

Electric Vehicle Supply Equipment Work Group

Final Report

Prepared for:

**The Senate Education, Energy, and the
Environment Committee**

The House Economic Matters Committee

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Executive Summary

On May 9, 2024, Maryland Governor Wes Moore signed into law SB951/HB1028 (the “Act”) establishing the Electric Vehicle Supply Equipment (“EVSE”)¹ Work Group to develop a report due to the legislature by November 1, 2024. The EVSE Work Group consists of 13 representatives from the Maryland legislature, State government, private businesses, and members of the public.² Additionally, several interested businesses attended the EVSE Work Group meeting.

The Act requires the EVSE Work Group to address the following three topics in its report:

- (1) develop a framework for reliability and reporting standards for EV charging stations;³
- (2) study and make recommendations regarding which government entities have responsibility for ensuring accountability regarding EV charging stations; and
- (3) make recommendations regarding adopting and implementing regulations that cover several topics listed within the legislation. When making recommendations under this section, the Work Group was to give deference to rules implemented through the federal National Electric Vehicle Infrastructure (“NEVI”) Formula Program.

This report outlines a framework for reliability and reporting standards which are proposed to apply to publicly facing charging stations following a tiered approach for different types of publicly facing charging stations.

The EVSE Work Group did not reach agreement as to which State agency should have responsibility for implementation of said framework and provides the positives, negatives, and estimated budgets for different State agencies the legislature could consider delegating

¹ EVSE is defined in the ACT to mean “a unit that controls the power supply to one or more electric vehicles at an EV charging station.” The Act §(a)(7).

² See Appendix A for list of membership.

³ An EV charging station is defined in the Act and “means a connected point in EV supply equipment: (i) at which current is taken to charge a battery or any other energy storage device in an electric vehicle; and (ii) capable of providing, at a minimum: 1. Level 2 charging; or 2. direct current fast charger charging.

responsibility to.⁴ However, the EVSE Work Group agrees that Weights and Measures should continue its oversight of accuracy, registrations, and inspection through Handbook 44 and supports its associated initial budget request of \$610,000.

Finally, there were several unique topics that the legislature sought recommendations on for potential regulations to be promulgated by the Implementing Agency. These include reliability, design, consumer, and regulatory standards.

The EVSE Work Group identified which of the topics the Implementing Agency should have authority to oversee and offered some guidance on what the Implementation Agency should consider in its oversight of EV charging stations for the topics.

This Report provides some background information as well as recommendations and rationale of the EVSE Work Group as to the three topics listed above. Throughout the report the terms EVSE and charging station are used synonymously when referring to equipment that can charge an EV.

Except where it is stated that there was unanimous support, this report represents a consensus of members. Individual members may oppose or have concerns with specific recommendations.

⁴ For purposes of the report the unidentified agency is referred to as the “Implementing Agency” who will implement the proposed framework if adopted by the legislature.

Background Information

As background, the report provides information on:

- (1) Maryland’s current EVSE market, related goals, and general concerns about reliability;
- (2) Maryland’s agencies that could potentially take on the responsibility of implementing the recommendations of this Report; and
- (3) Existing standards and practices (federal, state, and local) for EVSE reliability outside of Maryland.

1. Maryland’s current EVSE market and related goals

a. Maryland’s climate goals as relevant to EVSE

Maryland has a number of statutory climate goals, but the primary statutory goals related to adoption of EVs and EVSE were enacted in the 2022 Climate Solutions Now Act (“CSNA”) which set a goal of achieving net zero emissions in the state of Maryland by 2045.⁵

Under the CSNA, the Maryland Department of the Environment (“MDE”) was required to adopt a plan by December 31, 2023, that (a) reduces statewide greenhouse gas emissions by 60 percent from 2006 levels by 2031 and (b) set the state on a path toward achieving net-zero greenhouse gas emissions by 2045.⁶ It issued that plan on December 28, 2023.

In its December 2023 Report, MDE explained: “it will be necessary to transition much of the light-duty fleet to [Zero Emissions Vehicles] ZEV by 2031...New charging infrastructure will need to be developed and installed in conjunction with the retrofitting of existing gas stations to support charging stations.”⁷

⁵ MD. Envi Code Ann. §2-1204.2.

⁶ MD. Envi Code Ann. §2-1204.5(1)(c).

⁷ Maryland’s Climate Pollution Reduction Plan, Dec. 28, 2023. p. 26.

b. Current and projected numbers of electric vehicles and public charging stations in Maryland

The Maryland Department of Transportation (“MDOT”) reports that, as of July 31, 2024, there are 112,986 registered Battery Electric Vehicles (“BEV”) and Plug-in Electric Vehicles (“PHEV”) in Maryland. MDOT also reports that, as of this same date, there are 1,675 charging stations with 3,816 Level 2 ports and 981 DCFC (fast charging) ports. For the Level 2 ports, there are approximately 445 non-networked ports; the remaining ports are supported by 16 network companies. For DCFC ports, there are approximately 77 non-networked ports and 11 network companies.⁸

Maryland electric utilities operate some of the charging stations which are currently available to EV drivers. The Maryland Utilities who were authorized to own and operate publicly available EV charging stations have installed 664 (17%) Level 2 charging stations and 150 (15%) DCFC stations as of June 30, 2024.

MDOT currently projects approximately 1.3 million light duty electric vehicles in Maryland by 2031.⁹ MDOT also filed comments with the PSC in July 2024 that estimated approximately 1 million private ports, 43,368 Level 2 ports, and 5,495 DCFC ports to support the approximate 1.3 million projection.¹⁰ The EVSE Work Group makes no finding as to the appropriateness of these values but presents them as scoping values.

c. General Concerns about Reliability

There are concerns regarding charger reliability. For example, a 2024 J.D. Power study found that 19 percent of EV owners were not able to charge when visiting a charger. Of those visits where EV owners could not charge, 61 percent of the time it was because the charger was

⁸ For a more recent update of values refer to MDOT’s website which tracks this information. <https://experience.arcgis.com/experience/d8d908d9e62f4054b14ec8f6cbb5392b/>.

⁹ 2023 MDOT Climate Pollution Reduction Plan, Table 2, p. 25.

¹⁰ MDOT extrapolated these estimates based on a report from the National Renewable Energy Laboratory (“NREL”), see MDOT comments in PSC Case No. 9478, p. 4.

out of service or simply did not work.¹¹ In another report by Plug In America regarding survey data from March 2024 found that about 40 percent of respondents claimed they were unsatisfied with public charger reliability.¹² Both reports are based on national surveys and are not Maryland-specific.

Also, it should be noted there appears to be differences in customer satisfaction and station reliability depending upon which charging network a customer uses. For example, Plug In America reports its survey findings separated by Tesla versus non-Tesla drivers. Since Tesla's "network is a vertically integrated system, the company has more control over the charging experience."¹³ They found that only 9 percent of Tesla drivers were unsatisfied with reliability of public charging when compared to other vehicle drivers at 35 percent.¹⁴ A different report by ChargerHelp that studies "when, where, and why charging infrastructure reliability falls short" found that charging reliability varies by network operator.¹⁵ There could be nuances as to what may be causing charging station reliability, but when discussed at Work Group meetings, there is no objection that charging station reliability is a concern.

¹¹ *Public EV Charging Sees Consistent Progress for Two Consecutive Quarters, J.D. Power Finds*, J.D. Power, Aug. 14, 2024. <https://www.jdpower.com/business/press-releases/2024-us-electric-vehicle-experience-evx-public-charging-study>.

¹² *ChargerHelp Annual Reliability Report*, ChargerHelp, June 2024, p. 6, citing - *The Public Charging Experience*, Plug In America in partnership with EPRI EVs2Scale 2030, May 2024. pdf p. 6. (923 respondents explain that most respondents use public charging rarely, defined as less than 10 times in a calendar year, pdf. p. 2.) <https://pluginamerica.org/wp-content/uploads/2024/06/2024.05-Q1-Quarterly-Survey-Public-Charging-1.pdf>.

¹³ *The Public Charging Experience*, Plug In America in partnership with EPRI EVs2Scale 2030, May 2024. pdf p. 3.
¹⁴ *Ibid.* pdf p. 9. As an additional note, a local Marylander, Lanny Hartmann, has also reported on high levels of reliability associated with Tesla charging networks. Lanny Hartmann will conduct forms of user audits on charging stations in Maryland and report on his findings through the website called, "Plug-In Sites." *see Tesla Supercharger Charger Audit – October 4, 2024*, Lanny, Oct. 5, 2024. <https://pluginsites.org/tesla-supercharger-charger-audit-october-4-2024/>. Accessed Oct. 10, 2024.

¹⁵ *ChargerHelp Annual Reliability Report*, ChargerHelp, June 2024, pp. 4 and 19.

2. Maryland’s agencies that could potentially take on the responsibility of implementing the recommendations of this Report

The Act designated five State agencies to participate in the Work Group. The following is a brief overview of those agencies and their role either with vehicle-fueling today or EVs generally.

- (1) The Maryland Department of Agriculture (“MDA”);
- (2) The Maryland Department of Transportation (“MDOT”);
- (3) The Maryland Public Service Commission (“PSC”);
- (4) The Office of the Comptroller (“Comptroller”); and
- (5) The Maryland Energy Administration (“MEA”).

a. MDA

MDA Weights & Measures (“W&M”) is invested with the regulatory authority to ensure fairness and equity of commercial transactions involving the determination of quantity.¹⁶ This has historically encompassed gas stations and, under existing law, will also encompass charging stations.¹⁷

The standards used by MDA W&M in its governance are set though a national standard commonly referred to as Handbook 44 as required by MDA’s statute §11–203.¹⁸

(c) (1) Except as provided in paragraph (2) of this subsection, the specifications, tolerances, and other technical requirements for commercial weighing and measuring devices, specified in § 11–204 of this subtitle, shall be those adopted by the National Conference on Weights and Measures and included in the National Institute of Standards and Technology Handbook 44, as amended. These specifications, tolerances, and other technical requirements shall remain in effect unless modified or rescinded by a regulation adopted by the Secretary.

The section of NIST Handbook 44 pertaining to EVSE outlines standards for determining accuracy, specifications, user requirements, receipts, and labeling. Additionally, MDA W&M

¹⁶ https://mda.maryland.gov/weights_measures/Pages/weights_measures.aspx.

¹⁷ The full authority is spelled out in Code of the Public Laws of Maryland. Agriculture Article. Title 2. Department of Agriculture. Subtitle 11.

¹⁸ Handbook 44 is a national standards manual for weights and measures authorities.

<https://www.nist.gov/publications/specifications-tolerances-and-other-technical-requirements-weighing-and-measuring-15>.

will set standards for those who are actively engaged in work on charging stations which they refer to as registered service agencies that install, calibrate, place into service, and repair EVSE under MDA’s jurisdiction.¹⁹

As part of its current enforcement responsibilities, MDA W&M will remove from service any device that does not meet the requirements of Handbook 44 that is not functioning as designed, legal for trade, or directly involved in a valid consumer complaint. MDA W&M indicated that a device cannot be returned to service until it is found to be accurate and correct. MDA W&M explained that if a device is broken, e.g. unable to dispense a charge or even if screens are broken such that customers cannot determine that the device has reset to zero, that device will be removed from service until it is rectified and confirmed to be fixed.

As presented to the EVSE Work Group, MDA W&M intends to register, inspect, test, and certify EVSE used in commercial transactions starting July 1, 2025. MDA W&M submitted a Joint Committee Report (“JCR”) this year which outlines some of its responsibilities and requirements related to EVSE under its jurisdiction.²⁰ In the JCR Report, MDA W&M indicated that they anticipate needing approximately \$610,000 in additional funding to oversee EVSE under its jurisdiction.²¹

The Act required the EVSE Work Group to make recommendations regarding adopting and implementing regulations that may establish standards and procedures for accurate field standards in accordance with the most recent edition of the National Institute of Standards and Technology Handbook 44.²² In this report, the subject of device accuracy is the same as what MDA W&M already has legal authority to regulate and oversee, as described above, which

¹⁹ Authority: Agriculture Article, §11-203(a)(3), Annotated Code of Maryland.

²⁰ *Information Request: Electric vehicle charging station inspection program report*, Maryland. Department of Agriculture. 2024. https://dlslibrary.state.md.us/publications/JCR/2024/2024_99.pdf.

²¹ *Ibid.* p. 1.

²² The Act (g)(4)(xvii).

includes: ensuring that customers receive what they pay for; that devices are operating within specific tolerances; that the devices are legal for trade; and ensuring transactions are properly computed, assessed to the customers, and recorded.

Additionally, the EVSE Work Group considered MDA W&M oversight as pertinent to the framework recommendation because the EVSE Work Group is required to make recommendations regarding which government agency should have responsibility for ensuring accountability regarding EV charging stations, of which enforcement of device accuracy is paramount.

The EVSE Work Group does not recommend any changes to MDA W&M oversight of EVSE nor how it may go about its administration of its oversight. Most of the EVSE Work Group does support a request from EVSE businesses for MDA W&M to use a formal process in their implementation of Handbook 44 standards. One of the EVSE business members put forward a request to have a formal comment process as to how MDA W&M will go about implementing Handbook 44. The EVSE business member has concerns with the implementation when it comes to the inspection process, associated fees, and enforcement and has requested that MDA allow for a formal process to invite input on drafting rules for its implementation of Handbook 44 as it relates to EVSE. The exact request is as follows:

MDA to issue a Notice of Public Comment before implementing procedures for registration, compliance, fees, and enforcement of NIST HB44 standards. The goal of this Public Comment proceeding is to enable the State to meet its Weights & Measures obligations for consumer protection in a manner that also supports the State's goal of increasing the timely deployment and operation of publicly-available EV chargers across the state.

MDA indicated to the EVSE Work Group that the request was acceptable, though there was discussion as to process timelines. MDA W&M says it could already enforce its Handbook

44 rules, but it has not because it does not have the funding to purchase the necessary equipment. As part of the discussions, members debated when this review process should be complete and MDA W&M should start to implement its oversight of EVSE under its jurisdiction. A majority of members support a recommendation that MDA should strive to complete its process and start registration and enforcement by October 1, 2025, though one member opposed this and instead supported the original July 1, 2025, target date.

b. MDOT

MDOT is the State agency dedicated to the oversight of several transportation types within the State of Maryland and is also the State agency primarily responsible for vehicle electrification and charging infrastructure strategy in Maryland. MDOT also chairs the Zero Emission Electric Vehicle Infrastructure Council (“ZEVIC”) and “is charged with the development of policies, recommendations, and incentives around zero emissions vehicles, statewide EV charging and hydrogen refueling infrastructure, and other policies to integrate zero emissions vehicles into Maryland’s transportation network.”²³

As will be discussed in more detail within, MDOT is responsible for developing and implementing the NEVI Plan which will incentivize charger deployment along certain transportation corridors, and, as part of the NEVI Program, require the stations to maintain certain uptime standards.

c. PSC

The PSC oversees the rates and operations of public service companies in the State of Maryland, which for this report, includes electric utilities. In 2019, the Commission authorized electric utilities to operate EV pilot programs that provided various incentives to customers to either deploy charging equipment, provide data, or change their charging behavior, all in order to

²³ <https://www.mdot.maryland.gov/tso/pages/Index.aspx?PageId=81>.

encourage customers to adopt EVs.²⁴ Included within this pilot authorization was the ability for utilities to own and operate publicly available EVSE. As will be discussed elsewhere within this report, the utilities under the PSC’s jurisdiction are now required to operate their charging stations to specific uptime levels. It should be noted that one of the purported benefits of allowing the utilities to own and operate charging stations in the pilot was that the utilities would ensure they were working and maintained.²⁵ Over the course of the pilot, though, there have been ongoing concerns with reliability of the utility owned charging stations.²⁶

Since most charging within Maryland will rely upon the electric grid and the utilities, the PSC will continue to be involved with the deployment of EVSE in the State under all proposals.

d. Comptroller

The Office of the Comptroller is responsible for the collection and distribution of taxes, including the collection and distribution of the 6% sales and use tax attributable to the sale of electricity at an electric vehicle (EV) charging station and the sale of electricity used to charge an electric vehicle that is not sold under a residential or domestic rate schedule on file with the Public Service Commission. Pursuant to the 2024 Budget Reconciliation Financing Act, the Office of the Comptroller distributes the sales and use tax revenue attributable to these sales to the Transportation Trust Fund.²⁷

Entities engaged in the sale of electricity at an EV charging station or the sale of electricity used to charge an electric vehicle that is not sold under a residential or domestic rate

²⁴ Case No. 9478, Commission Order No. 88997, January 14, 2019.

²⁵ IN THE MATTER OF THE PETITION OF THE ELECTRIC VEHICLE WORK GROUP FOR IMPLEMENTATION OF A STATEWIDE ELECTRIC VEHICLE PORTFOLIO. Order No. 88997, Case No. 9478, p. 63.

²⁶ Order Approving, In Part, Modifications to the Statewide Electric Vehicle Charging Pilot Program. Order No. 90036, Case No. 9478, pp. 47 – 48 (a discussion of why Baltimore Gas and Electric needed additional funds to improve reliability and utility explanations as to why they were positioned to maintain reliability). Also Order On Electric

Vehicle Pilot Phase I Evaluation and Next Steps, Order No. 91297, Case No. 9478, pp. 12 – 13.

²⁷ SB362 (2024), <https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/SB0362>.

schedule on file with the Public Service Commission must establish a Maryland sales and use tax account and file and pay sales and use tax. Similar to other businesses who file and pay sales and use tax, these entities are also subject to sales and use tax audits and subject to other sales and use tax collection activities.

The Office of the Comptroller is also responsible for fuel quality at gas pumps but does not report or track the functionality of gas pumps.²⁸

e. MEA

MEA is the state energy office whose mission is to promote clean, affordable, reliable energy and energy-related greenhouse gas emission reductions to benefit Marylanders in a just and equitable manner. MEA provides several grants for Marylanders related to energy which includes electric vehicle charging infrastructure. These programs include rebates, grants and loans, and program/technical assistance.

3. Existing standards and practices (federal and state) for EVSE reliability/uptime

The Act defines “uptime” as “the availability and consistency of an EV charging station to successfully dispense electricity as designed, measured as a percentage of both hours and days of a calendar year.”²⁹ Essentially, how often the EV charging station is able to dispense a charge when a customer tries to use the equipment, and whether it operates as advertised to the customer. For purposes of this report the word “reliability” is used synonymously with the word “uptime.”

What follows is a brief survey of the existing standards relating to uptime for federal, state, and local levels, and for Maryland.

a. Federal standards

²⁸ <https://www.marylandtaxes.gov/faq/motor-fuel.php>.

²⁹ The Act (a)(9).

Currently, there are no national standards for EVSE related to measuring and reporting uptime, but there is a national model for uptime measurement and reporting for federally funded EVSE, most notably through the National Electric Vehicle Infrastructure (“NEVI”) Formula Program. The program is administered by the U.S Department of Transportation’s Federal Highway Administration (“FHWA”) and was established through the Infrastructure Investment and Jobs Act.³⁰ NEVI is typically held up as the industry standard for uptime.

Each state is responsible for distributing its allocation of NEVI funds for the deployment of public EVSE along designated Alternative Fuel Corridors and in communities.

On February 28, 2023, the Federal Highway Administration (“FHWA”) published its final regulations that set minimum standards and requirements for projects funded through the NEVI Formula Program and other Title 23 programs, such as the Charging and Fueling Infrastructure Discretionary Grant Program.³¹ For the purposes of this report, these minimum standards and requirements will be referred to as NEVI standards, but they apply to all Title 23 charging projects. These regulations, which became effective on March 30, 2023, were established to ensure the convenience and reliability of public EVSE across all states and include uptime criteria, customer service standards, and regular data reporting with which projects must comply.³²

The established uptime standard for EVSE under NEVI is 97 percent, subject to certain exceptions. It is these standards that the Act required the EVSE Work Group to give deference to

³⁰ <https://afdc.energy.gov/laws/12744>.

³¹ Federal Register, Rules and Regulations, Vol. 88, No. 39, Feb. 28, 2023. <https://www.govinfo.gov/content/pkg/FR-2023-02-28/pdf/2023-03500.pdf> (“NEVI Standards”).

³² <https://www.federalregister.gov/documents/2023/02/28/2023-03500/national-electric-vehicle-infrastructure-standards-and-requirements>.

making recommendations regarding adopting and implementing regulations that cover several topics listed within the legislation.³³

b. California

Currently, California is developing regulations associated with EVSE uptime. The California Energy Commission (“CEC”) which is a similar entity to the Maryland Energy Administration, as required by various pieces of legislation, has proposed regulations that establish “reliability reporting and reliability performance standards regulations apply to all chargers that receive an incentive from a state agency or ratepayers, except those used solely for private use at a single-family home or at a multifamily dwelling with four or fewer dwelling units.”³⁴

California will require the EVSE subject to these reliability standards, if it is installed after January 1, 2024, to meet a 97 percent uptime standard subject to certain exceptions and, if installed after January 1, 2026, to meet a 90 percent successful charge attempt rate standard.^{35 36} These proposed regulations are on their second iteration and have not taken effect.

c. New Jersey

New Jersey is another state that recently enacted a law at the beginning of 2024 which will require state agencies to require uptime standards in alignment with NEVI as a condition of

³³ The Act §(h)(1).

³⁴ See *Second Draft Staff Report Tracking and Improving Reliability of California’s Electric Vehicle Chargers*, California Energy Commission, Docket No. 22-EVI-04, Apr. 9, 2024, pp. 17-18, 23.

³⁵ See *Second Draft Staff Report Tracking and Improving Reliability of California’s Electric Vehicle Chargers*, California Energy Commission, Docket No. 22-EVI-04, Apr. 4, 2024, pp. 23 and 27 – 28.

³⁶ Successful charge attempt rate standard (“SCAR”) is the “percent of the time that a customer attempts to initiate a charging session at a regulated charger the charging session must last at least five minutes, which will be considered a successful charge for this regulation.” The CEC claims “[t]he minimum SCAR requirement is intended to regulate the true real-world reliability of an EV charger more accurately than just an uptime requirement, since a charger that is “up” can still fail to successfully charge an EV because of charger timeouts and some technical faults. These errors at “up” chargers anecdotally appear to be common and may not be remedied by a 97 percent uptime requirement, which may even increase customer frustration at “up” chargers that still do not successfully charge vehicles.” See *Second Draft Staff Report Tracking and Improving Reliability of California’s Electric Vehicle Chargers*, Docket No. 22-EVI-04, Apr. 4, 2024, p. 35.

receiving state or federal incentives.³⁷ This legislation requires 97 percent uptime from EVSEs that received an installation incentive from the Board of Public Utilities, Department of Environmental Protection, Department of Transportation, or any other State agency that offers such incentives. It also requires those agencies to review the uptime requirement every two years to ensure consistency with NEVI standards. Additionally, each of these agencies must develop a system to monitor and enforce compliance with this uptime standard. This legislation only applies to EVSEs installed after the effective date of the legislation and does not apply retroactively to previously installed EVSEs.

d. New York

New York also nearly implemented legislation that would have required the New York Department of Public Service (an entity similar to the Maryland Public Service Commission) to develop uptime and reporting standards for publicly available EVSE installed on or after Jan. 1, 2025, that received state or ratepayer funds.³⁸ There would have been a requirement that once every two years starting from January 1, 2026, the commission would assess the uptime of EVSE infrastructure, including an assessment on access to reliable charging stations in low-, moderate-, and high-income communities with any publicly published data being aggregated and anonymized to protect any sensitive information.

The legislation was ultimately vetoed by Governor Kathy Hochul on December 22, 2023. In her memo vetoing the bill, she notes that the creation and enforcement of EV charger regulations is outside of the expertise of the commission, “which is the manufacture, transportation, sale, or distribution of electricity for light, heat or power,” that the commission

³⁷ P.L. 2023, CHAPTER 278, approved Jan. 16, 2024. Senate, No. 3102 (Second Reprint).

https://pub.njleg.state.nj.us/Bills/2022/AL23/278_.PDF.

³⁸ Assembly Bill A01721, The New York State Assembly.

https://assembly.state.ny.us/leg/?default_fld=&bn=A01721&term=2023&Summary=Y&Actions=Y&Text=Y&Committee%26nbspVotes=Y&Floor%26nbspVotes=Y#A01721.

lacks authority to directly regulate such chargers, and that the budget to fund these responsibilities is “not currently accounted for in the State’s financial plan.”³⁹ The veto directed the New York State Department of Agriculture and Markets’ Division of Weights and Measures to gather information and create a database on publicly accessible EV chargers, identifying who is responsible for maintaining those chargers.

e. City of Philadelphia (local level)

While not federal or state level, the City of Philadelphia recently enacted a statute to be effective April 1, 2025, that will fine \$300 for non-operational EVSE.⁴⁰ The new rules apply to EVSE on property in the City of Philadelphia with ten or more parking spaces built or significantly upgraded after the effective date of the new law.⁴¹ The sponsor of the legislation claimed “[w]e wanted to address range anxiety by making sure that these chargers are maintained.”⁴²

f. Maryland

In Maryland the two State agencies that have some form of oversight of uptime for either publicly funded or ratepayer funded EVSE are the PSC and MDOT.

(i) The PSC’s role in oversight of uptime

As discussed previously, the utilities overseen by the PSC are required to operate their EVSE to certain uptime standards. During the pilot development, a PSC work group was directed to and developed interim reporting for utility owned station uptime standards, with the goal of aligning with NEVI standards once those were finalized. On May 8, 2023, Governor Wes Moore signed House Bill 834 (“HB 834”) Electric Vehicle Charging Reliability Act, into law, which

³⁹ Veto Memo 112, State of New York. <https://www.documentcloud.org/documents/24252074-hochul-veto-112-2023>.

⁴⁰ City of Philadelphia, Bill No. 240674. CHAPTER 9-6400.

⁴¹ *Ibid.* §9-6402.

⁴² *Philly property owners could soon face fines if their EV chargers don’t work*, WHYY PBS, Oct. 18, 2024, visited 10/25/2024. <https://whyy.org/articles/philadelphia-city-council-electric-vehicle-chargers-legislation-fines/>.

became effective October 1, 2023.⁴³ One aspect of HB 834 was that it required the PSC to set an uptime standard of 97 percent in alignment with NEVI, or as determined by the PSC, and established reporting standards for utility-owned charging stations.⁴⁴ The PSC's work group developed the required rules for measuring and reporting uptime which were ultimately approved by the Commission in Order Nos. 90971 and 91222, Case No. 9478. The PSC's work group is currently finalizing the reporting template that will be utilized for reporting.

(ii) MDOT's role in oversight of uptime

MDOT implements the Maryland NEVI Program, a federal formula program to first deploy public, convenient, and reliable charging stations along designated electric vehicle Alternative Fuel Corridors and then in communities. Maryland's NEVI Program is part of a national NEVI effort to establish an interconnected public charging network to facilitate data collection, access, and reliability. To select NEVI sites, MDOT competitively procures projects within identified target areas and awards contracts to the entities proposing best value projects. Entities that are awarded a contract with the State of Maryland through MDOT to install, maintain, and operate a NEVI site are obligated to comply with federal standards for projects receiving Title 23 funds, including maintaining 97% or better uptime. As part of NEVI requirements, projects must provide one-time, annual, and quarterly data submissions to MDOT and the Joint Office of Energy and Transportation through the Electric Vehicle Charging Analytics and Reporting Tool (EV-ChART). The quarterly data submissions will track uptime, among other data, and will be the primary source of data for checking compliance. MDOT may conduct field investigations in response to reported outages or proactively to ensure uptime compliance as well.

⁴³ See https://mgaleg.maryland.gov/2023RS/chapters_noln/Ch_569_hb0834E.pdf.

⁴⁴ HB834, PUA §7-904(A) and §7-905. Effective October 1, 2023.

On July 10, 2024, MDOT conditionally awarded \$12.1 million of NEVI formula funds for 130 additional DCFC ports at 23 corridor sites in Maryland.⁴⁵ Projects that move forward as finalized awards will be open to the public within one year of design and construction and be operated and maintained for a minimum of five years thereafter in accordance with the long-term stewardship requirement for the NEVI Program. Throughout the duration of NEVI contracts between awardees and the State of Maryland, payments will be issued in installments based on predetermined project milestones, such as every year of successful operations and maintenance (O&M) with timely data reporting and uptime compliance, among other federal requirements. Regarding the enforcement of uptime, MDOT reserves the right within the executed NEVI contracts to adjust the payment for the O&M year pursuant to the actual uptime during the year if permissible uptime defined by federal standards falls below 97 percent.

Proposed Framework

The Act required the EVSE Work Group to develop a framework for reliability and reporting standards for EV charging stations.⁴⁶ The framework put forward by the EVSE Work Group in this Report provides a general outline showing how the Implementing Agency would oversee reliability and reporting standards for EV charging stations. The proposed framework consists of four core parameters:

- Who should be under the framework
- Registration and Implementation
- Data Reporting and Tracking
- Enforcement

⁴⁵ <https://www.mdot.maryland.gov/tso/pages/newsroomdetails.aspx?newsId=811&PageId=38>.

⁴⁶ The Act §(g)(1).

When developing these recommendations in the report, there were two guiding principles that the members tried to keep in mind. These were to (a) ensure that charging stations available for public use work as advertised and (b) not unduly hamper deployment of additional charging stations. These two parameters represent sometimes conflicting interests between consumers and the charging industry.

1. Who should be subject to the framework

EVSE Work Group members generally support some form of oversight for all publicly facing EVSE, although there was disagreement amongst members as to the level of oversight necessary for different categories of publicly facing EVSE.⁴⁷

The Work Group members defined *publicly-facing EVSE* as:

EVSE that are used to engage in a financial transaction that is not the property owner's or their business, e.g. those that charge another person or entity a fee, should be subject to some form of oversight. Public chargers are located at parking space(s) designated by a property owner or lessee to be available to and accessible by the public that engage in a direct consumer transaction. This is in contrast with private EVSE, such as that owned by individual residential owners or apartment buildings, or where the EVSE is owned by a business that uses it exclusively for its own fleet vehicles, where the charger is not accessible to the public.

Members generally agree that all publicly facing EVSE should be registered with the State, which will be necessary for compliance with MDA W&M compliance, ensuring taxes are

⁴⁷ Privately owned EVSEs not used by the Public (i.e. fleet owners, condo/HOAs) should not be subject to the framework. The Act provides that, when considering details that may become the subject of regulation via any implementing legislation that may result from this report, the regulations should exclude EVSE that is used for noncommercial purposes and EVSE that supplies wholesale electricity. The Act §(h)(3).

This is similar to the applicability of rules in Handbook 44 which is used to govern the process used by MDA W&M. See NIST Handbook 44, 2024, 3-153. A.1. General. – This code applies to devices, accessories, and systems used for the measurement of electricity dispensed in vehicle fuel applications wherein a quantity determination or statement of measure is used wholly or partially as a basis for sale or upon which a charge for service is based. A.2. Exceptions. – This code does not apply to: (a) The use of any measure or measuring device owned, maintained, and used by a public utility or municipality only in connection with measuring electricity subject to the authority having jurisdiction such as the Public Utilities Commission. (b) Electric Vehicle Supply Equipment (EVSEs) used solely for dispensing electrical energy in connection with operations in which the amount dispensed does not affect customer charges or compensation. (c) The wholesale delivery of electricity.

appropriately paid, and to better track the deployment of EVSE in the State. Members also agree that publicly-facing EVSE which are free of financial transactions should not be subject to regulatory requirements, though it is recommended that they register with the State to better understand the scope of charging infrastructure deployment in Maryland. Where differences arose was the appropriateness of applying reliability standards and the associated data reporting and enforcement to non-publicly funded EVSE as will be discussed later.

The Work Group members also made distinctions based on how the charging station is used by general members of the public and the technology types used. Since the proposed framework makes distinctions between different categories of charging stations for reliability purposes, it is important that these distinctions are made clear.

The EVSE Members agreed upon the following subcategories of public facing chargers:

Shared Private - Workplace and MUD: Shared private chargers are located at parking space(s) designated by a property owner or lessee to be available to, and accessible by, employees, tenants, visitors, and residents. Examples include workplaces and shared parking at a multifamily residence.

Utility Owned EVSE - This is EVSE owned by the utility that is beyond the utility meter and available for non-utility use. This includes utility charging stations that were installed for public use during the PSC-approved utility pilots. Would fall under the publicly funded category as well.

Publicly Funded – Received financial compensation for installing and/or operating the charger. This includes but is not limited to grants and/or funding from federal, State, local governments, and utility ratepayers. (intent – did EVSE receive money to install or maintain its equipment from a government or utility source).

Shared Public/Private: Chargers that are provided for public use for specific hours and other hours restricted for only shared private use.

Other - All other EVSE that falls under Publicly Facing but does not fit into the first four categories.

When differentiating between technology types for charging stations, The Work Group made the following distinctions:

*Level 2 Charging - is defined by NEVI regulations as “a charger that operates on a circuit from 208 volts to 240 volts and transfers alternating-current (AC) electricity to a device in an EV that converts alternating current to direct current to recharge an EV battery.” This is slower charging that can typically charge a battery electric vehicle in 4 - 10 hours and a plug-in hybrid electric vehicle in 1 - 2 hours.*⁴⁸

*Direct Current Fast Charging - is defined by NEVI regulations as “a charger that enables rapid charging by delivering direct-current (DC) electricity directly to an EV's battery.” This is typically where a battery electric vehicle can be charged to 80 percent in 20 minutes to 1 hour.*⁴⁹

*Networked Charger:*⁵⁰ *Networked chargers are stations that are typically internet connected and can be managed remotely. Also networked chargers may be part of a larger charging network. The California Energy Commission (“CEC”) in its second set of proposed regulations defines Networked Charging where “a charger can receive or send commands or messages remotely from or to a charging network provider or is otherwise connected to a central management system, such as by using OCPP 2.0.1, for the purposes of charger management and data reporting.”*⁵¹

2. Registration and Implementation

The Work Group makes the following recommendations regarding the timelines and process for (1) registration of EVSE with the State; for (2) achieving compliance with reliability

⁴⁸ *Charger Types and Speeds*, U.S. Department of Transportation. <https://www.transportation.gov/rural/ev/toolkit/ev-basics/charging-speeds#:~:text=Level%20%20equipment%20offers%20higher,PHEV%20in%201%2D2%20hours>.

⁴⁹ *Charger Types and Speeds*, U.S. Department of Transportation. <https://www.transportation.gov/rural/ev/toolkit/ev-basics/charging-speeds#:~:text=Level%20%20equipment%20offers%20higher,PHEV%20in%201%2D2%20hours>.

⁵⁰ During the work group, it was discussed if non-networked chargers should be subject to the framework. It was determined that it was likely that a non-networked charger would not assess fees since it was not internet connected and thus the framework does not distinguish a difference as free charging was generally exempt. It should be noted that the Alternative Fuels Data Center managed by the U.S. Department of Energy states that non-networked chargers could assess fees through “radio-frequency identification (“RFID”) capabilities, mobile applications, or in-person payments.” (*Operations and Maintenance for Electric Vehicle Charging Infrastructure*, U.S. Department of Energy. <https://afdc.energy.gov/fuels/electricity-infrastructure-maintenance-and-operation>.) It should also be noted that the CEC, in its second set of draft regulations, has set different standards for non-networked chargers due to their lack of remote monitoring capabilities.

⁵¹ See *Second Draft Staff Report Tracking and Improving Reliability of California's Electric Vehicle Chargers*, California Energy Commission, Docket No. 22-EVI-04, Apr. 9, 2024, p. A-6.

rules; and for (3) ensuring smooth communication between EVSE owners and the Implementing Agency.

a. Registration

The EVSE Work Group generally recommends a three- to twelve-month timeline (three months for new stations and twelve months for existing stations) to register new and existing publicly facing charging stations once the Implementing Agency develops its rules for the proposed reliability framework.

Given the large numbers of existing charging stations in the State, it is important that businesses which have installed EVSE be given adequate notice of a need to register and also to comply with new regulations. The Work Group recommends that the Implementing Agency develop an education campaign to make existing and future EVSE owners aware of registration and compliance requirements for any new reliability and reporting rules. The Work Group also recommends that the Implementing Agency have the flexibility to waive registration timelines for good cause shown.

The Work Group notes that both MDA and the Comptroller's Office have statutory responsibilities associated with certain charging stations. If the proposed framework is established for all publicly facing charging stations in the State under a different agency, there will either need to be cross coordination between the agencies if registration only occurs with one agency or the charging station will need to register with multiple agencies. The positives and negatives of this are discussed further in the section discussing which agency should have responsibility for the framework.

b. Compliance

The Act required that the EVSE Work Group determine the amount of time existing EVSE should have to comply with the implementation of new regulations associated with the legislation.⁵² The EVSE Work Group recommends that both existing and new EVSE should be within a framework for reliability and reporting standards so long as charging stations were given a sufficient amount of time to comply. There are some regulatory standards that the EVSE Work Group members supported grandfathering that will be discussed in a later section.

The time period to come into compliance will be especially important for existing EVSE owners who made investments in the State before the implementation of any new legislation. Some EVSE businesses preferred that the rules only apply to prospectively installed charging stations, once regulations are established. This would avoid businesses having to make investment decisions regarding if existing equipment and reporting systems could be brought up to the new standards. Additionally, applying the proposed framework to only EVSE installed in the future would align with some jurisdictions as discussed in the background section. Finally, the EVSE businesses pointed out that, if existing stations are required to comply with new rules, sufficient time needs to be provided to avoid companies taking stations out of service as they bring them into compliance.

Some Work Group members were concerned that establishing a framework that grandfathered existing charging stations versus prospective stations could lead to driver confusion and inconsistent service. Others pointed out that they believed standards should apply to all stations, but only after EVSE businesses were given sufficient time to comply.

⁵² The Act §(h)(2).

The EVSE Work Group debated what qualified as a sufficient grace period for EVSE businesses to bring their equipment into compliance with any new rules for reliability and reporting. Proposals ranged from 18-30 months after the Implementing Agency developed their rules for implementing the proposed framework. Some members wanted to give EVSE businesses an 18-month grace period to start reporting and enforcement. Other members supported giving EVSE owners a 12-month grace period to start reporting and another 12 months after reporting started before any negative consequences would occur for poor uptime, for the stations subject to negative consequences as discussed in the enforcement section. Other members supported giving a 12 - 18 month grace period before reporting started and then an additional 12 months before any negative financial consequences. No proposal was supported by a majority of members, but the proposal for a concurrent 18-month grace period for both reporting and enforcement was the most supported.

It should be noted that certain charging stations under the PSC or MDOT's purview are, or will be, subject to reliability standards. The EVSE Work Group recommends that any current uptime standards, including utility uptime standards per HB834 of 2023, remain in effect until the Implementing Agency has fully implemented its rules.

c. Communication between EVSE owners and the Implementing Agency

A complicating factor when implementing the proposed framework will be the identification of who should coordinate with the Implementing Agency. The owner of a charging station may not be the operator of the equipment. For example, there are several network providers who do not own charging stations but operate them on behalf of a business, although the network provider's labeling may be on the device. Alternatively, there could be situations where the site host of the charging station does not own the equipment. This could cause issues

with identifying the owner of equipment, where complaints should be directed, and from whom to collect data. Additionally, it is not clear how easy it will be to inform independent operators of the need to register, though this will be necessary regardless of the State choosing to implement a framework associated with reliability and reporting standards, as the EVSE business owners will need to register with the State for implementation of MDA W&M Handbook 44 rules.

The Work Group recommends that the EVSE owner be ultimately responsible for complying with any new framework but that the EVSE owner should be permitted to designate an operator to coordinate for reporting and communication purposes with the Implementing Agency. Additionally, the EVSE Work Group recommends that charging stations in general should be marked to identify the owner and/or operator. Any designation should make clear who is responsible for operating and maintaining the site.

3. Data Reporting and Tracking

At the core of the reliability and reporting standards will be the collection of data from the relevant charging stations. The Work Group recommends that the Implementing Agency for reliability and reporting standards should determine the rules for data reporting based on the standards it will be required to enforce. This would include frequency, data standardization, cyber security, exceptions, etc. Where appropriate, data reporting should align with data reporting from the NEVI Program. The minimum reporting standards shall include:

- Power output (kW) and level
- Number of ports and connector types
- Hours of availability
- Network
- Open date
- Facility type (site host type, see the Alternative Fuel Data Center for more information)
- At minimum, is there a fee to charge? If so, what are the accepted payment methods

- Annual kWh output (for tax purposes)
- Uptime – if it is required, as discussed in the enforcement section below

Please note that most of this information would be provided upon registration but can be updated later if there are changes to the information.

4. Enforcement

The Implementing Agency will be tasked with holding charging stations responsible for meeting uptime standards. The Work Group reached a compromise recommendation on this issue whereby different types of publicly facing charging stations would be subject to different enforcement and reporting requirements. Portions of this compromise were not supported by certain members as discussed below and enforcement of reliability standards was the most controversial of the topics discussed within the proposed framework. Generally, the disagreement was based upon the appropriateness of requiring reliability and reporting standards and the application of possible penalties to non-publicly funded EVSE.

a. Publicly Funded EVSE that is Publicly Facing

The EVSE Work Group recommends that publicly funded EVSE be required to both report and meet reliability standards and face potential financial consequences for failing to meet the standards. There was no opposition to this requirement. As discussed in the background section, there are some States which have passed laws that require uptime standards for publicly funded EVSE. In situations where financial consequences may be warranted, it is recommended that the Implementing Agency consider the existing negative obligations that would already be imposed upon an EVSE business charging station that is actively receiving public funds, before imposing additional fines. In all situations, the EVSE business should be given an opportunity to rectify a poor performing charging station before facing financial penalties. A complication of

this requirement will be coordinating across state agencies to ensure the Implementing Agency is aware of what EVSE meets the publicly funded requirements.

b. Privately Funded EVSE that is Publicly Facing

The EVSE Work Group debated if uptime standards should apply to EVSE that is entirely privately funded. Concerns were raised that applying reliability and reporting rules for privately funded chargers would be an overregulation of the industry and could be a hindrance to the market, especially for Level 2 charging. Concerns were raised about the economics of Level 2 charging versus DCFC and the sophistication of Level 2 charging owners and their desire or ability to comply if obligated with any new reliability and reporting standards. EVSE businesses noted that few other industries' overall products or services are subject to punitive action absent concerns about public health or safety, and that site hosts and businesses who are considering investing their own funds to deploy chargers as an amenity for visitors will be disinclined to do so if they are subject to financial penalties should the chargers fail to operate as intended. The EVSE businesses are concerned that imposing obligations on privately funded EVSE would result in fewer installations or less charging infrastructure investment in Maryland.

This was in tension with several EVSE Work Group members' desire to improve the charging experience for drivers as the reliability of charging stations has been an issue. They also questioned why one set of chargers should be treated differently than others. Members recognized that a tiered approach to enforcement for different charging technology types or owners may be appropriate. Some members mentioned that it may be appropriate for *Shared Private - Workplace and MUD* sited infrastructure to receive notice of customer complaints instead of facing financial penalties. Also, during discussions there was amenability to tiering enforcement or reporting obligations related to Level 2 charging vs DCFC.

Ultimately, a compromise was reached in the treatment of privately funded chargers. Members agreed that privately funded chargers should not face financial penalties currently, but that information should be gathered and reported to the legislature which can, later, expand the Implementing Agency's authority to impose financial consequences if necessary. The Work Group recommends that the Implementing Agency submit a report every year by November 1 to the legislature about the state of charger reliability in the State and, if necessary, identify actions the State can take, including expanding the scope of enforcement authority, to improve EVSE reliability.

c. Tiered Requirements for Privately Funded EVSE

As part of the compromise, members recommended that publicly facing DCFC that is privately funded in Maryland report reliability metrics to the Implementing Agency, but would not face financial consequences for reliability metrics. To the extent that a non-networked charger is required to report to the Implementing Agency, it should take into account that these types of chargers may require different reporting requirements.

Members agreed to not require reporting of uptime from publicly facing non-DCFC that is privately funded. In lieu of this though, a majority of members believed it was important for publicly facing chargers that were not DCFC to provide a publicly available longevity maintenance plan to the Implementing Agency once it registered with the State. The purpose of the longevity maintenance plan is to show that there is some foresight into keeping the EVSE working. The Implementing Agency will need to develop the official details of the maintenance plan, but the guiding principles should include maintaining the operations of the charger and a business plan to fix a charger if it is not operating. Additionally, the members agreed that the plan would only need to be informative and does not need to be approved by the Implementing

Agency. The Implementing Agency shall monitor compliance with the maintenance plan based on customer complaints and other reviews.

In conjunction with the concern about these reporting and registration requirements not being solely for prospective stations as discussed earlier, the EVSE business members and non members opposed the requirements for non-DCFC public facing charging as the scope of the maintenance plan is not defined and because they believe information surrounding a maintenance plan should be confidential and not be disclosed because it may contain proprietary business information.

d. Decommissioning

Late in the work group process, another issue was raised regarding the enforcement framework for the Implementing Agency to develop standards for decommissioning EVSE. According to MDA, today gas stations are required to remove equipment within six months of shutting down and must provide some form of notification. This could also support the creation of an accurate list of active EVSE operating in the state. Establishing decommissioning standards was opposed by the EVSE business members as well.

e. Civil Penalties

Finally, there is the issue of civil penalties. The Act required the EVSE Work Group to make recommendations “regarding adopting and implementing regulations that may establish civil penalties for noncompliance with the regulations.”⁵³ The Work Group did not determine an appropriately sized financial penalty and recommends that the size of financial penalties be legislatively determined, or left to the determination of the Implementing Agency based upon

⁵³ The Act §(g)(3)(xix).

guidance from the legislature. As previously discussed, the only civil penalties that have been proposed for failing to meet reliability standards apply to publicly funded EVSE.

Who should administer the program

The Act required the EVSE Work Group to “study and make recommendations regarding which government entities have responsibility for ensuring accountability regarding EV charging stations.”⁵⁴

The agencies that EVSE Work Group members focused on were MDA W&M, PSC, MDOT, and the Comptroller. There was no clear State agency that received a majority of support to be the implementer for the reliability and reporting proposed framework, but the two agencies which received the most support for implementation were MDA W&M⁵⁵ and the PSC.

Regardless of which agency(s) are ultimately selected, the Work Group agreed that the Implementing Agency will require new resources.

1. MDA

Several members recommended that MDA W&M oversee uptime standards and reporting because the agency already enforces accuracy standards and has a field division that could be augmented for inspection purposes. Placing responsibility with MDA may be the most consumer-friendly option because it would unify responsibility for both reliability and accuracy (which MDA already has responsibility for) and drivers who have reliability or device accuracy problems with charging station operations will therefore have less difficulty determining which State Agency to contact if they have a complaint. Additionally, this will limit the number of State

⁵⁴ The Act §(g)(2).

⁵⁵ As discussed previously, MDA W&M currently oversees device accuracy and certain labeling requirements associated with informing customers about pricing and electrical output when charging a vehicle. Members agree that MDA W&M should continue to exclusively retain this responsibility.

agencies that EVSE business owners have to coordinate with and could simplify the need to cross coordinate the registration of EVSE and the sharing of information between agencies.

Those who did not support MDA W&M in this regard expressed concerns that MDA does not have experience with reliability standards and that their current rules are predominantly governed by a national standards manual and not developed internally. MDA also does not have the analytical or administrative expertise associated which would need to be hired and developed before such a program could be implemented. Additionally, MDA itself disputes that inter-agency authority of charging stations would be burdensome for customers and business because today authority for gas stations is split between different State agencies. The PSC concurs with MDA's position that splitting oversight for reliability and oversight for accuracy between different agencies would not be excessively burdensome.

2. PSC or MDOT

Other members preferred the PSC or MDOT (more members supported the PSC over MDOT to implement the proposed framework) to oversee charging station uptime. Both agencies currently oversee incentive programs for the development of EV charging stations. Additionally, as discussed previously, both agencies have implemented or are implementing standards and reporting for reliability related to publicly facing EVSE under their jurisdiction and could expand their oversight if required.

Issues that would differentiate MDOT versus the PSC as an appropriate agency for overseeing uptime: (a) MDOT is the agency charged with the State's plan to decarbonize the transportation sector and would be naturally positioned to monitor the charging market to assess how to improve customer charging experiences; (b) the PSC is a quasi-judicial body equipped to handle disputes over the development and enforcement of new regulations.

The PSC also has many publicly facing EVSE already under its jurisdiction because of utility-owned charging stations. The PSC notes that if utility owned charging station reliability oversight is shifted from under its purview, the PSC still has ultimate responsibility for determining cost recovery for the utility costs and the exact responsibility of the PSC for utility owned stations (for which recovery will be sought) will need to be defined.

3. Comptroller and MEA

The Comptroller's office was also discussed but ultimately did not get a vote for being the Implementation Agency. The Comptroller currently oversees fuel quality of gas stations and oversight of charging station uptime could be a possible expansion of this authority.

No member recommended MEA overseeing EVSE uptime standards and reporting.

4. Resources that the Implementing Agency will require

All agencies have confirmed that new resources will be necessary to implement any reliability and reporting standard framework that may result from this report. Across the agencies, there will need to be an increase in personnel and the procurement of equipment to implement the proposed framework.

Each agency was requested to provide an estimated budget if they were required to oversee reliability and reporting standards under the proposed framework. These were to be worst case budget estimates assuming that the Implementing Agency would need to proactively monitor all publicly facing EVSE.

Please note that all estimates are drafts and were developed before the proposed framework was finalized as there was not enough time to revise budgets based on the final

recommendations. It should be emphasized that the agencies may revise these estimates based on any legislation that may result due to this report.⁵⁶

Agency Budget Estimates for Implementation of EVSE Reliability and Reporting Standards

Agency	Estimated budget
MDA	~\$2 million in start-up costs ~\$1.7 million in annual recurring costs.
PSC	~\$992,000-\$1,240,000 for equipment ~\$586,200 -\$732,750 for personnel (annual recurring costs)
MDOT	~\$2,009,000 year 1 costs ~1,584,000 annual recurring costs
Comptroller	~3,045,389 year 1 costs ~\$1,445,389 annual costs
MEA	~\$1.8 million for initial investment ~750,000 in recurring annual costs

Possible Regulations associated with overseeing uptime

The Act required the EVSE Work Group to make recommendations regarding adopting and implementing regulations that may cover several topics listed within the legislation.⁵⁷ There were approximately 19 topics the EVSE Work Group was to respond to. These topics can be categorized into 4 groups:

- (1) reliability,
- (2) design,
- (3) consumer, and
- (4) regulatory standards, which is how the report discusses these topics.⁵⁸

⁵⁶ A more detailed breakdown of these proposed budgets are contained in Appendix B.

⁵⁷ The Act §(g)(3).

⁵⁸ See Appendix C for the numerical order of the topics and the associated recommendation.

When making recommendations on these topics, the EVSE Work Group was to give deference to NEVI standards but could deviate for good cause, provide a delayed applicability date for EVSE installed before the date of regulations were adopted, and to exclude EVSE that is not used for noncommercial purposes or that supplies wholesale electricity.⁵⁹

1. Reliability Standards

The Act required the EVSE Work Group to make recommendations explicitly as to the level of required reliability and specifics on how it was measured. The EVSE Work Group recommends that the Implementing Agency be given authority to require reliability at 97 percent applicable to publicly funded EVSE, as described above, but to leave the specifics of the measurement of the 97 percent uptime requirement to be later determined by the Implementing Agency with deference given to NEVI or other national standards.

The Act explicitly required recommendations regarding a 97 percent uptime for EVSE.⁶⁰ This is the standard required of EVSE that receives NEVI funding and is the level of uptime required of utility owned charging stations per HB834 (2023). As this is a standard associated with a significant amount of federal funding and is also referred to by other states requiring or monitoring uptime, the EVSE Work Group recommends it be adopted for any EVSE that the legislature sets for financial enforcement or monitoring purposes. It should be noted that the calculation of 97 percent reliability and exemptions related to it are outlined in the implementing NEVI regulations which should also be considered by the Implementing Agency when enforcing and monitoring uptime within the framework listed above. As NEVI is a federal regulation, it is subject to change, so the EVSE work group recommends the Implementing Agency continue to align with NEVI over time and/or other nationally recognized standards as they evolve. It is

⁵⁹ The topics of delayed applicability of regulations and the exclusions of certain EVSE was discussed within the proposed framework above.

⁶⁰ The Act §(g)(3)(xi).

important to EVSE business members that there be alignment between regulatory frameworks nationally so as to avoid business hardship of having to develop equipment and internal business processes differently across states.

Therefore, the EVSE Work Group recommends the Implementing Agency be given authority to enforce and/or track uptime standards and for the Implementing Agency to establish standards for EVSE to maintain an average annual uptime of 97% or greater. The standards to measure EVSE uptime shall align with NEVI or other nationally recognized standards. The Implementing Agency may deviate from NEVI or other nationally recognized standards for good cause. (One member preferred the Implementing Agency to not have the ability to deviate from NEVI for good cause.)

While 97 percent uptime is the reliability standard, there has to be structure to how it is calculated as determined by the Implementing Agency. The Act asked the EVSE Work Group to provide recommendations on specific issues that impact how uptime is measured. These are:

- Whether uptime must be calculated per EV charging port or per EV charging connector;⁶¹
- The date to which downtime is backdated;⁶²
- Whether downtime includes EV charging station disconnection or broken interface features when EV supply equipment can still output electricity;⁶³ and
- Establish exemptions from the uptime requirement of 97%.⁶⁴

It is recommended that the determination of these issues be left to the Implementing Agency, though they should consider how other state agencies, specifically MDOT and PSC, implemented their uptime measurement standards relative to NEVI standards.⁶⁵ It is best that

⁶¹ The Act §(g)(3)(xii)1.

⁶² The Act §(g)(3)(xii)2.

⁶³ The Act §(g)(3)(xii)3.

⁶⁴ The Act §(g)(3)(xiii).

⁶⁵ Appendix D provides examples of how the PSC developed different aspects of its reliability standards for utility-owned EVSE and some of the complications that had to be sorted through. It should be noted that the standards were developed in response to Maryland legislation HB 834 (2023).

specifics related to these topics not be put in legislation as they are details that can change over time.⁶⁶ 2. Designs Standards

The Act lists two topics for the Work Group to address that have to do with the design of the EVSE itself. These are (1) the minimum power output of the EVSE and (2) standards for the connectors attached to EVSE.⁶⁷ The EVSE Work Group does not recommend standards be set for either of these topics because the implementing regulations should be technology agnostic and focus on reliability of the equipment that is installed.

Minimum power output means the amount of energy that would be required to be discharged from a charging station or port when a customer uses it. Under NEVI, a DCFC must support voltages between 250-920 volts DC and when located along designated Alternative Fuel Corridors, continuously deliver power of at least 150 kilowatts.⁶⁸ A Level 2 charging station funded using NEVI must be able to deliver 6 kW of energy continuously.⁶⁹

The EVSE Work Group agrees it is unnecessary for future regulation to require charging stations in Maryland to meet certain output standards when installed as this will be a business decision of the business that installs the charger. The EVSE Work Group recommends diverging from NEVI on this point as NEVI is a funding mechanism to build new chargers while the Implementing Agency should be technology agnostic and focus on the reliability of the equipment that is made available for public use. Therefore, the EVSE Work Group recommends that there not be minimum output standards as technology is changing and there are different vintages of equipment. When determining uptime, the Implementing Agency should ensure the

⁶⁶ EVSE Work Group Member, Scott Wilson, provided an example flowchart for how reliability metrics may be tracked. This is provided in Appendix E. Ultimately, the details of said tracking will need to be determined by the Implementing Agency.

⁶⁷ The Act §(g)(3)(vii) and The Act §(g)(3)(xviii).

⁶⁸ 23 CFR 680.106(d)(1).

⁶⁹ 23 CFR 680.106(d)(2).

station output is what was registered with the Implementing Agency, effectively ensuring the station is operating as designed.

The Act also required the EVSE Work Group to make recommendations to establish a standard of use for two different connector types—Combined Charging System (CCS) and North American Charging System (SAE J3400). Connectors are the device on the charging system that plugs into an EV to dispense the charge.⁷⁰ There are multiple types of connectors, including the two previously listed. Similar to minimum power output, NEVI requires charging stations funded through the program to install connectors on the charging station that meet certain design criteria or are a specific connector type. The EVSE Work Group recommends that the Implementing Agency does not need to establish a standard that charging stations use specific connector types.⁷¹ For reliability purposes, what matters is that the equipment is operating as designed. The Implementing Agency should keep standards technology agnostic.

3. Consumer Standards

The Act required the EVSE Work Group to make recommendations on approximately eight topics related to consumer standards. These issues are unrelated to charging station reliability and instead pertain to the customer's experience when using the charging station. Generally, the legislature will need to determine if it wants to give authority to the Implementing Agency to oversee these issues as they relate to publicly facing chargers. Each of the topics is discussed separately in the following section.

*(a) Establishing different payment methods for the retail use of EVSE including credit card, mobile phone, and toll-free number payment options and options for customers with disabilities and non-English speaking customers.*⁷²

⁷⁰ The Act §(a)(3).

⁷¹ MDOT generally supports this and given likely market convergence on the North American Charging Standard as the standard we also advise including at least one permanently attached North American Charging Standard connector on new publicly funded EVSE installed on or after a certain date.

⁷² The Act §(g)(3)(i).

The EVSE Work Group recommends that the Implementing Agency have authority to set consumer standards around payment methods and should strive to be consistent with NEVI⁷³ and other national standards.⁷⁴ During discussions, some concerns were raised about being overly prescriptive, changing technology making such standards obsolete, if the recommendation applied to existing versus future chargers, and to what types of charging stations payment standards should apply. These are issues that the Implementing Agency will need to balance and should be given flexibility to determine best practices to provide a good customer experience while not unduly burdening charging businesses.

The EVSE Work Group also discussed if these payment standards should apply to all EVSE within the framework. The EVSE Work Group recommends that standards developed for payment methods should apply to publicly funded stations. For non-publicly funded EVSE that is public facing, it is recommended that the Implementing Agency be given the ability to assess the state of the market before imposing these standards upon all other EVSE to avoid undue burdens. It is also recommended that these standards should apply to future charging stations and not existing stations to avoid undue burdens for owners of existing EVSE.

(b) Permissibility of Memberships to use EVSE: (a) prohibit an EV Service provider from requiring a subscription or membership to initiate a charging session;⁷⁵ (b) authorize an EV service provider to offer services on a subscription or membership basis.⁷⁶

The EVSE Work Group supports the Implementing Agency having the authority to prohibit EV service providers from requiring a membership to initiate a charge but still allowing

⁷³ NEVI funded charging stations are required to “[p]rovide for secure payment methods, accessible to persons with disabilities, which at a minimum shall include a contactless payment method that accepts major debit and credit cards, and either an automated toll-free phone number or a short message/messaging system (SMS) that provides the EV charging customer with the option to initiate a charging session and submit payment” (23 CFR 680.106 (f)(1)).

⁷⁴ While not a national standard, California required charging stations installed and made publicly available after July 10, 2023 to, at a minimum, provide a contactless payment method that accepts major credit and debit cards and allows for the initiation and payment of a charging session by automated toll-free telephone number or short message system (“SMS”). (Cal Health & Saf Code § 44268.2).

⁷⁵ The Act §(g)(3)(ii).

⁷⁶ The Act §(g)(3)(iii).

businesses to have the flexibility to permit memberships.⁷⁷ The Implementing Agency should strive to be consistent with NEVI/FHWA and other national standards.

NEVI-funded chargers are prohibited from requiring a customer to have a membership to use the NEVI funded charging station.⁷⁸ It should be recognized that NEVI funded charging stations are publicly funded unlike several charging stations that would be subject to such a rule if implemented in Maryland. Under the EVSE Work Group proposal, the EVSE businesses will still be allowed to permit memberships that provide perks to drivers who use their charging stations, but they cannot restrict a non-member from using the charging station. A similar construct exists in California.⁷⁹

*(c) Establish requirements for transparent information regarding EV charging stations, including charging rates, location, accessibility, and real-time availability.*⁸⁰

A majority of members support requiring the real-time availability of the listed information for all publicly facing EVSE. Members supported having the Implementing Agency develop an implementation plan for said requirement. It is recommended that the Implementing Agency develop a plan within a reasonable timeline, likely two to four years. It was also recommended that the Implementing Agency develop a phased-in timeline for existing charging stations to comply with resulting regulations associated with the real-time reporting of data.

Under this requirement, the EV charging station must make certain information available in real-time to the general public through a web or application-based solution. Today such information is made available on third-party applications which may rely upon crowd sourcing,

⁷⁷ EV Service Providers is defined in Act as “an entity responsible for operating one or more EV supply equipment units, including being responsible for: (i) sending or receiving commands or messages to an EV charging network as defined in § 7–901 of the Public Utilities Article; and (ii) providing billing, maintenance, reservations, and other services for an EV supply equipment unit.” The Act §(a)(6).

⁷⁸ 23 CFR 680.106(f)(2).

⁷⁹ Cal Health & Saf Code §44268.2 (a).

⁸⁰ The Act §(g)(3)(iv).

such as PlugShare.⁸¹ For context at the federal level, charging stations funded under the NEVI Program are required to communicate real-time charging-port status and the real-time price to customers.⁸² Also, under the NEVI Program, states or other direct recipients of funds must make available to third-party developers via an application program interface (“API”) certain data which includes all the information listed.⁸³ At the state level, California, through the CEC and in response to legislation, has proposed regulations that require publicly funded chargers installed on or after January 1, 2024, to make information available for third party developers to publish, similar to NEVI.⁸⁴

There was a debate within the EVSE Work Group as to the achievability of the requirement at this time and how the requirement could be enforced since there does not currently exist government-mandated applications to share the listed information. Some members believed this should be a standard that Maryland strives for but not require at this time. A majority of the other members believe that the listed information in real-time is very important so EV drivers can appropriately plan their trips. Additionally, with the availability of real-time data, this will help consumers avoid going to charging stations they believe are working but in reality are not, which could result in the driver potentially being stranded or having a poor customer experience.

*(d) Enable users who have a subscription or membership with an EV service provider to use an EV charging station that is not part of the subscription membership.*⁸⁵

The topic that the Act is referring to is a process called “roaming” where an EV driver can use a membership from one EV service provider to charge at a charging station operated by a

⁸¹ See <https://www.plugshare.com/>.

⁸² 23 CFR 680.114(a)(4).

⁸³ 23 CFR 680.116(c).

⁸⁴ *Second Draft Staff Report Tracking and Improving Reliability of California’s Electric Vehicle Chargers*, Apr. 9, 2024, p. 36.

⁸⁵ The Act §(g)(3)(v).

different EV service provider. Roaming agreements make the charging experience more convenient for EV drivers since they now avoid the need to manage different accounts across network providers or to maintain different access to use different charging stations in the state.⁸⁶

This view was supported by several members.

A point raised in the meetings is if companies set up roaming agreements among each other, they will be done at a national level so states should avoid establishing different parameters. A recently enacted law in California could be a model for how to potentially establish roaming requirements for charging station providers. Under California law, EV charging providers who operate more than 100 charging stations in the state must meet interoperability standards established by the California Energy Commission.⁸⁷

There were concerns raised about requiring roaming agreements. Implementing “roaming” could be complicated for businesses since it requires companies to recognize other companies' networks and that it would serve as a disincentive for coming to Maryland. Roaming may also be difficult for EV service providers to implement because they would need to establish a process to confirm a customer has a membership with a different service provider. It was posited that roaming is becoming less of an issue since there are becoming more ways to access charging. A member pointed out the market is still not yet at the point where one can simply use a credit card to initiate a charge.

Members were asked to decide between three different options as recommendations for the legislature:

- (1) The Implementing Agency has authority to consider and develop rules that enable or obligate roaming agreements based on policy guidance provided by the legislature, such as size of network provider and utilizing national standards.

⁸⁶ <https://blinkcharging.com/blog/how-ev-roaming-creates-the-freedom-to-charge-anywhere>.

⁸⁷ AB 2697, signed September 27, 2024,

https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240AB2697.

- (2) The Implementing Agency makes recommendations through a report to the General Assembly if the State of Maryland should obligate roaming agreements between network providers.
- (3) Require no action of the Implementing Agency on this issue.

Option (1) was the most supported of the three options. Generally, it is recommended that if “roaming” requirements are established, that the legislature and Implementing Agency consider what was required by California through AB 2697 discussed above and other national standards for establishment of roaming requirements.

(e) Establish employee training or certification requirements for individuals who install or perform maintenance on EVSE.⁸⁸

While not consensus, it is recommended that the Implementing Agency have the authority to oversee certification requirements for those permitted to install or perform maintenance on all publicly facing chargers. The Implementing Agency should determine what the appropriate level of certification should be, but should strive to be consistent with the requirements of the NEVI Program and other national standards, as appropriate.

Ensuring there is a workforce that is trained to work on EVSE could improve reliability of the equipment. This improvement of the reliability was a driver of why the FHWA obligated training certification for those who work on EVSE under the NEVI program,⁸⁹ and it was to be the obligation of the state to ensure there was an appropriate workforce to accomplish this.⁹⁰ The standard for training under the NEVI program is called Electric Vehicle Infrastructure Training Program (“EVITP”) which “was created through a collaboration of automakers, EVSE manufacturers, educational institutions, utility partners, electric industry professionals, and other key stakeholders in the EV charging market” to train electricians installing EVSE.⁹¹ NEVI

⁸⁸ The Act §(g)(3)(vi).

⁸⁹ Federal Register, Vol. 88, No. 39. Feb. 28, 2023. 12742.

⁹⁰ 23 CFR 680.106(j).

⁹¹ Federal Register, Vol. 88, No. 39. Feb. 28, 2023. 12742. also see the following website for advisors to EVITP: <https://evitp.org/partner-advisors/>.

standards also allow certain registered apprenticeship programs to qualify as an alternative to EVITP certification. At least three other states (Nebraska,⁹² Oregon,⁹³ and California⁹⁴) have established certification requirements for technicians that are based on EVITP for contractors to install EV chargers funded or authorized by the state.

In Maryland, there will be training and certifications requirements for those who are permitted to install, calibrate, place into service, and repair EVSE under MDA W&M jurisdiction. These individuals are referred to as registered service agents (“RSA”). As explained by MDA W&M, a RSA will be required to pass National Council on Weights and Measures testing and can then place EVSE into service or repair and return it to service if removed by MDA W&M. There were concerns raised by the EVSE business community regarding potential implementation of the MDA W&M’s RSA program who pointed to some implementation concerns with a similar program in California. As discussed previously, MDA W&M’s has agreed to hold public commenting sessions to consider its implementation of rules for EVSE.

EVSE business interests also raised concerns with mandating training, such as EVITP, stating it could lead to higher costs and potentially fewer installations. Anecdotal concerns were also raised about the EVITP program being slow with certification and not being quick to update curriculum for changing technology. They also pointed out that there is usually a difference in workforce for those who install EVSE versus those who maintain it, and EVITP only applies to the former.

⁹² Electric Vehicle (EV) Charger Certification, Alternative Fuels Data Center, U.S. Department of Energy, <https://afdc.energy.gov/laws/13439>. See Neb. Rev. Stat. Ann §70-1002.02 (LexisNexis, Lexis Advance through all Acts of the 1st Special Session of the 108th Legislature (2024); all Acts of the 2nd Regular Session of the 108th Legislature (2024); and the 2024 ballot propositions).

⁹³ Electric Vehicle (EV) Charger Certification, Alternative Fuels Data Center, U.S. Department of Energy, <https://afdc.energy.gov/laws/13306>. See Or. Rev. Stat. Ann. §283.410 (LexisNexis, Lexis Advance through amendments effective on January 1, 2025).

⁹⁴ Electric Vehicle (EV) Charging Station Certification and Training Requirements, Alternative Fuels Data Center, U.S. Department of Energy, <https://afdc.energy.gov/laws/12726>. See Cal Pub Util Code §740.20.

While not discussed by the EVSE Work Group, if the legislature does not designate MDA W&M as the Implementing Agency then it will need to determine the appropriate split of developing certification programs for compliance with placing EVSE into service in compliance with MDA regulations versus other certifications for being able to install or perform maintenance on EVSE in other scenarios.

*(f) Establish labeling requirements including labeling requirements for EV charging station rates, capacity, and voltage.*⁹⁵

The EVSE Work Group supports legislation that enables the Implementing Agency to determine what additional information should be disclosed at a charging station, but at a minimum should include those required of MDA W&M. MDA W&M through Handbook 44 will require devices under its jurisdiction to meet NIST HB 44 marking requirements on the dispenser. This includes charging rates, voltage, amperes, and the Minimum Measured Quantity.

*(g) Establish customer support requirements including labeling requirements for providing customer support information on EV charging stations.*⁹⁶

It is recommended that the Implementing Agency be given authority to require this information be labeled on an EV charging station. Under the NEVI program, it has been left to the states to ensure EV drivers have mechanisms to report EVSE issues with a charging station and did not specify labeling requirements for customer support information. It is important that a driver be able to get assistance if they are having trouble with a charging station.

*(h) Establish minimum hours of operation for: (a) general service needs and providing or dispatching customer assistance;*⁹⁷ *and (b) EV charging stations.*⁹⁸

The EVSE Work Group recommends that the minimum hours for (a) providing general service needs, (b) dispatching customer assistance, and (c) operation for the station itself be left

⁹⁵ The Act §(g)(3)(x).

⁹⁶ The Act §(g)(3)(xiv)1.

⁹⁷ The Act §(g)(3)(xiv)2.A. & B.

⁹⁸ The Act §(g)(3)(xv).

to the businesses' discretion. For publicly funded EVSE, it should operate for the hours in its contract. The EVSE Work Group recommends that hours of operation for a charging station be disclosed.

A NEVI-funded charging station that is located along Alternative Fuel Corridors is required to be available 24 hours a day, seven days a week, for public use. In all other instances, NEVI-funded chargers must be available for public use as “frequently as the business operating hours of the site host.”⁹⁹ Additionally, under the NEVI Program it has been left to the states to ensure EV drivers have mechanisms to report issues with a charging station and did not specify hours for providing general service needs nor dispatching customer assistance.

It is not necessary to follow the NEVI requirements since the proposed framework discussed in this report will apply to both publicly and privately funded chargers. In this instance, the EVSE Work Group recommends that minimum hours be established for customer service availability and that hours of operations be left to the business but that the information be made available to drivers.

4. Regulatory Standards

There are four topics under §(g)(3) of the Act that are best categorized as regulatory standards. These are:

- (1) required submission of reports on EVSE to certain agencies;
- (2) proactive monitoring of EVSE;
- (3) standards for implementation of Handbook 44; and
- (4) establishment of civil penalties for non-compliance with regulations.

(1) Require the submission of reports on EV supply equipment to: (1) the Office of the Comptroller, (2) The Public Service Commission, and (3) The Alternative Fuels Data Center in the U.S. Department of Energy.

⁹⁹ 23 CFR 680.106(e).

A majority of the EVSE Work Group supported that if the Implementing Agency needed information from EVSE to implement any required regulations then reporting should be required of the EVSE. The EVSE business members did not support the recommendation because it is too open ended and due to concerns with the enforcement framework discussed previously.

(2) Require proactive monitoring of EV supply equipment and EV charging stations.

Most members recommended that the Implementing Agency only needs to proactively monitor publicly funded EVSE, though some members wanted the agency to proactively monitor all publicly facing EVSE. Under the framework, publicly funded EVSE is the only subset of chargers that could possibly face financial consequences for failing to meet uptime. It should be noted that MDA W&M will check all EVSE under its jurisdiction periodically to ensure compliance with meter accuracy and associated standards.

Members were asked to decide between the following three options for determining the parameters to proactively monitor publicly facing EVSE:

- The Implementing Agency shall develop procedures to audit publicly funded chargers at an interval set by the legislature and to develop procedures to inspect publicly funded charging stations when a complaint is received;
- Same as option (1) but set time limits legislatively for the agency to meet, e.g. proactively inspect all publicly funded stations every one to three years and deploy a field agent within 72 hours of a customer complaint; or
- Only deploy field agents to check stations based on customer complaints or unusual data.

Option 1 received the most support from members, followed by option 2, and then option 3. It should be noted that the size of the budgets needed by the Implementing Agency for field enforcement will increase as the number of charging stations it must check and the required frequency of checking increase.

(3) Establish standards and procedures for accurate field standards in accordance with the most recent edition of the National Institute of Standards and Technology Handbook 44.

As discussed previously, the EVSE Work Group does not recommend any changes to MDA W&M oversight of EVSE nor how it may go about its administration of its oversight. Most of the EVSE Work Group supports a request from EVSE businesses for MDA W&M to use a formal process in their implementation of Handbook 44 standards. The exact request is as follows:

MDA to issue a Notice of Public Comment before implementing procedures for registration, compliance, fees, and enforcement of NIST HB44 standards. The goal of this Public Comment proceeding is to enable the State to meet its Weights & Measures obligations for consumer protection in a manner that also supports the State's goal of increasing the timely deployment and operation of publicly-available EV chargers across the state.

(4) Establish civil penalties for noncompliance with the regulations.

As discussed previously, the EVSE Work Group did not determine an appropriately sized financial penalty and recommended that it be legislatively determined or left to the determination of the Implementing Agency based upon guidance from the legislature.

Appendix A - EVSE Work Group Membership

Member	Designation
Senator Shelly Hettleman	Member of the Maryland Senate appointed by the Senate President
Senator Ron Watson	Member of the Maryland Senate appointed by the Senate President
Delegate David Fraser-Hidalgo	Member of the House of Delegates appointed by Speaker of the House
Delegate Nick Allen	Member of the House of Delegates appointed by Speaker of the House
Rachel Jones	Representative of the Department of Agriculture designated by the Secretary of Agriculture
Ben Baker	Representative of the Public Service Commission designated by the Chair of the Public Service Commission
Kim Pezza	Representative of the Office of the Comptroller designated by the Comptroller
Amanda Hinh	Representative of the Maryland Department of Transportation designated by the Secretary of Transportation
Diego Lopez	Representative of the Maryland Energy Administration designated by the Director of the Maryland Energy Administration
Scott Willson	Representative of the public interest sector who are identified as nongovernment organization leaders in the electric vehicle industry in the State and consumers of electric vehicles (Designated by the Chair of the PSC)
Paul Verchinski	Representative of the public interest sector who are identified as nongovernment organization leaders in the electric vehicle industry in the State and consumers of electric vehicles (Designated by the Chair of the PSC)
Josh Cohen	Representative of the private sector business partners who are identified as leaders in the electric vehicle industry in the State (Designated by the Chair of the PSC)
Matthew Chen	Representative of the private sector business partners who are identified as leaders in the electric vehicle industry in the State (Designated by the Chair of the PSC)

Ben Baker of the Maryland Public Service Commission was designated the Work Group Chair by the Chair of the Maryland Public Service Commission. Together, these 13 individuals constitute the EVSE Work Group.

Appendix B - Detailed Explanation of State Agencies Estimated Budgets

The following are detailed explanations of budgets provided by the State Agencies in the EVSE Work Group if required by the legislature to implement the proposed framework for reliability and reporting. The State Agencies were requested to develop estimates assuming they would be required to proactively monitor and enforce reliability and reporting standards for all publicly facing EVSE in the state. Please note that all estimates are drafts and were developed before the proposed framework was finalized as there was not enough time to revise budgets based on the final recommendations. It should be emphasized that the agencies may revise these estimates based on any legislation that may result due to this report.

MDA

MDA estimates that it will require approximately \$2 million in start-up costs and \$1.7 million in annual recurring costs if required to implement the reliability and reporting proposed framework. This does not include the budget for W&M Inspection of tolerances and specifications pertaining to the implementation of NIST HB 44.

Category	Description	Cost
Uptime and Reliability	Implementation	
Field Personnel	Field Inspectors, Supervisors	711,000
Admin Personnel	Data Specialist, Admin, Admin Aide	395,000
Vehicles/ Fleet	Purchase vehicles, Maintenance fees, Fuel Costs	679,000
Training	Safety, Inspection, Data Collection and Analyzing	45,000
Infrastructure	Data Reporting, Laptops, Office Furniture, Cell Phones	95,000
Software	Create, Track and Storage of Data- Software	40,000
Supplies	Office, and Field Supplies Equipment	35,000
	Total Implementation of Uptime and Reliability	2,000,000
	Estimated Annual Operational Cost through 2029	1,700,000
Weights and Measures	Inspections for Accuracy and Specifications	
Field Personnel	Field Inspection Staff	110,000
Vehicle/ Fleet	Purchase vehicles, Maintenance fees, Fuel Costs	100,000
Equipment	Purchase o Standards for Accuracy	400,000
	Total Weights and Measures Program as Currently Outline	610,000.00
	Estimated Annual Operational Cost through 2029	360,000.00
Total Uptime, W&M	Start-up Total for Uptime and Weights and Measures	2,610,000
Total Uptime, W&M	Estimated Annual Operational Cost for Both through 2029	2,060,000

PSC

Based on the current projected approximation of 27,000 EV chargers in the state,¹⁰⁰ it is estimated that PSC may need at least a team of 8-10 technicians. This assumes that the PSC is required to proactively send a technician to every EV charger in the state every year. This takes into consideration PTO time allotted per technician and approximately 20 minutes per EV charger for testing (this will need to be refined as it is determined exactly what type of testing will need to be completed). A ballpark of 118 EV chargers will need to be tested per working day which does not include inclement weather delays or extensive travel times. Travel time alone, not including unanticipated traffic jams, from site to site would take a large portion of the

¹⁰⁰ This uses the MDOT assumption that Maryland is projected to need 43,368 level 2 ports and 5,495 DCFC ports. Level 2 stations usually have two ports; the projected value is divided in half to get 21,684 Level 2 chargers plus 5,495 DCFC chargers to get 27,179 total chargers that are estimated as needed to be inspected.

work time depending on how far the EV chargers are located from each other and from the technician's starting point.

The total annual budget per technician is approximately \$73,275 without benefits (this includes salary, annual training, annual vehicle maintenance and gas cost, and annual test equipment calibration cost); adding in the cost for a new vehicle and test equipment raises that to \$124,000 per technician. The vehicle and equipment costs would not be incurred every year depending on the life span of the vehicle and test equipment.

Based on the above, the first year's budget would be approximately \$586,200-\$732,750 for 8-10 technicians (not including benefits) and \$992,000-\$1,240,000 for the cars and testing equipment for a total of \$1,578,200-\$1,972,750.

One suggestion to cut down on travel time and related costs for the technicians is to hire technicians that will be located in various parts of the state and who will then be responsible for EV charger testing in their particular region. Depending on the volume of EV chargers in particular areas, there may be a need for multiple technicians covering some locations (such as central Maryland) and only one covering others.

The following is a full breakdown of costs:

- Salary for licensed technicians/electricians - \$65-75K per year according to [Glassdoor](#)
- Annual training EVITP per technician - \$275.00
- Benefits cost - still awaiting information from HR
- Vehicle cost- Nissan Sentra \$24,089, Nissan Leaf EV - \$36,189 (my budget includes the Sentra option)
- Annual cost of maintenance per vehicle - \$700-\$800
- Annual cost of gas per vehicle - \$1200 (\$3 per gallon)
- Cost of test equipment per technician - \$100,000
- Annual cost of equipment calibration per technician - \$1000

MDOT

Maryland Department of Transportation	
EVSE Annual Draft Budget	
ITEM	AMOUNT
Personnel	
Director (1 FTE)	\$ 130,000.00
Project Manager (1 FTE)	\$ 105,000.00
IT/Performance Manager (1 FTE)	\$ 95,000.00
Executive Assistant (0.5 FTE)	\$ 32,500.00
Lead Inspector (1 FTE)	\$ 90,000.00
Field Inspectors (4 FTEs at 75k)	\$ 300,000.00
Personnel Subtotal	\$ 852,500.00
Fringe (60%)	\$ 511,500.00
Total Personnel	\$ 1,364,000.00
Contingency	
	\$ 200,000.00
Non-Personnel + Contractual Services	
Marketing Contractor	\$ 100,000.00
IT Database and Dashboard	\$ 200,000.00
Inspections equipment @ 5	\$ 20,000.00
Vehicle cost share @ 5 vehicles	\$ 105,000.00
Vehicle maintenance and operations share @ 5 vehicles	\$ 20,000.00
Total Non Personnel + Contractual Services	\$ 445,000.00
Total Annual	\$ 1,584,000.00
Total Year 1	\$ 2,009,000.00
ongoing costs include Personnel and IT system maintenance (unknown cost)	

Annual costs are personnel, contingency, and vehicle maintenance and operation costs.
 Year 1 costs are personnel, contingency, and all non-personnel and contractual services costs.

Comptroller

Year 1: **\$3,045,389**

Annual: **\$1,445,389 (also estimate the agency will need until 2028 to implement)**

There are also non-personnel costs not included at this time.

Comptroller of Maryland	
EVSE Annual Draft Budget	
ITEM	AMOUNT
Personnel	
IT Functional Analyst Staff (2 FTE)	\$121,974.00
Senior Tax Attorney (1 FTE)	\$93,721.00
Contractual Attorney (2 - 6 mo contract)	\$125,000.00
Revenue examiner II (2 FTE)	\$95,072.00
Administrator I (6 FTE)	\$365,922.00
Revenue Administrator IV (1 FTE)	\$69,323.00
Administrator VII (1 FTE)	\$89,913.00
AAG (1 FTE)	\$140,000.00
Revenue examiner I (2 FTE)	\$105,116.00

Financial compliance auditor I (2 FTE)	\$144,348.00
Communications 1 (1 FTE)	\$95,000.00
Total Annual	\$1,445,389.00
Non Personnel	
Integrated tax system revenue premier (1 time expense)	\$1,600,000.00
Staff equipment	unknown
Total Year 1	\$3,045,389.00
ongoing costs include Personnel and IT system maintenance (unknown cost)	

Proposed Budget for EVSE Uptime Management in Maryland

Cost Category	Description	Initial Investment
Initial Investment	One-time expenses for equipment, training, software, and infrastructure setup.	\$200,000
Equipment	Tools, diagnostic equipment, and vehicles for inspection teams.	\$20,000
Training	Training for inspection teams on EVSE technologies, safety protocols, and data collection methods.	\$150,000
Software	Investment in software for data management, reporting, and analysis.	\$100,000
Infrastructure	Establishment of a centralized database and reporting system.	\$100,000
Annual Operating Costs	Recurring expenses for personnel, maintenance, software updates, and travel.	\$50,000
Personnel	Salaries and benefits for inspection teams, data analysts, and administrative staff.	\$850,000
Maintenance	Regular maintenance and calibration of inspection equipment.	\$50,000
Software Updates	Licensing fees and updates for data management software.	\$50,000
Travel Expenses	Costs associated with traveling to inspect EVSE stations throughout the state.	\$50,000
total		\$1.8 million

Initial Investment: \$1.8 million

- **Equipment:** Purchase of necessary tools, diagnostic equipment, and vehicles for inspection teams.
- **Training:** Training for inspection teams on EVSE technologies, safety protocols, and data collection methods.
- **Software:** Investment in software for data management, reporting, and analysis.
- **Infrastructure:** Establishment of a centralized database and reporting system.

Annual Operating Costs: \$750,000

This recurring cost will cover:

- **Personnel:** Salaries and benefits for inspection teams, data analysts, and administrative staff.
- **Maintenance:** Regular maintenance and calibration of inspection equipment.
- **Software Updates:** Licensing fees and updates for data management software.
- **Travel Expenses:** Costs associated with traveling to inspect EVSE stations throughout the state.

Appendix C - Categorized Recommendations of the Work Group for the Act §(g)(3)

The Act Citation to §G	Legislative Topic	Draft Proposal for WG Consideration	Type of Standard
(3)	Make recommendations regarding adopting and implementing regulations that may:		
(i)	Establish different payment options for the retail use of EV supply equipment including:		
(1)	Credit card, mobile phone, and toll-free number payment options; and	Give Implementing Agency authority to oversee. Implementing Agency should strive to be consistent with NEVI/FHWA and other national standards.	Consumer Standard
(2)	Options for customers with disabilities and non-English speaking customers	Implement this for future EVSE and not existing EVSE due to EVSE upgrades that may be needed that would present an undue burden for owners of existing EVSE. Implementing Agency should be given the ability to assess the state of the market before imposing these standards upon all other EVSE to avoid undue burden.	Consumer Standard
(ii)	Prohibit and EV service provider from requiring a subscription or membership to initiate charging	Give Implementing Agency authority to oversee. Implementing agency should strive to be consistent with NEVI/FHWA and other national standards.	Consumer Standard
(iii)	Authorize an EV service provider to offer services on a subscription or membership basis	This should encompass all publicly facing chargers.	Consumer Standard
(iv)	Establish requirements for	Require the real-time availability of this information for	Consumer

The Act Citation to §G	Legislative Topic	Draft Proposal for WG Consideration	Type of Standard
	transparent information regarding EV charging stations, including charging rates, location, accessibility, and real-time availability	<p>all publicly facing EVSE.</p> <p>The Implementing Agency needs to figure out a plan within a reasonable timeline, likely 2 – 4 years. For existing stations, Implementing Agency should set a phase-in timeline.</p>	Standard
(v)	Enable users who have a subscription or membership with an EV service provider to use an EV charging station that is not part of the subscription membership	<p>Recommendation: The Implementing Agency has authority to consider and develop rules that enable or obligate roaming agreements based on policy guidance provided by the legislature such as size of network provider and utilizing national standards.</p> <p>It is recommended that the legislature and Implementing Agency consider what was required by California through AB 2697 (signed 9/27/24) and other national standards for establishment of roaming requirements. Link to approved legislation: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240AB2697</p>	Consumer Standard
(vi)	Establish employee training or certification requirements for individuals who install or perform maintenance on EV supply equipment	Give Implementing Agency authority to oversee for all publicly facing chargers. Implementing Agency should determine what the appropriate level of certification should be. They should strive to be consistent with NEVI/FHWA and other national standards as appropriate.	Consumer Standard

The Act Citation to §G	Legislative Topic	Draft Proposal for WG Consideration	Type of Standard
(vii)	Establish minimum power output limits for EV supply equipment and EV charging stations	Don't have a minimum output standard as technology is changing and there are different vintages of equipment. For measuring and reporting uptime standards the station's output for determining if it is working as designed should be based on what was registered with the Implementing Agency.	Design Standard
(ix)	Require the submission of reports on EV supply equipment to:	If an Implementing Agency needs information from EVSE to implement its regulations then require reporting.	Regulatory Standard
(1)	The Office of the Comptroller		Regulatory Standard
(2)	The Public Service Commission		Regulatory Standard
(3)	The Alternative Fuels Data Center in the U.S. Department of Energy		Regulatory Standard
(x)	Establish labeling requirements including labeling requirements for EV charging station charging rates, capacity, and voltage	Enable Implementing Agency to determine what additional information should be disclosed at a charging station. Minimum disclosures should include MDA W&M requirements.	Consumer Standard
(xi)	Require an uptime of 97%	For EVSE, the Implementing Agency is given authority to enforce and/or track uptime standards as described in the framework. The Implementing Agency shall establish standards for EVSE to maintain or track an average annual uptime of 97% or greater as described in the framework. The standards to measure EVSE uptime shall align with NEVI or other nationally recognized standards. The Implementing Agency may deviate from NEVI or other nationally recognized standards for good cause.	Reliability Standard

The Act Citation to §G	Legislative Topic	Draft Proposal for WG Consideration	Type of Standard
		One member opposed allowing the implementing agency to deviate from NEVI for good cause.	
(xii)	Specify how uptime will be measured including:	Advise that the Implementing Agency consider how these state agencies implemented their uptime standards relative to NEVI standards but do not put the specifics in legislation as these are details that can change.	Reliability Standard
(1)	Whether uptime must be calculated per EV charging port or per EV charging connector		Reliability Standard
(2)	The date to which downtime is backdated; and		Reliability Standard
(3)	Whether downtime includes EV charging station disconnection or broken interface features when EV supply equipment can still output electricity		Reliability Standard
(xiii)	Establish exemptions from the uptime requirement of 97%		Reliability Standard
(xiv)	Establish customer support requirements including:		Consumer Standard
(1)	Labeling requirements for providing customer support information on a EV charging station; and	Give authority to Implementing Agency to require this information to be labeled on the EV charging station.	Consumer Standard
(2)	Minimum hours of operation for:	Leave to business to decide minimum hours of operation of customer service for station but require disclosure. If they receive financial incentives, then they shall operate for the hours in their contract.	Consumer Standard
(A)	General customer service needs; and		Consumer Standard
(B)	Providing or dispatching customer assistance		Consumer Standard
(xv)	Establish minimum hours of operation for EV charging stations	Leave to business to decide the minimum hours of operation for station, but do require disclosure. If EVSE	Consumer Standard

The Act Citation to §G	Legislative Topic	Draft Proposal for WG Consideration	Type of Standard
		received financial incentives then they shall operate for the hours in their contract.	
	Require proactive monitoring of EV supply equipment and EV charging stations	<p>Options:</p> <ul style="list-style-type: none"> (1) The Implementing Agency shall develop procedures to audit publicly funded chargers at an interval set by the legislature. Implementing Agency develop procedures to inspect publicly funded charging stations when a complaint is received; (2) Same as option (1) but set time limits legislatively for the agency to meet, e.g. proactively inspect all publicly funded stations every one to three years, and deploy a field agent within 72 hours of a customer complaint; or (3) Only deploy field agents to check stations based on customer complaints or unusual data. <p>Option (1) received the most support, followed by option (2), and then option (3).</p>	Regulatory Standard
(xvii)	Establish standards and procedures for accurate field standards in accordance with the most recent edition of the National Institute of Standards and Technology Handbook 44	The Work Group recommends that "MDA to issue a Notice of Public Comment before implementing procedures for registration, compliance, fees, and enforcement of NIST HB44 standards. The goal of this Public Comment proceeding is to enable the State to meet its Weights & Measures obligations for consumer	Regulatory Standard

The Act Citation to §G	Legislative Topic	Draft Proposal for WG Consideration	Type of Standard
		protection in a manner that also supports the State's goal of increasing the timely deployment and operation of publicly-available EV chargers across the state." MDA should strive to complete its process and start registration and enforcement by October 1, 2025. (One dissent who wants the date to be July 1, 2025).	
(xviii)	Establish standards for the use of:	Implementing agency does not need to establish a standard that charging stations use specific connector types. For uptime/reliability purposes what matters is if the equipment is operating as designed. Basically, keep it technology agnostic.	Design Standard
(1)	Combined charging systems, under which a standard EV charging connector allows a direct current fast charger to connect to, communicate with and charge an electric vehicle; or		Design Standard
(2)	North American charging systems, under which a Tesla standard EV charging connector allows a direct current fast charge to connect to communicate with, and charge an electric vehicle; and		Design Standard
(xix)	Establish civil penalties for noncompliance with the regulations	Recommend that the Implementing Agency be given authority to establish civil penalties based on guidance from the legislature.	Regulatory Standard

Appendix D - Discussion of PSC implementation of certain topics that impact reliability measurement

The following is provided to illustrate how the PSC developed different aspects of its reliability standards for utility-owned EVSE. It should be noted that the standards were developed in response to Maryland legislation HB 834 (2023). These four standards are the same four listed in The Act that have an impact upon how the 97 percent reliability standard may be measured.

1. Whether uptime must be calculated per EV charging port or per EV charging connector;¹⁰¹
 2. The date to which downtime is backdated;¹⁰²
 3. Whether downtime includes EV charging station disconnection or broken interface features when EV supply equipment can still output electricity;¹⁰³ and
 4. Establish exemptions from the uptime requirement of 97%.¹⁰⁴
-
1. *Whether uptime must be calculated per EV charging port or per EV charging connector.*

EVSE that receives NEVI funding must maintain a 97 percent uptime as measured at the port level.¹⁰⁵ When implementing uptime standards for utilities parties in the process debated maintaining the NEVI standard versus going to the connector level.¹⁰⁶ Those in support of using the NEVI standard pointed out that one connector is operational and that the port is still dispensing electricity.¹⁰⁷ Also private charging companies were worried that the requirement could then extend to them at a later date and wanted to avoid having to develop unique solutions

¹⁰¹ The Act §(g)(3)(xii)1.

¹⁰² The Act §(g)(3)(xii)2.

¹⁰³ The Act §(g)(3)(xii)3.

¹⁰⁴ The Act §(g)(3)(xiii).

¹⁰⁵ 23 CFR 680.116(b).

¹⁰⁶ *Reliability and Reporting Standards Report*, Public Conference 44 Electric Vehicle Work Group, Jul. 28, 2023. pp. 10 - 13.

¹⁰⁷ *Ibid.* p. 11.

for different jurisdictions, arguing it could dissuade investment.¹⁰⁸ Those in support of the connector level viewed it as better for the customer experience and that it aligned better with the requirements of the implementing legislation that a charging station was up if able to successfully dispense electricity as designed.¹⁰⁹ Ultimately, the Commission required a stricter measuring of uptime at the connector level for utility charging station in the Commission's pilot claiming it was the “best protection for Maryland consumers, the best incentives for utilities, and the best insights into the weak links in the developing EV charging infrastructure.”¹¹⁰

2. *The date to which downtime is backdated.*

The date and time when an entity starts to record that a charging station became in-operational became controversial when developing utility reliability standards in response to HB 834 (2023). When implementing HB 834 (2023) it was determined that the utilities could not track the start of a charging station outage for reliability metrics based on when a valid customer complaint was received. Instead, the utility would only start tracking a charging station as offline once the utility had verified there was an issue.¹¹¹ Parties had different views on the appropriateness of requiring backdating to when a customer made a valid reliability complaint and the utilities had different abilities to perform said tracking.¹¹² Since utilities could not at the time develop a backdating system, most parties agreed to a process where the utilities would seek approval from the Commission as to how they would record an outage and have a definitive transition plan to have the ability to backdate the start of an outage.¹¹³ Ultimately, the Commission requested the utilities address this in their annual business plans to measure

¹⁰⁸ *Ibid.* p. 11.

¹⁰⁹ *Ibid.* p. 12.

¹¹⁰ Order No. 90971, MD Public Service Commission, Case No. 9478. p. 6.

¹¹¹ *Reliability and Reporting Standards Report*, Public Conference 44 Electric Vehicle Work Group, Jul. 28, 2023. pp. 13 - 17.

¹¹² Order No. 90971, MD Public Service Commission, Case No. 9478. p. 7.

¹¹³ *Ibid.* p. 7.

reliability. In those subsequent filings, the utilities discussed how they would start to backdate or were working with their vendors to develop the capabilities.¹¹⁴

3. *Whether downtime includes EV charging station disconnection or broken interface features when EV supply equipment can still output electricity.*

When developing utility charging station reliability standards, parties debated if the recorded “downtime” of a charging station should include when the screens were non-operational but the charging station could still dispense a charge. Those who wanted broken screens to count against reliability metrics pointed out that customers may conclude based on visual inspection that the station is not working and leave.¹¹⁵ Those opposed to this point explained that customers could still initiate a charge even with a broken screen.¹¹⁶

The Commission determined “that a charger with a broken interface is not functioning as designed and should be treated as “down.” The Commission agrees that broken screens or other interfaces could reasonably lead customers to conclude that chargers are inoperable.”¹¹⁷ It should be noted that the phraseology “as designed” came from the definition of uptime from HB 834 (2023)¹¹⁸ and is not used in the definition of uptime from NEVI.¹¹⁹ So the reader is aware, for

¹¹⁴ *THE EXELON UTILITIES’ RELIABILITY AND REPORTING BUSINESS PLAN FOR ELECTRIC VEHICLES AND PUBLIC CHARGING STATIONS*, The Exelon Utilities, MD Public Service Commission, Case No. 9478, Feb. 9, 2024. Pdf pp. 14 - 15.

Re: Case No. 9478 – Electric Vehicle Reliability and Reporting Standards – Southern Maryland Electric Cooperative, Inc.’s Business Process Plan for Determining if a Charging Station is “Down,” Any Associated Process Improvements, and Reliability and Reporting Standards Compliance, Southern Maryland Electric Cooperative, MD Public Service Commission, Case No. 9478, Feb. 9, 2024. pp. 3 - 4.

POTOMAC EDISON REPORT ON ELECTRIC VEHICLE CHARGING STATIONS RELIABILITY AND REPORTING BUSINESS PLAN, Potomac Edison Company, MD Public Service Commission, Case No. 9478, Feb. 9, 2024. pp. 9 - 10.

¹¹⁵ *Reliability and Reporting Standards Report*, Public Conference 44 Electric Vehicle Work Group, Jul. 28, 2023. p. 23.

¹¹⁶ *Ibid.* pp. 23 - 24.

¹¹⁷ Order No. 90971, MD Public Service Commission, Case No. 9478. p. 11.

¹¹⁸ For HB 834 (2023) *see* PUA §7-901 (G) - “UPTIME” MEANS THE AVAILABILITY AND CONSISTENCY OF AN EV CHARGING STATION IN AN EV CHARGING NETWORK TO SUCCESSFULLY DISPENSE ELECTRICITY AS DESIGNED, MEASURED AS A PERCENTAGE OF BOTH HOURS AND DAYS OF A CALENDAR YEAR.

purposes of its Order that addressed the calculation of utility uptime standards, the Commission found “that the physical connections and user-interface of a charging station are integral to its ability to dispense electricity as designed.”¹²⁰

4. *Establish exemptions from the uptime requirement of 97%.*

There is no significant distinction between NEVI exceptions and those required for utility owned EVSE in Maryland when determining if a station met an uptime standard. EVSE that must adhere to and report under the NEVI standards are relieved from counting certain situations where the EVSE is not working which are referred to as exceptions.¹²¹ For utility-owned EVSE, the only additional exception for measuring uptime that is not listed in NEVI is for “force majeure, as determined by the Commission.”¹²²

¹¹⁹ For NEVI *See* 23 CFR 680.116(b)(1) - “A charging port is considered “up” when its hardware and software are both online and available for use, or in use, and the charging port successfully dispenses electricity in accordance with requirements for minimum power level.”

¹²⁰ Order No. 90971, MD Public Service Commission, Case No. 9478. p. 6.

¹²¹ 23 CFR 680.116(b)(3).

¹²² *see* PUA §7-904 (A)(2)(i)

Appendix E - Example Flow Chart for Tracking Uptime

EVSE Member Scott Wilson provided the following flowchart to help visualize how uptime standard may be tracked.

