossibly high percentages of uptime presented to regulators and media vs the frequency that EV drivers encounter broken chargers in the real world.

Included in these comments is a summary of a survey of the operational status of all 69 BGE-owned public DC fast chargers in the pilot. Each fast charger was evaluated by driving to the charger, plugging in and, taking note of whether the payment system, screen, connectors, communication signal and charging equipment functioned as expected.

Background

The Public Service Commission of Maryland approved a suite of utility-administered EV charging pilot programs in Order No. 88997 issued on January 14, 2019. The 2019 EV Order included a public charging component for the Investor-Owned Utilities including BGE.

BGE assured the Commission that their public EV charging stations would be highly reliable and that they would respond quickly to resolve outages and issues.

The BGE semi-annual report states that their public charging network had 95% uptime. BGE defines uptime as “the percent of time a station is in cellular communication and able to dispense a charge or is actively dispensing a charge.” If “unknown” time is treated as uptime, then BGE says that their reliability would rise to 99%

BGE is not alone among charging providers in claiming a high level of reliability. EVgo, a national EV charging service provider, claims to have 98% uptime across their network.

Despite these cheerful statistics, EV drivers continue to be plagued by broken charging stations. The issue of broken chargers has gotten some high-profile press attention in recent weeks:

“Owners of battery-powered cars sometimes struggle to refuel on longer trips because public chargers don’t work.” New York Times - Aug. 16, 2022¹

“EV owners continue to be faced with charging station equipment that is inoperable.”
Detroit Free Press - Aug. 17, 2022²

“Charging stations in Washington, D.C., are often unavailable, broken or have cut cords”
NBC News 4 Washington - Sept. 7, 2022³

Automotive journalist Jonathan Gitlin recently suggested that if drivers continue to have these horrible experiences with EV charging, it could stall the adoption of electric vehicles.⁴

We must acknowledge and come to grips with these issues as a first step to solving them.

BGE Territory-Wide Charger Evaluation

-Rationale

I have been a proponent of electric vehicles for more than a decade. Eight years ago, we took the first of many long trips across the US in an electric car using what was, at the time, a new network of strategically placed Tesla Superchargers. Since that 2014 coast-to-coast electric road trip, my wife and I have driven to – and charged in – every state except Alaska and Hawaii. Along the way we have visited more than 900 Tesla Supercharger locations.⁵

Tesla Superchargers are extraordinarily dependable. We almost never have an issue with them. We also use other fast charging stations with a Tesla-to-CHAdeMO adapter. The non-Tesla fast chargers can be extremely frustrating. Until recently, nobody has quantified just how many of these chargers are operational and how many are not.

In April, Professor David Rempel of the University of California, Berkeley published a study⁶ on the reliability of the public (non-Tesla) electric vehicle fast chargers in the San Francisco Bay Area. The results showed that more than a quarter of the chargers in that area were not functioning or had a design failure. The non-functioning stations suffered from non-responsive displays, payment system failures, initiation failures, network failures, or damaged connectors.

The study utilized a group of volunteer EV drivers who visited the chargers and tested each one by plugging into their EV and attempting to charge for two minutes. The methods used in the Berkeley study inspired the procedure that I used to test the fast chargers in Maryland.

-Procedure

69 BGE-owned fast chargers were tested between August 28 and September 6, 2022. I put the names and locations of all the BGE public charging stations into a spreadsheet. I then filtered the list to include only the DC fast chargers that have been built under the Maryland PSC EV pilot program. I then created a map of those locations and divided them into manageable groups that I could visit and evaluate over a number of days.

I drove to each site and worked through a checklist of tasks to test each fast charger. First I took a series of photos of the chargers. Then I recorded the Station ID, model and serial number of each unit. I visually inspected the equipment including the display, cables and connectors for damage. I documented the online status of the charger in the Shell Recharge mobile app. Then I attempted to initiate a charge via the app. If the unit began charging, I let it run for two minutes. Meanwhile I took note of the charging speed and made sure that the charger was operating as expected. After two minutes, I'd stop the charge and then attempt to initiate a charge using the RFID card reader. If a charging session failed, I'd report it to Shell Recharge customer service via the app or I'd call if the issue seemed as if it was possible to fix remotely.

-Results

A charger was classified as fully functional if it authorized via the Shell Recharge app (or started free), initiated a charge, and maintained the expected charging speed for two minutes.

71% (49) of the BGE fast chargers were fully functional as defined above.

14.5% (10) of the chargers were completely inoperable.

2.9% (2) consistently displayed error codes and would not charge.

4.4% (3) were offline and did not respond via the app. However, these did initiate via a tap of a Shell Recharge RFID card. Most drivers however do not carry a Shell Recharge card.

7.2% (5) initiated a charge but delivered very low power, around 15 kW. That is a fraction of the 50 kW rated power for those stations.

-Payment Methods

The payment methods tested were the Shell Recharge mobile app and the Shell Recharge RFID card. The BGE chargers do not have functioning credit card readers. The RFID card requires a \$5.00 payment and is delivered by mail. Due to the advance arrangements required to acquire an RFID card, I focused mainly on the mobile app to determine payment authentication success.

-Charger Models

The chargers used in the BGE public charging pilot to date come from three different manufacturers and consist of four models. The table below shows the number of chargers of each model tested and how many were classified as fully functional.

Manufacturer	Model	Tested	Functional
BTCPower	EVDSP-350-5-120-0-2-C-4-0	11	8
BTCPower	L3S-50-480-01-001	9	8
Efacec	EFAPOWER EV QC 45	19	9
Tritium	TRI93-50-01-US	30	24
Total		69	49

-Charging Speed

The nominal charging speed on most of the chargers tested was 50 kW. There are 10 chargers by BWI Airport and one in Crownsville that are rated at 150 kW. I was unable to confirm the full power delivery performance of those chargers due to the specifications of my vehicle.

-Physical Access

There were two instances during the evaluation where my access to a charging station was obstructed. The first was a gasoline car that had parked in front of one of the two fast chargers in Chesapeake Beach. The signage at that space read, ELECTRIC VEHICLE PARKING ONLY. A new Maryland law that goes into effect on October 1st would prohibit vehicles from blocking EV charging stations. An important proviso of the statute is that a sign designating that charging space must conform to federal and state standards for parking signs and include the amount of the penalty for violations (\$100 fine). The legislature has left it up to the property owner to decide if they wish to post the particular signs that will allow enforcement.⁷

The Whitmore Garage in Annapolis is undergoing renovations that have temporarily routed vehicles through the parking spaces in front of the charging stations. I was able to park close enough to the chargers in both instances to perform a complete evaluation including two minutes of continuous charging. I treated both of these chargers as if they were fully available for the purposes of this evaluation. Both were classified as fully functional.

-Follow Up Testing

I revisited 13 chargers that were classified as less than fully functional. I checked if their condition had changed in the days and weeks following the initial visits and reporting of the issues. In every instance, the chargers were still broken.

In order to achieve a minimum of 97% uptime on an annual basis, a charger must not be down for more than 11 days. Eight of the revisited chargers have already fallen below the 97% uptime threshold since I began this charger evaluation.

-Conclusions

High reliability of public EV charging stations is vital for a positive EV driver experience and to support electric vehicle adoption in Maryland. The Commission's 2019 EV Order requires that the utilities "be responsible for ensuring that public charging stations are working and

maintained in good working order.” It is clear from my perspective as an EV driver that there is much room for improvement.

-Suggestions

I do not have any simple answers to solve these problems. I do sense that they need to be acknowledged and addressed without delay if the EV pilot is going to succeed.

The Commission might consider the following section of the MOU between the City of Baltimore and BGE as a template for a consumer complaint driven accountability process.⁸

10) In the event that any user of an EV Station lodges a complaint with the City, BGE shall be notified by the City and BGE shall respond to the user, with a copy to the City, within three (3) days after receipt of the complaint. If BGE receives a complaint directly from a user, it shall reply within three (3) days after receipt of the complaint and provide a copy of the complaint and response to the City.

Another action to consider is to compensate ratepayers for the diminished value of the public charging network when the system falls below a certain uptime. See the “Service Level Failure” section in the Virginia DEQ agreement with EVgo for their statewide charging network.⁹

Contractor’s failure to achieve the required average 95% Uptime Percentage for the Applicable EV Charging Station Network in a given reporting year shall equate to a “Service Level Failure.” For each Service Level Failure, Contractor shall issue a Service Level Credit to DEQ on Contractor’s next invoice.

At some point, the Maryland General Assembly may want to consider legislation to amend the COMAR regulations to include specific reliability requirements for electric vehicle charging infrastructure that is installed using public funding. The California State Legislature passed a bill two weeks ago that addresses this issue. AB-2061 would require the California Energy Commission, in consultation with the Public Utilities Commission, to develop uptime reporting standards for EV charging stations by January 1, 2024.¹⁰

I hope these comments and the accompanying charger evaluation data are helpful to the Commission. Thank you for allowing me to contribute – as an EV driver and ratepayer – to the conversation on public charging station reliability.

Sincerely,

/s/ Lanny Hartmann

Lanny Hartmann
Columbia, Maryland

Notes:

¹ ["A Frustrating Hassle Holding Electric Cars Back: Broken Chargers"](#) New York Times, Aug. 16, 2022

² ["EV drivers aren't happy with public chargers, new survey says."](#) Detroit Free Press, Aug. 17, 2022

³ ["Electric Vehicle Owner Describes 'Charging Anxiety' in DC"](#) NBC News 4 Washington, Sept. 7, 2022

⁴ ["Electric cars are doomed if fast charger reliability doesn't get better"](#) Arstechnica, July 13, 2022

⁵ ["Die-Hard Tesla Owners Are in a Heated Race—With No End in Sight"](#) Wall Street Journal, May 26, 2022

⁶ [Reliability of Open Public Electric Vehicle Direct Current Fast Chargers](#) - Rempel, April 7, 2022

⁷ [Maryland § 21-1003.2. Vehicle Laws – Plug-In Electric Drive Vehicles – Reserved Parking Spaces](#)

⁸ [Baltimore City DOT MOU- BGE -- Installation of Electric Vehicle Charging Stations](#), Sept. 16, 2020

⁹ [Virginia DEQ, EVgo Contract No. 18-01-CP, Modification 3](#), Aug. 30, 2021

¹⁰ [California AB-2061 Transportation electrification: electric vehicle charging infrastructure.](#)

Appendix A

Station Name	Station ID	Date Tested	Functional	App Status	Issue Description	Reported to SRS Customer Service - Details
Carroll Co. Commissioners	43336	11/12/2022	No	OFFLINE	Offline. Neither card nor app worked. App: "Start Charge Unsuccessful. Unable to use the EVSE, it is in an unknown state." A Leaf driver here told me he couldn't get the DCFC to work and was charging on Level 2 to get home.	Reported via app: Unable to charge, Network Problems - Unable to initiate charging. Tried both the app and RFID card. Charger didn't respond to either.
Howard Co Library - Miller	43335	11/12/2022	No	OFFLINE	No power. Screen is dark	Reported via app: No Power to Station - Station is offline, the screen is dark. See attached photo.
Ripken Stadium - R	43359	11/13/2022	No	OFFLINE	Offline. Neither card nor app worked. Broken latch on CCS connector. App: "Start Charge Unsuccessful. Unable to use the EVSE, it is in an unknown state."	Reported via app: Visible Damage - Station is offline and the latch on the CCS connector is broken off. See attached photo.
Finksburg Library	153033	11/12/2022	No	*Not Listed	Offline. Neither card nor app worked. App: "Get EVSE Stations Unsuccessful. Charge station not found."	Reported via email to SRS: Fast charger does not initiate. Tried both scanning the QR code and a Shell Recharge RFID card. Neither worked.
BCPL Cockeysville - L	153488	11/13/2022	No	*Not Listed	No power. Unit is dark and wrapped with caution tape.	Did not report, presumed that it is a known issue since the station ID is not listed in the app.
HCLS Glenwood - L	153018	11/12/2022	No	*Not Listed	Offline. Neither card nor app worked. App: "Get EVSE Stations Unsuccessful. Charge station not found." Another EV driver told me that she couldn't charge on this station.	Phoned CS. They said there was a note that this unit is due to be replaced. She said that she will put in a note that the power should be turned off to help other drivers know that this is not operable.
HDG City Hall	53381A	11/13/2022	No	AVAILABLE	Error code: Proximity Error1 (on 3 attempts)	Phoned CS. On hold for over 25 minutes. I had already left the station when CS finally answered. CS confirmed that there was already an open case on this station and he said he would update it with my report.
S Carroll Sr CC - R	43395	11/12/2022	No	AVAILABLE	Red indicator ring on vehicle. Charger Error: "Charger did not detect vehicle. Check the connector or the ignition!"	Reported via app: Unable to charge, Other - Got the following message: Charger did not detect the vehicle. Check the connector or ignition!
Howard Comm Coll - R	43371	11/12/2022	No	AVAILABLE	Did not initiate via app or card. App: Start Charge Unsuccessful. Unable to process your request please try again later.	Phoned CS. They could not communicate with the station, said it had network issues and that they would create a case.
BWI Cell Lot - #1	54161	11/12/2022	No	AVAILABLE	Error code: TIMEOUT_INSULATION_TEST	Reported via app: Unable to charge, Other - Could not charge on Nov 12. Error code: TIMEOUT_INSULATION_TEST
BWI Cell Lot - #4	54153	11/12/2022	No	AVAILABLE	Error code: Communication_Failed	Reported via app: Unable to charge, Other - Could not charge on Nov 12. Error code: Communication_Failed
Arbutus - R	153019	11/12/2022	No	AVAILABLE	Start button didn't respond to pressing when blinking	Phoned CS. He restarted the station but the start button wouldn't react. He said he'd put in a report.
Arbutus - L	153034	11/12/2022	No	AVAILABLE	Error code: Err 22. When the start button is pressed it immediately says to return the connector to the holster.	Phoned CS. He restarted the station but it still didn't initiate. CS said there was already an open ticket on this station.
BWI Rideshare Lot - #3	54147	11/12/2022	No	*Not Listed	No power. Screen blank.	Reported via app: (continuation with 54163) Also, station ID 54147 at the same location has no power. Screen is dark.
BWI Rideshare Lot - #6	54163	11/12/2022	No	AVAILABLE	Error code: Proximity Error1, Damaged CCS	Reported via app: Unable to charge, Other - CCS connector is broken. CHAdeMO session does not initiate. Error code: Proximity Error1
MDA HQ Annapolis - R	53378A	11/6/2022	No	AVAILABLE	Error code: Communication_Failed	Reported via app: Unable to charge, Network Problems - Charging failed. Error code: Communication_Failed
S Carroll Sr CC - L	43396	11/12/2022	Low Pwr	AVAILABLE	Low power, 16 kW	Reported via app: Other - Very low charging power. 15.6 kW
HCC A Lot - L	43394	11/13/2022	Low Pwr	AVAILABLE	Low power, 15 kW	Reported via app: Other - Station ID 43394 and 43398 have lower power than is normal. Both charge at only 15 kW. Normal is around 40 kW. See attached screenshots from Shell Recharge app.
HCC A Lot - R	43398	11/13/2022	Low Pwr	AVAILABLE	Low power, 15 kW	Reported via app: Other - Station ID 43394 and 43398 have lower power than is normal. Both charge at only 15 kW. Normal is around 40 kW. See attached screenshots from Shell Recharge app.
2660 Riva Rd - R	43373	11/6/2022	Low Pwr	AVAILABLE	Low power, 15 kW	Phoned CS. Rebooted, but only charged at 15 kW. Created a ticket for low power.
Chesapeake Beach - R	43356	11/11/2022	Low Pwr	AVAILABLE	Low power, 15 kW	Reported via app: Other - Only charging at 15.4 kW.

Appendix A

Station Name	Station ID	Date Tested	Functional	App Status	Issue Description	Reported to SRS Customer Service - Details
Kenhill Center - R	153020	11/11/2022	Card Only	OFFLINE	Offline - Card only. App: "Start Charge Unsuccessful. Unable to use the EVSE, it is in an unknown state."	Reported via app: Unable to charge, Network Problems - Station offline Nov 11. Unable to initiate charge via app.
Aquatic Center - L	43358	11/12/2022	Card Only	OFFLINE	Offline - Card only.	Reported via app: Unable to charge, Network Problems - Station is offline.
Eastport - R	53197	11/6/2022	Card Only	*Not Listed	Offline - Card only. App: "Start Charge Unsuccessful. Unable to use the EVSE, it is in an unknown state."	Reported via app: Unable to charge, Network Problems - Offline. Station does not initiate via app. Does initiate with RFID card though.
Glen Burnie Garage	153016	11/12/2022	Closed	FAULTED	Faulted since August Temporarily inaccessible. Section of garage is closed. (exempt)	Station has been Faulted since August. Reported via email to BGE that the floor of the garage with the charging stations is closed due to construction.
Whitmore Garage	153025	11/6/2022	Closed	*Not Listed	Station is not listed on app. Temporarily inaccessible. Section of garage is closed. (exempt)	Temporarily closed. All stations at this location have been removed from being listed on app.
Harford County Govt - R	53386A	11/13/2022	See Note	AVAILABLE	Note: Sign covering screen: "CHARGER UNDER REPAIR" However, the charger seemed to function as normal.	Reported via app: Other - Sign says "charger under repair" but it works OK.