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ABB E-mobility Comments on EV Charging Interoperability

Additional submitted attachment is included below.

December 22, 2023

California Energy Commission
Fuels & Transportation Division
715 P Street
Sacramento, CA 95814

Re: 22-EVI-06 EV Charging Interoperability

Dear California Energy Commission staff,

ABB E-mobility is pleased to provide the following submission to the California Energy Commission (CEC) in response to Docket No. 22-EVI-06 relating to CEC Statement on Charging Interoperability and the Staff Workshop on Charging Interoperability. ABB E-mobility shares the CEC's vision for improving the charging experience for drivers. An important keystone of achieving that is broad interoperability between vehicles and chargers across any charging network.

ABB E-mobility has been manufacturing EV chargers for the US market for over a decade and is the leading manufacturer of electric vehicle chargers globally, having sold more than 1 million electric vehicle chargers, including 50,000+ direct current fast chargers (DCFC). ABB E-mobility has been manufacturing EV chargers in the US since 2019 and beginning in early 2023, began expanded US manufacturing operations, in part, to meet Build America, Buy America Act requirements. ABB E-mobility can produce up to 10,000 chargers per year, ranging from 20kW to 600kW in power, meeting the needs of public charging, transit and school buses, medium- and heavy-duty vehicles, and fleets of all kinds.

As a long-time member of the e-mobility industry, ABB E-mobility is actively involved in developing not only charging technology, but also industry-wide standards for both hardware and software interoperability. ABB E-mobility serves on the Steering Committee for CharIN and actively participates in industry development of standards and conformance testing procedures with International Organization for Standards (ISO), International Electrotechnical Commission (IEC), Open Charge Alliance (OCA), SAE, American National Standards Institute (ANSI), and more.

Figure 1. ABB E-mobility Public Charging Reference

ISO 15118-2 Conformance

CharIN is developing a "CCS Extended" certification that verifies ISO 15118-2 conformance. CEC staff believes CharIN CCS Extended may be an appropriate future requirement for certain CEC projects. Are there other available ISO 15118 certifications or conformance procedures that would be more appropriate?

As background, CCTS Extended work at CharIN is a requirement gathering effort that pulls from both ISO and IEC standards to develop a uniform implementation that the members can agree on. The goal of the effort is to develop an implementation profile using requirements from existing standards to improve interoperability. The certification program will provide conformance to the CCTS Extended profile and its requirements once completed, going far beyond conformance to ISO 15118-2:

- **CCTS Basic**
  - DIN70121 + patches for interop
  - DIN70122 + patches for interop
  - IEC61851-23ED1+ patches in line with IEC61851-23ED2 (CCS1 + CCS2)
- **CCTS Extended**
  - CCTS Basic +
  - ISO15118-2 + Interop patches and IEC61851-23ED2 modifications
  - ISO15118-4 + modifications for interop
  - ISO15118-5 + modifications for interop
- **Both are demanding also:**
  - IEC61851-21-2 certification report
  - CE/UL certificates
  - and compliance to the connector standards

ABB E-mobility is actively participating and leading this ongoing work. Given the current status of ISO 15118-2 development, we think it is premature to require a certification at this time. The -2 standard is still not finalized and has several technical challenges. We expect a second edition of ISO 15118-2 will be released in the near future which aims to resolve some of these challenges. For example, the current version of -2 does not allow charging beyond 200kW[1].

After ISO 15118-2 is finalized, the process to set up a complete certification program can begin in earnest, and we expect that to take until at least 2026. There are several reasons why it takes many years to set up a certification program. First, the available testing laboratories are all very new to these standards. As such, they do not yet have a comprehensive understanding of the requirements and regulations needed to set up an accredited certification program. Second, the hardware portions of the standards, like electromagnetic compatibility (EMC) requirements, are not well developed and there are differences between the US and Europe. Third, technical personnel resources are extremely limited across the industry. For example, when the CharIN CCTS effort started approximately 5 years ago it involved weekly meetings of 30 technical experts. Today, due to competing

[1] ISO 15118-2:2014(E), Road vehicles — Vehicle-to-Grid Communication Interface —Part 2: Network and application protocol requirements, Table 68 — Value range and unit definition for message elements using PhysicalValueType, page 110.

demands (NACS/J3400 standardization, NEVI requirements, OCPP version requirements, etc.) only 5 people regularly attend the meetings.

Once the updated versions of the ISO 15118-2, -4 and -5 are adopted, and a certification program is established, ABB E-mobility is supportive of the CEC requiring CCS Extended for future projects and agrees that it will enable interoperability. However, we don't expect a complete certification program will be established until at least 2026.

ISO 15118-20 and OCPP Implementation & Certification Costs

CEC staff proposes potentially allowing ISO 15118-20 and OCPP implementation and certification costs as eligible costs in certain CEC projects. Would this be an effective use of public funds, or would funds be more effective elsewhere to support broad interoperability?

ABB E-mobility appreciates CEC's consideration of providing reimbursement for certification costs. However, a viable certification regime is still years away and ABB E-mobility recommends the CEC to wait until at least 2027 before requiring ISO 15118-20 certification.

ISO 15118-20 is still in the development process, and prior to widespread adoption, additional versions and amendments are needed to make -20 stable and interoperable. For example, some of the current requirements for -20 are in conflict with -2 and are not backward compatible. We expect these additional amendments to be made in the coming years. Requiring implementation before effective testing and finalization will result in the opposite outcome of the CEC's vision of interoperability, as the industry will rush to achieve "conformance," but then still have separate work arounds in deployment to achieve successful charge sessions.

As a reflection of industry readiness, at the most recent CharIN Testival held in Cleveland, OH from November 28-30, 2023, not a single auto OEM was willing to test ISO 15118-20. The only companies that are currently willing to do this testing with charging manufacturers are test equipment manufacturers. Robust interoperability testing and versioning must take place prior to any sort of certification requirement.

Once the ISO 15118-20 standard has been finalized, ABB E-mobility supports CEC allowing implementation costs as eligible costs in certain funding programs. However, we think such funding support should be issued as part of a separate program and not tied to a specific charging deployment project. As we've seen with other new EV and EVSE specific certification regimes, there is a steep learning curve and limited resources between standard bodies, testing labs, test tool developers, EVSE OEMs and EV OEMs. Funding to support this would be impactful.

With the rapid growth in this relatively new industry, there is a skilled and experienced resources gap, particularly for specialized work like standards development and implementation. As the regulatory requirements (ISO 15118, OCPP 2.0.1, NEVI, etc.) ratchet up, the demands on these resources are outpacing the ability to hire and train skilled workers. Funding will allow charging companies to increase the resources they can dedicate to achieve these objectives more quickly. Importantly though, not all of the specialized resources reside in California. As such, the CEC should consider funding standards and

interoperability testing and software development work that takes place outside of California.

"Failing" ISO 15118 Conformance to be Interoperable

As noted above the ISO suite of standards and conformance tests are not yet complete and therefore the CEC should be cautious about requiring them. As one example, some test cases in ISO 15118-4 and -5 are incomplete or broken and there are instances where following or passing the test case requires taking actions that leads to a failed charging session. Fortunately, these issues are being addressed in the next version of the standards, but it serves as a cautionary tale for requiring compliance and conformance to standards that are not yet complete or fully vetted.

While we appreciate and share the CEC's desire to standardize the industry and move toward a conformance and compliance regime, requiring conformance when the standards are not fully functional could have the opposite impact and actually hamper interoperability in current and future chargers.

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Thank you for the opportunity to provide comments on the CEC's Statement on Charging Interoperability. Our goal is that this is just the beginning of a broader conversation between CEC staff and ABB E-mobility's interoperability experts. ABB E-mobility shares the CEC's interoperability vision, and we are eager to participate in future conversations.

If you have any questions or want to discuss any of these topics further, please do not hesitate to reach out to Alex Ehrett, Public Policy & Market Development Manager, at alex.ehrett@us.abb.com.

Respectfully submitted,

Alex Ehrett

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ABB E-mobility