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BUILDING RELIABLE EV CHARGING NETWORKS: MODEL STATE GRANT AND PROCUREMENT CONTRACT PROVISIONS FOR PUBLIC EV CHARGING

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INTRODUCTION

To ensure a coordinated and strategic approach to electric vehicle (EV) charging infrastructure investment in the Northeast Corridor, states from Virginia to Maine convened a Steering Committee¹ to develop the *Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure: 2018-2021*, released in May of 2018.² In addition to making recommendations for public and private sector investment in charging infrastructure, the *Regional Strategy* identifies key overarching issues that have a direct bearing on the reliability of EV charging networks and consumer confidence in charging infrastructure. These issues range from access to charging stations to payment options to uptime requirements to pricing transparency.

In order to promote a consistent regional approach to addressing these important consumer use issues, the Northeast States for Coordinated Air Use Management (NESCAUM) worked with the Steering Committee members to develop and achieve consensus on model language for state electric vehicle service equipment (EVSE) grant and procurement contracts. Steering Committee members participated in two informational webinars and a two-day workshop with key stakeholders, all co-hosted by NESCAUM and Plug-in America. Thereafter, NESCAUM facilitated a deliberative process with the Steering Committee to reach consensus on model language to increase access to and functionality of charging infrastructure.

MODEL STATE EVSE GRANT AND PROCURMENT PROVISIONS

The model provisions set forth in this document were developed through a robust deliberative process and, except as otherwise noted, reflect the consensus of Steering Committee members. However,

¹ The Steering Committee is comprised of state agency representatives from CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT and VA.

² NESCAUM, "Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure 2018-2021." May 2018. Available at: <https://www.nescaum.org/documents/northeast-regional-charging-strategy-2018.pdf/>

states reserve the right to modify or decline use of these provisions when implementing their EVSE grant and procurement programs.

In considering the application of EVSE requirements to Level 2 and DC fast chargers, Steering Committee members strove to balance consumer convenience benefits with added costs and the ability to attract site hosts. This resulted in a decision to apply some requirements only to DC fast chargers.

DEFINITION OF PUBLIC ELECTRIC VEHICLE CHARGING STATION

State EVSE grant and procurement programs provide funding for a variety of charging use-cases, including those that are intended for use by the general public (e.g., charging along travel corridors and at public parking lots and garages) and those that are not intended for use by the general public (e.g., charging at workplaces and multi-unit dwellings). The model provisions included herein are intended for public charging stations.

In order to avoid any confusion about what constitutes public versus private EVSE, several states – Connecticut, California, Massachusetts and New Hampshire – have adopted nearly identical statutory definitions of “public EV charging station.” The Steering Committee considered using Connecticut’s statutory definition of “public EV charging station” as a regional model, but ultimately decided that states should use this definition as a starting point and have flexibility to modify it as needed to meet unique state circumstances. The state of Connecticut defines the term “public electric vehicle charging station” as follows:

“Public electric vehicle charging station” means an electric vehicle charging station located at a publicly available parking space.

“Publicly available parking space” means a parking space that has been designated by a property owner or a lessee to be available to and accessible by the public, and may include on-street parking spaces and parking spaces in surface lots or parking garages; provided, however, that “publicly available parking space” shall not include a space that is part of or associated with a private residence or a parking space that is reserved for the exclusive use of an individual driver or vehicle or for a group of drivers of vehicles, including employees, tenants, visitors, or residents of a common interest development or residents of an adjacent building.³

OPEN ACCESS, PAYMENT OPTIONS, ACCESSIBILITY, AND CUSTOMER SERVICE SUPPORT

Given that range anxiety continues to be a key barrier to mainstream consumer EV adoption, it is essential that EV drivers have access to reliable public charging stations when needed. This is the primary purpose of provisions requiring open access, minimum payment options, accessibility, and customer service support.

OPEN ACCESS

³ Conn. Gen. Stat. § 16-19f (7)-(8) (2018).

Open access is the ability of an EV driver to initiate a charging session regardless of whether that driver is a member of the specific charging network. The Steering Committee reached consensus that publicly funded EVSE intended for public use should be open to all drivers without restrictions based on network membership or subscriptions. This will maximize the number of available chargers without the need for EV drivers to be members of multiple charging networks. However, the Steering Committee recognizes that EVSE providers have different business models, and the model language expressly acknowledges that EVSE providers may have different price schedules for network members and non-members.

OPEN ACCESS MODEL PROVISION

The (grantee/recipient/contractor) must ensure that public electric vehicle charging stations are accessible by all drivers regardless of network memberships or subscriptions, and that consumers are not required to pay a subscription fee or otherwise obtain a membership in any network, club, association, or organization as a condition of using such public electric vehicle charging station; provided, however, that owners and operators of public electric vehicle charging stations may have separate price schedules conditional on a subscription or membership.

REQUIRED PAYMENT OPTIONS

Varying payment options can be confusing to EV drivers and limit charging station access in some cases. Accepted payment methods at charging stations often include one or more of the following: EVSE network membership/RFID cards, credit and debit cards, mobile payment (e.g., Apple Pay), etc. In addition, credit and debit card payments may be accepted at EVSE in different ways, including swipe readers, chip readers, contactless payment, or by calling a toll-free number.

The Steering Committee decided that some form of credit/debit card payment should be required to increase access to public charging because membership/RFID card payment is restricted to network members, and mobile payment is not yet prevalent. Ownership of smartphones in the U.S. is now widespread (77 percent of U.S. adults own a smartphone), but consumer behavior data indicates that only 10 percent of consumers under the age of 45 use mobile wallets as a payment method.

While there is no dispute that credit and debit cards are ubiquitous as a method of payment (70 percent of U.S. adults have one or more credit/debit cards), today only 5 percent of those cards are contactless. Contactless payment is increasing and may be predominant in the future, but it is not at all clear when that will happen. Steering Committee members also recognized that credit card payment through a toll-free number would not work in remote locations where cell service is limited, and it is less convenient than a credit card reader.

Some EVSE providers expressed concern about the added cost of requiring credit card readers for swipe and chip cards. However, the cost differential for DC fast chargers is minimal. Adoption of chip credit card reader requirements by the Northeast Corridor and possibly other states would create economies of scale that would further reduce costs to EVSE manufacturers and providers. In the meantime, the Steering Committee decided to limit the model language for minimum payment options to DC fast chargers.

Another concern is that there is a security risk associated with swipe and chip credit card readers – difficult-to-detect skimmers that thieves attach to credit card readers to steal credit card information. However, it is unclear if this problem will arise with charging stations, and if so, how widespread it might become. Chips, which are reportedly more secure than magnetic swipes, help to address this concern by encrypting data during card transactions. Tap cards also address this security concern by using an encrypted code that changes with each transaction.

Ultimately, most Steering Committee members agreed that offering the credit/debit card chip reader payment option to drivers provides greater universal access and convenience than other payment options in this early market and minimizes the risk of stranding motorists who are in need of a charge. The model language below is intended to serve as a template for states who wish to require chip and tap credit card readers at publicly funded DC fast chargers designated for public use. Note, however, that the language should be revisited periodically as markets, technology and consumer behavior evolve.

PAYMENT OPTIONS MODEL PROVISION

For public DC fast charging stations that require payment, the (grantee/recipient/contractor) must ensure that such stations, at a minimum, are equipped with a credit card reader that allows users to pay using chip and tap credit and debit cards without incurring excessive fees, inconvenience or delays compared to other payment methods.

ACCESSIBILITY

Maximizing driver accessibility to charging stations is important to build consumer confidence in the charging network. Not all public charging stations will be accessible on a 24-hour, seven day a week basis. Some, for example, will be located in parking lots that are closed to the public during non-business hours. While the preference is for public EVSE to be accessible 24 hours a day, seven days a week, the Steering Committee acknowledged circumstances where it may be unreasonably burdensome for site hosts to meet this requirement. The Steering Committee agreed, however, that because inaccessible DC fast charging stations serving highway corridors would be most likely to result in stranded drivers, these stations should be accessible at all times.

ACCESSIBILITY MODEL PROVISION

All public DC fast charging stations serving (designated) highway corridors must be publicly accessible year-round, 24 hours a day, 7 days a week (e.g., stations shall not be deployed in gated parking lots or fenced property that is closed to the public for any period of time). Charging station parking spaces must be clearly designated as reserved for EV charging and adequately lit from dusk to dawn.

CUSTOMER SERVICE SUPPORT

Timely customer service support to assist EV drivers is important to address unexpected operational problems with charging stations. The model provision approved by the Steering Committee requires a

clearly visible toll-free assistance number on all public charging stations. Because the majority of access or operational issues can be resolved remotely, the Steering Committee agreed that public DC fast chargers should also be equipped with remote diagnostics. Some publicly funded Level 2 chargers are expected to be non-networked, and therefore, would not be subject to this requirement.

CUSTOMER SERVICE SUPPORT MODEL PROVISION

For all public EV charging stations, the (grantee/recipient/contractor) shall provide a customer support service number that is accessible to customers during hours of operation through a toll-free telephone number that is clearly visible and posted on or near the charging equipment to assist customers with difficulties accessing or operating the charging stations. The (grantee/recipient/contractor) must ensure that DC fast charge units are equipped with remote diagnostics and the ability to be “remote started.” The customer support service must be capable of dispatching or otherwise providing services to address operational problems at the charging station. A customer who calls the toll-free number must get immediate assistance, including rebooting the system if necessary.

REDUNDANCY, UPTIME, OPERATIONS & MAINTENANCE, REPAIRS, AND OPERATIONAL STATUS

Setting minimum requirements for public charging station “uptime” – that is, the percentage of time that a charging station must be functioning properly and available for use by EV drivers – promotes confidence in the charging network and reduces the risk of broken stations inconveniencing and stranding drivers. Identifying the entity or individual responsible for station maintenance and repair and ensuring the availability of adequate resources to conduct regular inspections, diagnose problems, and service charging stations in a timely manner are proactive steps states can take to minimize downtime. Installing multiple EV chargers at each site is another important way to increase charging network reliability. Effectively communicating with EV drivers when a station is not working, for example, through a mobile app, is also important to prevent stranding drivers in need of a charge.

REDUNDANCY

Ideally, charging stations would be operational 100 percent of the time, but it is impossible to avoid downtime during routine maintenance and unexpected equipment failures. In addition to establishing uptime and maintenance requirements, building redundancy into the network in the form of multiple charging ports at each site is another EVSE deployment tool states can implement to increase functionality and reliability. Therefore, the Steering Committee endorses a requirement for multiple charging ports at each site.

REDUNDANCY MODEL PROVISION

For public DC fast charging sites: At each project site, DC fast charging equipment must be networked and configured in one of the following ways: (1) at least two dual-cord protocol charging units per project site, each equipped with a CHAdeMO and a SAE CCS connector; or (2) at least two CHAdeMO chargers and two SAE CCS chargers per project site.

For public Level 2 sites: Each Level 2 site shall be equipped with a minimum of 2 J1772-compliant charging ports.

UPTIME REQUIREMENTS

Minimizing downtime of public charging stations is important to avoid stranding motorists and to build consumer confidence in the charging network. This is particularly true for DC fast chargers serving longer distance travelers. Because Steering Committee members felt that setting a uniform uptime requirement for L2 chargers could be unreasonably burdensome for some site hosts, the model uptime provision applies only to DC fast chargers, and leaves states to decide uptime requirements for L2 chargers on a case-by-case basis.

Uptime can be measured in one of three ways: (1) separately for each individual charging port; (2) for each charging pedestal (i.e., whether there is at least one operational port at each charging pedestal); or (3) whether there is at least one available plug at a charging site.

The Steering Committee agreed that measuring uptime based on the operational status of each charging connector was the best approach to ensuring a high level of functionality, and that an uptime requirement of 99 percent is in-line with current industry goals. State approved maintenance and operation plans, discussed below, should contain provisions for enhanced inspection and maintenance requirements in the event that a site host or EVSE provider falls short of the uptime requirement.

UPTIME REQUIREMENT MODEL PROVISION

Each connector on each public DC fast charging station pedestal shall be operational at least 99 percent of the time based on a 24 hour 7-day week (i.e., no more than 1.7 hours of cumulative downtime in a 7-day period).

MAINTENANCE AND REPAIR OBLIGATIONS

All state grant and procurements contracts for public EVSE, whether for Level 2 or DC fast chargers, should clearly establish responsibility for maintenance and operation of charging stations and define the scope of the obligation. Recipients of public funding should plan for the added expense and administrative work that are required to maintain charging stations in good working order. The duration of the maintenance obligation is left to the discretion of individual states.

MAINTENANCE AND REPAIR OBLIGATION MODEL PROVISION

For all public electric vehicle charging stations, the (grantee/recipient/contractor), and any successor-in-interest, shall be responsible for operating and maintaining or causing a (sub-grantee/sub-recipient/subcontractor) to operate and maintain the charging station pedestals, and all ancillary equipment, including cables, awnings, canopies, shelters, and information display kiosks or signage associated with the charging stations, in good working order and in compliance with all manufacturer requirements and recommendations for a period of at least ___ years following the date when the charging station commences operation.

DCFC OPERATION AND MAINTENANCE PLAN

A robust inspection and maintenance plan is necessary to minimize charger downtime. In the Northeast region where snow is a common occurrence during winter months, inaccessibility due to accumulation of snow should not be excused, and an approved maintenance plan should include provisions for timely snow removal.

DCFC OPERATION AND MAINTENANCE PLAN MODEL PROVISION

For public DC fast charging stations, the (grantee/recipient/contractor) must submit, for state approval, an operations and maintenance plan for all deployed DC fast chargers that ensures compliance with the 99 percent uptime requirement. The operations and maintenance plan shall provide for snow removal to ensure access during inclement weather and include a schedule for regular inspection and maintenance of each charging station and all ancillary equipment.

MAKING REPAIRS

Optimal maintenance notwithstanding, charging stations may occasionally malfunction. In such event, efforts to restore operation of the charger should be initiated within 24 hours following notice of a reported issue.

MODEL REPAIR PROVISION

For all public electric vehicle charging stations, the (grantee/recipient/contractor) shall initiate or cause a (sub-grantee/sub-recipient/subcontractor) to initiate the process for making any needed repairs within 24 hours following notice of a malfunction or other operational issue and shall complete repairs in accordance with the provisions of the approved operations and maintenance plan.

SMART PHONE APP OPERATIONAL STATUS INFORMATION

Providing motorists with information about the operational status of networked charging stations in real-time through a smart phone app will help drivers better plan for charging stops by steering them away from charging stations that are not working.

CHARGING STATION OPERATIONAL STATUS MODEL PROVISION

All networked public EV charging stations are required to display real-time operational status on a smartphone application, either through a network-specific application or a third-party aggregator.

PRICING TRANSPARENCY

Most drivers know how much it costs to fuel a car with gasoline, but the same is not always true when it comes to the cost of charging an EV. Pricing information is not always clearly disclosed at charging stations, and the price can vary from station to station, depending on factors such as the cost of electricity and whether the EV driver is a member of the charging network. In addition, the unit of sale may vary. For example, pricing may be based on the duration of the charging session, a flat fee, or on

membership in the charging network. Like drivers of gasoline cars, EV drivers are entitled to know, before they start a charging session, what the price of the charge is based on and how much it will cost. Requirements for transparent pricing will help to eliminate any confusion and enable informed consumer choice.

PRICING TRANSPARENCY MODEL LANGUAGE

For public electric vehicle charging stations that require payment, the (grantee/recipient/contractor) is responsible for making the following pricing information available to drivers in advance of each charging session either through a user interface that is legible both at night and in direct sunlight, or through another form of display on the charging station: the unit of sale (free, kWh, time, etc.), pricing per unit, any additional fees that may be assessed (e.g., fees associated with parking, dwell time surcharges, etc.); and, for DCFC stations only, the maximum power level of the station (when not sharing power) in kilowatts or equivalent units. A description of how the aforementioned requirements for pricing information will be met should be included with the application.

CONCLUSION

These model state EVSE grant and procurement contract provisions for public charging stations represent a consensus of a majority of the Steering Committee members. This effort is intended to foster a consistent and consumer-friendly EV charging experience throughout the Northeast Corridor. The model provisions were developed against the backdrop of today's market and should be revisited periodically as market penetration grows and conditions evolve over time. States are not bound by these model provisions and may make modifications to suit their individual needs and circumstances.

ACKNOWLEDGMENTS

This document was developed by the Northeast States for Coordinated Air Use Management (NESCAUM) on behalf of the Northeast Corridor Steering Committee and the Multi-State ZEV Task Force. Combined, these two groups are comprised of state agency representatives from the following jurisdictions: California, Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, and Virginia. While members of the Northeast Corridor Steering Committee and the Multi-State ZEV Task Force reviewed and provided feedback on the document, their review does not imply an endorsement and the Authors are responsible for any errors or omissions.