CHAdeMO Association
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105-0004 Japan

August 22, 2022

Stephanie Pollack
Deputy Administrator
Federal Highway Administration
1200 New Jersey Ave SE
Washington, DC 20590

**Re: Notice of proposed rulemaking; request for comments FHWA-2022-0008**

Dear Deputy Administrator Pollack,

The CHAdeMO Association appreciates the opportunity to provide comments to the Federal Highway Administration (FHWA) and the U.S. Department of Transportation (DOT) regarding the notice of proposed rulemaking for the National Electric Vehicle Infrastructure (NEVI) Formula Program.

Comprised of over 500 members, the CHAdeMO Association including major automakers including General Motors, Honda, Isuzu, Jaguar Land Rover, Mazda, Mitsubishi Motors, Nissan, Subaru, Tesla, and Toyota, zero-emission trucks, and buses manufacturers, 50 charging station manufacturers (with over 260 certified charger models), construction, watercraft, aircraft and other off-road vehicle manufacturers and other industry and government leaders supporting transportation electrification.

CHAdeMO Association's vision; "Powering global zero-emission mobility for the happiness of future generations." The transport sector is responsible for a quarter of global CO2 emissions. We strive to phase out fossil fuels and achieve global energy transition in the coming decades. CHAdeMO Association takes this to heart and is committed to support the electrification of transport systems for the happiness of future generations.

CHAdeMO is both the name of the DC fast charging technology and the organization tasked to develop it. We are the pioneer of light duty vehicle fast charging and it is the most popular charging standard with almost 50,000 charge points in 98 countries.

Most importantly, CHAdeMO is truly global public standard [published under IEC & EN (61851-23, 61851-24, 62196-3), and IEEE (2030.1.1)] and supports over 1 million EVs

equipped with a CHAdeMO inlet and another 1 million compatible EVs utilizing CHAdeMO chargers with a simple adaptor. It is not a proprietary standard.
Our core mission, "Providing safe, affordable and interoperable DC charging." First to market with an innovative approach to DC charging and accumulating 12 years of expertise, the CHAdeMO Association has successfully developed standards, specifications and an EVSE certification program delivering fast, simple, and robust DC fast charging experience to all EV users. Here is how:

1. Protocol Development - One of our main tasks is enabling and evolving the CHAdeMO protocol, adapting it to the changing market environment and needs of e-mobility stakeholders.
2. V2G/VGI – since 2012, CHAdeMO incorporates bi-directional power transfer. V2H/ V2L chargers (Mitsubishi's MiEV Powerbox, Nissan LEAF to Home) available for the last 10 years and completed third party certification. Numerous demonstration projects are underway globally including the successfully completed Maui V2G project.
3. High Power - To meet the growing expectations of the e-mobility stakeholders and drivers, CHAdeMO is developing the next generation of high-power charging. The new CHAdeMO protocol enables 500kW charging with state-of-the-art ethernet based communication and cybersecurity developed by CHAdeMO along with its international partners within the framework of Project ChaoJi.
4. Certification - CHAdeMO is the only fast charging standard with an impartial third-party certification system in the world. The result is all CHAdeMO EVSEs work with all CHAdeMO vehicles = true interoperability.

Since 2012, CHAdeMO has included the specification for bidirectional (V2G/VGI) power flow. Nearly all CHAdeMO equipped EVs are capable for bidirectional power flow without any modifications. Globally, EVs are beginning to help the electricity grid with bidirectional power flows especially where EVs dwell for longer times (e.g., destination centers, multi-unit dwellings, curbside charging, and other public charging). Once the benefits of V2G/VGI core technology are realized, CHAdeMO believes automakers will begin switch to CHAdeMO charging systems for North American market*.

We suggest NEVI funds should be used to encourage V2G/VGI charging stations to support the electricity grid after NEVI has funded the alternative fuel corridors.

* Nearly all automakers using CCS-1 in the North American market have a CHAdeMO designs for their Japanese market vehicles. Therefore, automakers can easily switch back to CHAdeMO.

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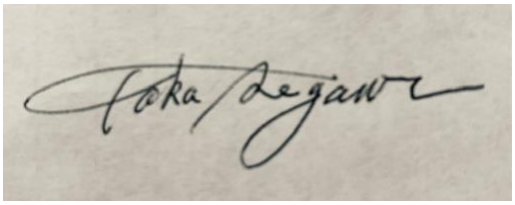
We appreciate the opportunity to shape the NEVI regulation to support charging of all EVs across the country. We look forward to sharing our experience and expertise to create truly pragmatic, reliable, safe, and affordable EV charging experience responding to the users' various charging needs to facilitate widespread EV use. Our full comments are attached in the next section.

Thank you for the opportunity to comment. If you have any questions, please contact David N. Patterson, P.E., Executive Director CHAdeMO NA, (patterson@chademo.org).

Sincerely,



Takafumi Anegawa
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**CHAdeMO Association**
**Comments Regarding the Notice of Proposed Rulemaking for the National Electric Vehicle Infrastructure (NEVI) Formula Program**

CHAdeMO Association appreciates the opportunity to provide the following comments on the NEVI formula program NPRM.

Executive Summary

Paragraph 1 states:
*"This regulation would enable States to implement federally-funded charging station projects in a standardized fashion across a national EV charging network that can be* ***utilized by all EVs regardless of vehicle brand****."*

Section (1)
(1) Installation, operation, and maintenance by qualified technicians of EV infrastructure:
*"These proposed requirements would* ***provide the traveling public with the reliable expectation for their EV charging experience anywhere that NEVI Formula funds are used to construct EV charging infrastructure.****"*

CHAdeMO Comment – Nation-wide, approximately 200,000 Kia, Mitsubishi Motors and Nissan EVs equipped with CHAdeMO DCFC systems. Additionally, there are several other vehicles (Tesla, motorcycles, etc.) that also use CHAdeMO charging stations.

These early adopter EV owners that will continue to use CHAdeMO charging in the future. Many of these will be owned by low-income EV drivers as used vehicles. The continued support of CHAdeMO EVSEs is important to Environmental Justice (EJ) communities as 13 years of used Nissan LEAFs and other used CHAdeMO equipped EVs are ideal entry EVs for disadvantaged communities.

Therefore, for "*all EVs regardless of vehicle brand*" - this minority of used CHAdeMO EV drivers need "*the reliable expectation for their EV charging experience anywhere that NEVI Formula funds are used to construct EV charging infrastructure.*" **CHAdeMO Association respectfully requests the minimum installation of one CHAdeMO charging connector at each NEVI funded EV charging station.** This is easily accomplished with a CHAdeMO-CCS dual connector chargers (a common charger design since CCS was

developed) and will not hurt deployment of EVs with CCS connectors and will not cause stranded assets.

§ 680.106: Installation, operation, and maintenance by qualified technicians of electric vehicle charging infrastructure.

**§ 680.106(b)(2)** Number of Charging stations.

The number of ports per charging site should be dependent on the projected EVs in a corridor and should be established by each individual State's Department of Transportation or other department or agency responsible for NEVI infrastructure deployment. We support the proposal that each charging site to allow for a minimum of four ports/chargers with a minimum of one CHAdeMO port. This is necessary to support existing CHAdeMO equipped vehicles as discussed above.

Currently, the proposal limits CHAdeMO installation using NEVI funds to 2022FY. Considering that the average life of US vehicles is about 10 years, many of the 200,000 CHAdeMO vehicles will still be in operation in 2027. Therefore, CHAdeMO Association requests the continued installation using NEVI funds of CHAdeMO charging ports for the next 5 years. At the end of EVSE 8-year useful life, the decision can be made whether to increase, replace or reduce the number of CHAdeMO ports based on actual usage.

**§ 680.106(c)** Connector Type.

We recommend use of both public charging standards - the CCS Type-1 connector system, the North American industry standard and the CHAdeMO system, the Global standard, for all NEVI funded chargers.

Use of permanently attached proprietary connectors like Tesla should not be allowed for NEVI funded chargers. Instead, Tesla vehicles can utilize Tesla's optional CHAdeMO adaptor to meet their charging needs at NEVI funded EV charging stations.

Please note, contrary to popular belief, **it is not possible to adapt a CCS-1 charger to charge a CHAdeMO equipped vehicle.**

- The CCS-1 charging system utilizes Power Line Communication (PLC) to communication between the vehicle and EVSE.

- Originally designed for SAE J1772 Level 2 charging, CCS-1's PLC is not capable of CANbus communication utilized by the CHAdeMO system.
- Though an adaptor can physically connect between CCS-1 and CHAdeMO, a CCS-1 cannot properly communicate with a CHAdeMO system and CHAdeMO system will not allow charging.
- Therefore, there is no safe and functional adaptor between CCS-1 and CHAdeMO.

§ 680.106(d)(1) Power Level – DC Charging.

We recommend that the charging system hardware must support at least 50kW continuous power delivery for all system voltages. It is necessary to balance investment expense, energy cost and the grid's ability to support power delivery with the desire for higher powered charging hardware. The stations should be designed with flexible architectures starting with a **minimum of 50kW** and load-sharing within the stations to achieve up to 150kW on some ports when the others are not in use. When existing grid infrastructure economically supports greater power delivery, two or more 150 kW charging port can be installed.

Comment – the proposal specified a minimum of four 150kW charging ports equaling 600kW. Our experience has shown – for example - the twelve 50kW charging ports (same 600kW) charges more vehicles in less time. Current battery design limits the amount of time an individual vehicle can use the full charging port power rating, most reduce rapidly after the first few minutes. The vehicle will continue to charge near 50kW until EV signals the EVSE to reduce the charging rate even further. Therefore, a 50kW system can provide a similar charging experience with a small cost (a few minutes) of time.

Instead, we have found the availability of more charging ports allows higher average power transferred to vehicles. If combined with load-sharing technologies when several ports are not in use, higher power levels are possible.

680.106(d)(2) Power Level – AC Level 2 Charging.

For AC Level 2 charging, we support the proposed maximum power at or above 6kW.

§ 680.106(e) Charging Station Availability.

CHAdeMO supports 24 hours/7 days per week public access.

**§ 680.106(f)(1)** Payment Methods.

We do not recommend using Plug and Charge (PNC) payment capabilities using the ISO 15118 as a preferred method of payment for charging services. Currently, Public Key Infrastructures (PKI) authentication systems - with or without ISO 15118- are under development to secure EV/EVSE authentication/identification without RFID or other payment systems. Once PKI systems are implemented, then PNC (with or without ISO 15118) payments will be viable.

**§ 680.106(g)** Equipment Certification.

As it is one of our core missions, **we strongly support third party certification of all DCFC EVSEs and EVs.** This will ensure true compatibility between all EVs and EVSEs using a specified charging standard.

Currently, eMobility Power (Japan) is operating a 22,000-station nationwide CHAdeMO charging network with station uptimes greater than 99%. The main reason is the third-party certification of all charging equipment required by the CHAdeMO Association.

**§ 680.106(h)** Security: Physical and cybersecurity strategies.

We recommend that agencies adopt best practices developed by Department of Energy and NIST, which represent the best practices to be implemented. We recommend the following revisions to 680.106(h)(2): (1) Change "may address..." to "shall address..." (2) We also suggest replacing "appropriate encryption systems" (indefinite) with "cryptographic agility," and add "support of multiple Public Key Infrastructures" to the list of cyber strategies that must be addressed.

**§ 680.106(i)** Long-Term Stewardship.

We recommend that the EVSEs should be maintained in compliance with NEVI standards for a period of 8 years – the average useful life of DCFC EVSEs.

**§ 680.106(j)(5)** Qualified Technician.

Currently, EVSEs are installed by electricians holding appropriate licenses, certifications, and training as required by the State. Similarly, technicians servicing

EVSEs are trained by their companies to repair and troubleshoot charging station components. Requiring additional EVITP certification will delay installation of EVSEs. While we support opportunities for EV technicians to obtain additional training, such certification should not be required for installing and servicing charge stations.

§ 680.108: Interoperability of electric vehicle charging infrastructure.

**§ 680.108.** Charger-to-EV communication.

We strongly support the requirement of ISO 15118 for CCS-1 charging systems only. Due to CCS-1 use of the PLC communication, ISO 15118 is required for proper operation of the CCS-1 DCFC system. Since CHAdeMO (and Tesla) utilizes the robust CANbus communications system, they do not require the ISO 15118 standards for proper operation.

Please note, the ISO 15118 standards can be difficult and expensive to develop and implement for CCS-1 systems. Further, interoperability is currently lacking between CCS-1 vehicle and EVSE manufacturers' products due, in part, to the lack of detailed specifications in the SAE J1772 standard and lack of third-party certification.

§ 680.114: Charging network connectivity of electric vehicle charging infrastructure.

**§ 680.114(a)** Charger-to-Charger-Network Communication.

We support using OCPP 2.0 and future editions.

§ 680.116: Information on publicly available electric vehicle charging infrastructure locations, pricing, real-time availability, and accessibility through mapping applications.

**§ 680.116(a)(1)** Communication of Price.

We support using $/kWh in states which allow it, as it offers the most consistent and recognizable unit for customers. Further, we support using $/min in states which do not allow $/kWh. For states using the $/min metric, prices must be assigned for discrete power level ranges (kW) and communicated to the customer. Increasing power level ranges correspond with higher prices. All fees and taxes imposed on the customer should be included in rate displayed at the charging station. More detailed pricing structure and fee information could be made available via a scannable QR code on the charging station.

§ 680.116(b) Minimum Uptime.

To support EV use and encourage proper maintenance of EVSE, we support that charging ports must have a minimum uptime of greater than 99%. Further, we also recommend an overall charging site uptime of greater than 99.9%.

§ 680.116(c)(17) Third-Party Data Sharing.

We support OCPI 2.2 and future editions.

The following are FHWA additional requests for comment:

*The FHWA requests comments to address if EVs lose their charge while driving on the roadway, this emergency situation could create a traffic incident.*

Since 2008, Automakers and numerous automobile roadside service organizations (auto clubs) have considered how to address EVs running out of energy on the roadways. Automakers have improved charge gauges to accurately measure the amount of energy remaining in battery packs and provide warnings for drivers to seek charging or, worse case, safely pull off the roadways like IC vehicles running out of fuel. Auto clubs have also worked to develop emergency charging systems to allow stranded EVs to get enough charge to get off roadway and get charged. Failing the "roadside charge", EVs can be towed to a charger.

*The FHWA requests specific comment on how "a walled garden" should be addressed.*

To avoid "a walled garden", membership, access and payment limitations must be prevented – it should be open to all EVs. More importantly, technical limitations must be eliminated. It is reported - due to the general nature of the CCS standards – certain EV, EVSE manufactures and charging system operators can create an extreme variance (but still in compliance to the standard) that prevents other vehicles from using these extreme EVSEs. The solution is to require third party certification to the applicable standard to demonstrate interoperability.