

**DOCKETED**

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*Comment Received From: Rajiv Shah/FreeWire Technologies*  
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**FreeWire Technologies Comments - CALeVIP Future Equipment Requirements**

*Additional submitted attachment is included below.*



December 13, 2019

California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814-5512

**Re: Docket No 17-EVI-01 – Future Equipment Requirements for CALeVIP**

FreeWire Technologies (FreeWire) is grateful for the opportunity to comment on the Future Equipment Requirements for the California Electric Vehicle Infrastructure Project (CALeVIP) proposed by the California Energy Commission at the workshop held on November 18, 2019. FreeWire also takes this opportunity to sincerely thank the CEC for continued leadership in advancing transportation electrification across California through a broad suite of programmatic and funding initiatives. In particular, we commend the Commission for supporting and recognizing the importance of innovation in the buildout of EV charging infrastructure throughout the state. Rather than simply reducing this to a sheer numbers game in terms of EVSE deployment, we appreciate the Commission's acknowledgement that the "near-term [infrastructure] gap might also be reduced by the introduction of new technologies that reduce the ratio of necessary charging connectors per PEV (such as mobile chargers or faster charging rates)."

As the leading manufacturer of battery integrated electric vehicle (EV) charging equipment and mobile zero emission alternatives to traditional fossil fuel generators, FreeWire provides infrastructure-light power solutions that deliver energy whenever and wherever it's needed for reliable electrification beyond the grid.

FreeWire currently manufactures the Mobi and the Boost Charger product lines. The Mobi integrates an 80 kWh lithium-ion battery system with a mobile drivetrain in either a dual-port level 2 "Mobi Electric Vehicle Charger" configuration or a "Mobi Gen" configuration, substituting various power outlets for J-1772 cables. The flexibility of the Mobi affords a variety of different applications, including EV "charging as a service" at corporate campuses, replacement of portable diesel generators to power food truck operations, and serving as a source of backup or emergency power for disaster relief. Our newest product, the Boost Charger, is an ultrafast 120 kW DCFC with a 160 kWh battery system, capable of delivering 120 kW to vehicles while only drawing 20 kW from the grid. The Boost Charger is ideal for providing public charging at grid-constrained locations where infrastructure (480V 3-phase electrical service) and operational costs (demand charges) for traditional fast charging would otherwise render DCFC projects uneconomic for site hosts.

With respect to the proposed future equipment requirements under CALeVIP, FreeWire provides the following comments:

**1. Energy Star**

While FreeWire is committed to ensuring energy efficiency in its product design, we urge CEC to provide an exception from the Energy Star certification requirement for DCFC systems with onboard energy storage that do not fall squarely within the draft specification until such time that Energy Star certification is feasible for such systems. In recent



discussions with FreeWire, EPA and ICF staff from the Energy Star program have indicated that battery-integrated DCFC systems like the Boost Charger would fall outside the scope of the draft test method and soon-to-be-published specification, effectively rendering Energy Star certification infeasible for such products. FreeWire will continue to engage Energy Star to confirm this interpretation, but EPA and ICF's initial assessment is that a workaround approach, wherein the battery components of the Boost Charger are excluded from the evaluation, would be impracticable. Thus, if CEC were to require Energy Star certification as a hard requirement for DCFC eligibility under the CALeVIP program without providing for path for an exception, then battery-integrated systems like the Boost Charger will be at a distinct competitive disadvantage in the market due to ineligibility for the rebates.

Such an outcome would actually run counter to the Commission's underlying objective of ensuring energy efficiency through this requirement. The Boost Charger's entire design is focused on reducing the energy burden on the grid (and ratepayers) as well as costs incurred by site hosts by alleviating the high energy demand of traditional fast charging – which provides a substantially higher energy benefit than ensuring the energy efficiency of the dispensers in standby mode. Additionally, FreeWire's Boost Charger is inherently more efficient (and cost-effective) than pairing a standalone conventional DCFC with a separate standalone energy storage system. Most pairings of standalone DCFC and energy storage systems involve at least three power conversions, which reduce energy efficiency – (1) AC-to-DC from the grid to the battery system; (2) DC-to-AC from the battery system to the EVSE; and (3) AC-to-DC from the EVSE to the vehicle. The Boost Charger avoids much of this energy loss because there is only one conversion (AC-to-DC) from the grid to the battery system, which in turn provides DC electricity directly to the vehicle.

Some manufacturers have suggested that the specification should be limited in its applicability to systems rated at 50 kW or less due to the relatively nascent and still evolving state of fast charging technology. This point is even more salient with respect to the Boost Charger, given the complexity of merging “nascent” fast charging technology with energy storage.

In short, we respectfully request the Commission provide an exception from the proposed Energy Star requirement for DCFC systems falling outside the scope of the new specification until such time that Energy Star certification is practicable. For FreeWire's purposes, this exception could be limited to battery-integrated DCFC systems. Failure to do so would have the perverse result of both hindering innovation and disfavoring the most energy efficient approach to providing fast charging alongside energy storage.

## 2. ISO 15118

FreeWire supports requiring ISO/IEC 15118 readiness as physical hardware requirement for communications, and recommends CEC defer requiring use case software implementation under 15118 until the market has better coalesced around a specific communication protocol. ISO/IEC 15118 is not a prerequisite to enabling smart charging through software, as there are several alternative protocols that appear viable. As such, we propose that the Commission remain agnostic for the time being in terms of compelling software



implementation of a specific communication protocol through this requirement, thereby maintaining alignment with the California's VGI Communication Protocol Working Group's recommendation against "mandating specific communication protocols at this time."<sup>1</sup>

By requiring hardware compatibility rather than software implementability, CEC can ensure deployed infrastructure has the desired communication capabilities, effectively future-proofing the assets, while avoiding sunk costs to manufacturers associated with developing software solutions around a protocol that may or may not become the industry standard and is currently in flux. For a startup such as FreeWire, the resources required for software development would be especially impactful.

In addition, it may be best to consider limiting this requirement to level 2 chargers, given that smart charging, vehicle-to-grid and other capabilities enabled by ISO/IEC 15118 are more relevant and hold more promise for level 2 charging over fast charging. We would also note that many of the challenges addressed by a communication protocol like ISO/IEC 15118 are actually better addressed by the Boost Charger's inclusion of onboard energy storage. Without any high level communication capabilities, the low 20 kW input for the Boost buffers the grid from spikes associated with fast charging, inherently reducing grid strain, peak power draw and associated demand charges.

As ISO/IEC 15118 is updated to include, amongst other things, vehicle-to-grid (V2G) capabilities, FreeWire is concerned that requiring strict adherence to the protocol eventually render battery-integrated charging infrastructure ineligible under CALeVIP. For a system like the Boost, "charger-to-grid" may be more appropriate functionality than V2G, with the obvious benefit of being able to supply energy from the charging asset independent of an EV driver's acquiescence.

### 3. OCPP

As a member of the Open Charge Alliance (OCA), FreeWire supports the inclusion of OCPP certification to the program eligibility requirements, but requests CEC change the compliance timeframe to require self-certification of OCPP in 2021 and third party certification in 2022. Unlike ISO/IEC 15118, the industry has largely coalesced around OCPP through a transparent, open and inclusive process. FreeWire also has no issue with the fact that OCPP has been developed by OCA and has not yet been adopted by a traditional standard development organization, given the general coalescence around the standard within the industry.

However, FreeWire is quite sensitive to the delays that may occur in obtaining third-party certification. Typically, larger and more established companies are able to get "first-in-line" in the certification process, which can provide competitive advantage. Unless the Commission has a high degree of confidence that testing backlogs will not occur, FreeWire recommends providing a longer lead-in for third party certification. Given that OCA has a

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<sup>1</sup> California Public Utilities Commission, Energy Division, *VGI Communication Protocol Working Group Energy Division Staff Report*, October 2018.



straightforward software conformance test tool for self-certification, OCPP integration can still be meaningfully required in the contemplated 2021 timeframe without potentially putting certain manufacturers at risk.

#### 4. Resources for Testing and Certification

FreeWire applauds the CEC's ongoing efforts to leverage the state's considerable funding resources and facilities to help accelerate the development of clean energy technologies through the new CalTestBed program. For a young, growing company like FreeWire that is commercializing a cutting edge technology, these resources may prove invaluable. As programmatic requirements are developed, we recommend ensuring that the size and financial resources of applicants are included in order to factor overall need in the selection process under the program.

Furthermore, in some instances no suitable CA-based facilities exist today for performing certain tests. In those cases, we ask CEC to consider making funding available (through CalTestBed or some other initiative) to support California manufacturers that have no alternative but to conduct such testing out of state. This out-of-state testing scenario presents a major challenge for testing/certification of a new product, given the high costs and logistical impediments.

#### Conclusion

While energy efficiency is a value shared by both CEC and FreeWire, we strongly recommend establishing a commonsense exception from Energy Star certification for, at the very least, DCFC with onboard energy storage that fall outside of the scope of the new test method until Energy Star establishes an approach making certification possible for such systems. With respect to ISO/IEC 15118, FreeWire supports requiring hardware readiness, but recommends CEC defer from requiring software implementation of a specific communication protocol at the current juncture. Lastly, FreeWire supports inclusion of OCPP certification, but requests allowance for self-certification in 2021 with third party certification required in a 2022 timeframe.

Thank you for your consideration of FreeWire's comments on the proposed future eligibility requirements under the CALeVIP program. Please feel free to contact me if you have any questions or require additional information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Rajiv Shah'.

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