



December 14, 2018

Case No. 18-2660-IN

Ms. Judith C. Whitney, Clerk
Vermont Public Utility Commission
112 State Street
Montpellier, VT 05620-2701

RE: Greenlots' Model Language for Supporting Open Standards for EV Charging Hardware and Software Interoperability

Dear Ms. Whitney,

Greenlots submits the following model/draft language and potential regulatory text regarding hardware/software open standards and interoperability, in response to the Vermont Public Utility Commission's ("the Commission") direction following the November 16, 2018 Workshop.

Greenlots is a leading provider of electric vehicle (EV) charging software and services. The Greenlots network supports a significant percentage of the DC fast charging infrastructure in North America, and is increasingly supporting programs in the workplace, retail, and residential Level 2 space. Greenlots' smart charging solutions are built around an open standards-based focus on future-proofing while helping site hosts, utilities, and grid operators manage dynamic electric vehicle charging loads and respond to local and system conditions. Greenlots is a strong advocate for open standards, and is a founding member of the Open Charge Alliance.

Open Standards for Supporting EV Charging Hardware and Software Interoperability and Advanced EV Load Management

Open standards and hardware/software interoperability are critical aspects of responsible planning and deployment of infrastructure to support transportation electrification that leverages ratepayer or taxpayer investments in electric vehicle supply equipment (EVSE) going forward. At their core, open standards can facilitate a seamless driver experience, minimize infrastructure investment risks, and allow for the efficient integration of EVs into the electric grid. Utilizing them means that it is possible to connect an array of software, network, and utility IT systems with any charging station, regardless of the vendor via open and royalty-free protocols.

As more and more EVSE is deployed and EVs are added to the roadways, the implications of competing, proprietary standards and networks become increasingly serious. Especially given the challenging economics for charging networks and deployments, and the solvency issues that plagued the industry's pioneers, proprietary hardware that does not support software flexibility represent an unjustifiable increased risk that utilities, and ratepayers or taxpayers could be left with stranded assets or systems that do not meet evolving needs. Additionally, such networks limit innovation and competition in both the EVSE hardware and software space, as

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infrastructure owners are limited in their selection of hardware to suit their varying needs and operational parameters, and in their ability to easily switch software systems.

Open Charge Point Protocol, or OCPP, is the leading and freely available universal communication protocol that enables component vendors and network operators to mix and match interoperable charging station hardware and software. It was developed by the Open Charge Alliance in response to these challenges associated with proprietary networks and is the de facto network communications protocol throughout Europe, the de facto open standard in the U.S. and is used in over 75 countries worldwide. In the United States, Volkswagen, as part of its \$2 billion Electrify America investment, is requiring its network to be based on OCPP, and leading utilities are mandating it in their investments. Indeed, regulators are also increasingly supporting this communication protocol – even when not specifically naming it, including the Washington Utilities and Transportation Commission in its no action decision December 13, 2018 allowing the charging program of Puget Sound Energy take effect provided appropriate support for open standards and interoperability, including OCPP and Open Automated Demand Response (OpenADR).

OpenADR is a leading standard used to send demand response information and signals from utilities or other entities to distributed loads. It provides for a common language in the proliferation of smart grid infrastructure, and is the leading open standard use to facilitate smart or managed charging of EVs.

Together, OpenADR and OCPP provide for a complete, open communication pathway to facilitate smart charging and vehicle-grid integration between EVSE and upstream entities, in addition to handling billing, settlement, monitoring and other EVSE network needs. By embracing and utilizing these standards, significant complexity and risk is eliminated for utilities, site hosts, and ratepayers and taxpayers while encouraging competition in the EV charging products and services market.

In addition to these widely used methodologies for hardware-software and distribution system communications, there are also a number of methodologies for facilitating driver roaming and access to multiple networks, potentially with a single card or smart phone application. There are currently open communication protocols such as the Open Charge Point Interface (OCPI) to communicate between different charging networks. While there currently seems to be growing support for OCPI, this is an area that will continue to rely upon the commercial collaboration of network providers.

As such, we recommend that the Commission encourage the support of driver roaming and network and payment interoperability while not yet specifying the methodologies for accomplishing these goals.

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Draft Regulatory Text Pertaining to Open Standards and Interoperability

1. When utilizing ratepayer or taxpayer funding to deploy electric vehicle charging infrastructure, regulated entities shall deploy charging stations that support leading open protocols to ensure interoperability and future flexibility between charging station hardware and software management systems
2. When utilizing ratepayer or taxpayer funding to deploy electric vehicle charging infrastructure, regulated entities shall ensure that deployed infrastructure is capable of the communication of demand response and related information with utility systems via relevant leading open communication standards
3. When utilizing ratepayer or taxpayer funding to deploy electric vehicle charging infrastructure, regulated entities shall seek to maximize access to publicly available charging stations by minimizing barriers such as requiring membership or non-point of sale payment functionality
4. For 1 and 2 above, these standards may include OCPP and OpenADR.

Greenlots appreciates the opportunity to provide this language. We look forward to continued participation in this investigation and supporting transportation electrification and advanced mobility in Vermont.

Sincerely,

A handwritten signature in black ink, appearing to read 'Thomas Ashley', with a stylized initial 'T' and 'A'.

Thomas Ashley
VP, Policy