Comments of the
National Electrical Manufacturers Association (NEMA)
to
Federal Highway Administration

RE: Request for Information Development of Guidance for Electric Vehicle Charging Infrastructure Deployment

Docket No. FHWA-2021-0022

January 28, 2022

The National Electrical Manufacturers Association (NEMA) is the leading U.S. trade group representing electrical equipment and medical imaging manufacturers, which are at the forefront of electrical safety, reliability, and efficiency. Our nearly 325 Member companies provide a range of products including both the transportation and utilities sectors. Collectively our membership provides some 370,000 American manufacturing jobs in more than 6,100 facilities, with worldwide industry sales exceeding $140 billion.[1]

Summary of Comments

The Federal Highway Administration has requested information on "Development of Guidance for Electric Vehicle Charging Infrastructure Deployment." Please find our comments herein:

General Comments

NEMA feels that it is important to clarify that Electric Vehicle Charging Infrastructure is not just a piece of equipment. Rather, it represents a combination of hardware, software, cables and cable management, and analytics integrated into a network that delivers energy safely, reliably and efficiently to a vehicle. Infrastructure includes additional critical site elements encompassing lighting, controls, and other communication devices that enable the use of the charging equipment and enhance the security while optimizing overall energy efficiency and minimizing carbon impact.

[1] For more information, please visit: https://www.nema.org/.

NEMA is strongly in favor of the efforts to develop and sustain a nationwide electric vehicle charging infrastructure as part of global efforts to reduce emissions through electrification of the North American regional transportation system. This deployment should strive towards standardization and interoperability and allow for communication and coordination between the vehicle, the charging station, and grid to maximize the benefit and convenience for vehicle owners, while not putting overdue stress on the grid.

NEMA's EV Charging Equipment Manufacturers represent companies that are currently selling, manufacturing, and operating in North America. The full list is available at the following URL: https://www.nema.org/directory/products/view/electric-vehicle-supply-equipment-system

Questions

1. The distance between publicly available EV charging infrastructure.

> NEMA believes this is best answered by other stakeholders in the Electric Vehicle Charging Infrastructure market.

2. Connections to the electric grid, including electric distribution upgrades; vehicle-to-grid integration, including smart charge management or other protocols that can minimize impacts to the grid; alignment with electric distribution interconnection processes, and plans for the use of renewable energy sources to power charging and energy storage.

> EV chargers do not exist in isolation but are interconnected with the electrical distribution grid with supporting electrical equipment and infrastructure. Every charger and charging system has "customer side" power distribution equipment that supplies power to and between the chargers. In some cases, EV chargers are deployed in conjunction with on-site battery energy storage. When owners and operators of EV charging stations decide to deploy on-site battery storage with EV chargers, those systems may be distinct from the electrical systems of the building. States should have the flexibility to allow battery storage as an eligible investment covered under the plan when such technology is necessary to facilitate realistic operation of EV chargers, but program participants should not be required to include battery storage at charger locations. In determining the eligibility of equipment expenses and related software, we encourage the Department to ask whether that equipment or expense is integral to the functioning and operations of the EV charging system.
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> A key component in the development of guidance for EV charging infrastructure deployment is the incorporation of EV Ready and EV Capable requirements into both commercial and residential building and energy codes. FHWA should require states to adopt EV Ready requiments in their applicable state codes in order to be eligible for funding.

EV Capable refers to parking spaces that have listed raceway (approved wiring methods) and electrical capacity (breaker space) allocated in a local subpanel to accommodate future EV charging infrastructure installations. EV Ready refers to a parking space that includes the following components: listed raceway (approved wiring methods) sufficient electrical panel service capacity, overcurrent protection devices, wire, and suitable termination points such as a junction box with a service loop or directly landed within an EVSE (i.e., full circuit). NEMA has been advocating for the incorporation of EV Ready requirements in the 2021 and 2024 International Energy Conservation Code. (https://www.iccsafe.org/wp-content/uploads/21-20604_COMM_EV_Strategy_RPT_v5.pdf)

3. The proximity of existing off-highway travel centers, fuel retailers, and small businesses to EV charging infrastructure acquired or funded under the Program.

NEMA supports the deployment of EV Charging Infrastructure in these areas.

4. The need for publicly available EV charging infrastructure in rural corridors and underserved or disadvantaged communities.

NEMA supports the deployment of EV Charging Infrastructure in these areas. An analysis should be conducted to better understand the impacts (short and long term) to the energy system for managing the higher loads and power quality as a result of the use of more power electronics onto the grid.

5. The long-term operation and maintenance of publicly available EV charging infrastructure to avoid stranded assets and protect the investment of public funds in that infrastructure.

Public charging infrastructure are complex systems that require regular maintenance and service in order to reliably deliver charging services to drivers. Applicants for funding should be required to submit an operation and maintenance plan that effectively demonstrates their ability to serve EV charging infrastructure. Costs associated with the operation and maintenance of EV charging infrastructure as well as its network integration and monitoring should be included as valid recoverable costs through the program when associated with its deployment. Ensuring that chargers are inoperable also helps avoid stranded assets.

A well-developed operations and maintenance model could include a number of features, including, but not limited to:

- Scheduled preventative maintenance
- Detailed documentation and procedures to troubleshoot and repair chargers
- 24/7/365 customer call center to receive service calls

- 24/7/365 connectivity and monitoring of the operations of chargers
- Service ticketing and process to ensure service and operational issues are addressed in a reasonable timeframe
- Sufficient technicians trained to work on the make and model of charger they operate in the regions in which they operate
- Experience and capability to execute detailed service campaigns hand in hand between owner, operator, and manufacturer
- Sufficient local inventory of spare parts and logistics infrastructure

6. Existing private, national, State, local, Tribal, and territorial government EV charging infrastructure programs and incentives

Existing programs and incentives should utilize the eligible mitigation actions that were defined in Appendix D Environmental Mitigation Trust Fund of the Volkswagen settlement (https://www.vwcourtsettlement.com/en/docs/DOJ/Approved%20Appendix%20D.pdf)

Its also important that applicable government agencies collaborate to the greatest extent possible when using these programs and incentives. The program should direct a portion of the IIJA funding to supporting the advancement of underserved, tribal and State government programs related to publically accessible EV infrastructure.

7. Fostering enhanced, coordinated, public-private or private investment in EV charging infrastructure

Owners and operators of charging infrastructure funded by the Department should be required to meet a 20% cost share and this requirement should not be waived or subsidized by state or local governments. Cost share requirements play a critical role in ensuring that charging owners and operators use reasonable efforts to take care of their chargers, deliver competitive customer focused charging services, and have a business model that is self sustaining. Cost sharing programs should not be waived but leveraged to the greatest extent possible when investing in EV charging infrastructure.

8. Meeting current and anticipated market demands for EV charging infrastructure, including with regard to power levels, and charging speed, and minimizing the time to charge current and anticipated vehicle

The type of charging product, including power level, in use at a location should match the needs of drivers at that location. In general terms, the less time a driver plans to stay or "dwell' at a location, the faster they often need to charge, for which DC chargers are a good fit. AC Level 2 chargers, which can take 3-6 hours to charge a vehicle, are a good fit where vehicles tend to dwell for a few hours, like workplaces, apartment buildings, hotels, and commercial buildings.

DC chargers can charge a vehicle in 10-60 minutes, or more, depending on the power level and accessories of the charger and the capabilities of the car. Individual DC charging product categories can range from 50kW-90kW, 90-180kW and 150-350kW. Megawatt centralized charging systems range up to 2,000kW. These high power charging classes are often good fits for driver and market needs along highway corridors.

We strongly caution FHWA against setting a minimum power level for chargers deployed along highways. In part, this concern is driven by the fact that kW rating is not the only factor that influences rate of charge. Other factors that influence the rate of charge include,

- voltage rating of the charger and the vehicle,
- amperage rating of the cables,
- connector type (CHAdeMO v. CCS1),
- the ability to charge multiple cars at the same time,
- onboard charging capabilities of a vehicle, and
- the parameters of the vehicle battery management system.

Further, some locations have limits on how much power they can accommodate because of electric grid or utility constraints. FHWA should not artificially limit the ability to install chargers at such locations. For these reasons, we recommend that FHWA require that state plans allow for flexibility in installing chargers that meet the varying needs of drivers and the locations of the charging infrastructure

FHWA should allow charging locations to recover costs associated with preparing a site for additional charging capacity at a future date, which is sometimes referred to as "future proofing." This could include, but is not limited to, installing conduit, charger footings and pads, and upgraded power distribution equipment. Doing this work at the time of construction can reduce the cost of adding more chargers in the future as utilization increases. Ensuring that chargers are interoperable is another means of future-proofing, by ensuring that future equipment added to a charging site can interoperate with previously installed equipment and both existing and new vehicle models.

NEMA believes that the EV charging equipment industry is heading towards smaller physical footprints, greater integration of energy management systems, faster rates of charge, and improved customer experience technologies. FHWAshould not pre-determine what type of chargers should be installed as doing so would thwart innovation and improvements in the charging experience. FHWA should provide the anticipated vehicle demographics and dwell time analysis to determine the proper present and future needs that can guide the technology and infrastructure selection.

9. Any other factors, as determined by the Secretary.

Interoperability

All public charging locations should be interoperable with all electric vehicles. For a charging system to energize a vehicle's battery, there must be a common physical connection point and a 'handshake' made between the vehicle's Battery Management System (BMS) and the charger. The BMS then communicates important parameters of the battery to the charger, such as state of charge, power capability, environmental conditions and other data that are critical to both safety and battery longevity. The connection and communication between a vehicle and charger will be based on a common inlet-outlet and a language that both speak fluently, known as a protocol. The three main protocols for interoperability between vehicles and chargers are CHAdeMO, Combined Charging System (CCS1), and Tesla. The first two are open, non-proprietary protocols, while the Tesla protocol only works with Tesla vehicles. Another technology which is anticipated soon is Megawatt Charging System (MCS) to support large, heavy-duty vehicles.

While we do not recommend requiring that every charger be able to service both CHAdeMO and CCS1 ready vehicles, we do recommend that each charging location be able to serve vehicles that use these open standards. Although CCS1 is emerging as the preferred standard connector for DC fast charging, it is important to maintain support for existing drivers on the road with vehicles that had previously used the non-proprietary CHAdeMO protocol, as well as considering accommodations and considerations for larger vehicles such as those who will adopt MCS

There are some new emerging charging technologies like wireless or inductive EV Charging. However, these technologies are exceptionally nascent, not compatible with nearly any EVs currently being produced, and have only been deployed in pilot projects so far. For these reasons, we discourage the Department from funding these chargers at locations without adequate chargers at the same location capable of charging the vast majority of vehicles.

Networked Charging

All EVSE funded under FHWA programs should be networked and connected to the cloud. The California Energy Commission defines "networked" chargers as "a charger connected to a backend network operations center, which at a minimum enables remote diagnostics, remote start, and usage data collection."

Cyber Security

Ensuring cybersecurity and integrity of EV charging infrastructure is of paramount importance, with two main areas of concern: 1) securing user physical safety and personal information and 2) protecting operational integrity and connected infrastructure. While charging technology and cybersecurity systems to protect them are evolving quickly, there are some foundational cybersecurity principles and techniques that public charging infrastructure should adopt, including the following:

(1) **"Boot Security."** Boot security uses embedded manufacturer approved and authenticated hardware devices to authenticate operating system software when an EV charger is "booted" up. If the operating system at the boot stage is not authenticated, the charger will stop the malicious operating system from loading or making changes to the charger.
(2) **Secure "over the air updates**." Secure methods to update software on deployed chargers should be available such as "over the air updates" or updates that can be issued remotely. When the software components on an EV charger are updated, there should be protections in place to authenticate the software update before the update is accepted and implemented. This mitigates the risk of malicious software being loaded onto a device.
(3) **Secure Customer Information**. EV chargers may store sensitive data like, for example, personally identifiable information or payment information. This sensitive data should be protected and there are a variety of means to do that including, but not limited to, encryption, role based access, and limiting the amount of such information locally stored on an EV charger.

There are various hardware and software techniques for implementing these three principles and mitigating risks of malicious actors gaining access to public charging infrastructure and information. We encourage the FHWA to coordinate closely with the Department of Energy, the National Laboratories, and industry in setting minimum cybersecurity standards that implement these three principles.

Safety Standards

EV Chargers funded under FHWA programs should be compliant with the the UL 2202 standard for Safety EV Charging System Equipment.

Lighting and Controls

It is essential for electric vehicle charging stations to incorporate lighting and controls to facilitate a site that provides the necessary safety and security for the vehicle charging activity, especially during nighttime. This will require new or upgraded lighting to provide adequate illumination with accurate color rendition and reduced glare for appropriate visibility while minimizing energy use. Controls can be incorporated to provide bi-level lighting to dim during times at night when the charging units are not in use. FHWA may consider working with the industry to establish design standards to ensure the lighting at these facilities provides good visibility as well as meeting aggressive energy performance.

10. Please provide examples of best practices relating to project development of EV charging infrastructure and hydrogen, propane, and natural gas fueling infrastructure at the State, Tribal, and local levels

There are several examples of grants related to project development of EV charging infrastructure as a result of the Environmental Mitigation Trust Fund in Appendix D of the Volkswagen settlement (https://portal.ct.gov/DEEP/Air/Mobile-Sources/VW/VW-Settlement---Grants; https://floridadep.gov/air/air/content/volkswagen-settlement-mitigation-trust)

Overall, projects of this type require close cooperation from end users, regulators, EVSE suppliers, contractors, state and local governments, contractors, OEMs and utilities that lead to the most successful and well planned outcomes.

11. What topics do you suggest that we address in guidance on project development of EV charging infrastructure and hydrogen, propane, and natural gas fueling infrastructure at the State, Tribal, and local levels to allow for the predictable deployment of that infrastructure?

Buy America requirements need an interpretive certainty across the states and should be clarified for the purposes of this specific program

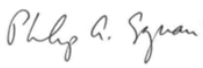
12. Please provide any suggestions to inform the administration of competitive grants under the Charging and Fueling Infrastructure Program for corridor and community charging

The competitive Charging and Fueling Infrastructure Program should allow applicants to propose incentive programs for Level 2 charging and higher power charging systems where applicable, which could be disbursed as rebates or vouchers.

Request for Meeting

We would like to facilitate a meeting with you to discuss NEMA's responses to this RFI at your earliest possible convenience. Please contact me (703-841-3274 or philip.squair@nema.org) or Steve Griffith (703-307-7847 or steve.griffith@nema.org).

Sincerely,



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