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comments to assembly bill 2061

see attachment

Additional submitted attachment is included below.

Assembly Bill 2061

Docket No. 22-EVI-04

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https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=22-EVI-04

Charger Network Failure

Failure Mode Effects and Analysis (FMEA) shall be created by the technical specialist for the individual technology: EVSP, EVSE, Vehicles and network controller. If not, then how will all the failure modes be identified: Root cause(s), Severity, Identify solution, or repair method for this failure mode.

- What error code(s) will be created for each failure mode?
- How will this failure code be communicated?
- Who will receive the failure codes?
- The agency that receives the failure code will take what kind of actions?

Clipper Creek product line offers an EVSE testing tool, Model CP-50, that will verify that a level 1 or level 2 EVSE is functioning correctly without the BEV. The test connector is compatible with the SAE J1772 connector. This type of device will need to troubleshoot and isolate the defective equipment in a charging system or public charging sites.

The failure of the communication systems, OCPP v1.6, will need to be ruled out as a possible cause. Having the communication systems validated by third-party like OCA will remove the probability that the software and messages have not been implemented correctly. The OCA validation and certification should be required for all EVSEs (Level 2 and DC Fast Chargers) as a means of increasing the overall system reliability.

BEV to EVSE communications, ISO 15118, should have the same level of validation as the OCPP communications. The ISO 15118 -4 and -5 should be required by all EVSP and automotive OEMs as part of an end-of-line manufacturing functional

testing. Dash 4 specifies conformance tests in the form of an Abstract Test Suite (ATS) for a System Under Test (SUT) implementing an EVCC or SECC according to ISO 15118-2. The dash 5 specifies conformance tests in the form of an Abstract Test Suite (ATS) for a System Under Test (SUT) implementing an Electric Vehicle or Supply Equipment Communication Controller (EVCC or SECC) with support for PLC-based High-Level Communication (HLC) and Basic Signaling according to ISO 15118-3.

What about the adoption of the new ISO 15118-20 protocol? When will the CEC require all EVSPs to switch over to this new protocol?

The cost of the network service and subscription fees may be beyond a level of burden that a small business can absorb. The CEC block grant programs should consider covering a multi-year warranty and maintenance cost as reimbursable expenses. By covering the subscription fees upfront as part of the block-grant, the site network data will always be captured.

Additionally, the CEC block grant terms and conditions need to be modified to ensure that the network service providers' data collection and data storage is the property of the state of CA for the full six-years post commissioning.

Key Performance Indicators and Standardized Metrics

Standardized performance metrics to achieve repeatable measurements of reliability is the first step to understanding the as-is state. A road map must be made by determining what these metrics are available from the EVSPs, how to capture the data and what type of statistical analysis should be used for reporting of that metric. A gap analysis can then define the shortcomings in the market. Currently, there are hints of both local bottlenecks and systematic failures across the EVSP and EVSE industries.

Metrics around reliability have been focused largely on a simple equation for uptime (Ex- how many chargers, how many available at any given time). Commentary provided within our quarterly EnegIIZE Technical Advisory Committee Meeting indicates that we are missing key pieces in our formula to equate uptime. Additional data around charge session data may provide a more robust, accurate depiction of uptime across both level 2 and DC fast chargers.

Our goal is to ensure that the metrics used to measure reliability include indicators that best model an equitable approach across all chargers in every region (DAC/LIC). Measurements of reliability need to be repeatable, scalable, and allow for benchmarked improvement. We request that more effort is spent on determining standardized key performance indicators that represent charge session data. (Reference: SB 170, Budget Act of 2021, section 40, (h) items 1 to 6)

Internal Payment System Failure

PCI stands for Payment Card Industry Data Security Standard. PCI DSS is called PCI for short or just the acronym PCI. What Does PCI Mean in Banking Compliance with payment industry regulations, called Payment Card Industry (PCI), is vital for verifying that credit card transactions are secure. Is PCI Compliance Required for Bank Accounts?

There are 12 standards created by the PCI DSS that cover both technical and operational system components:

- Maintain a firewall to protect cardholder data
- Use high-level security passwords instead of default system passwords
- Protect stored cardholder data through proper security protocols
- Encrypt the transmission of cardholder data
- Protect all systems against malware and regularly update anti-virus programs
- Develop and maintain secure systems and applications
- Restricting access to cardholder information
- Identify and authenticate access to all system components
- Restrict physical access to cardholder information
- Track and monitor all access to network and cardholder data
- Frequently test security systems and processes
- Maintain an information security policy for all personnel

This is not a complete list of all the PCI requirements, it is a means to establish that the payment system used on any EVSE is subject to significant regulatory compliance and continuous monitoring and software updates.

- What are the failure modes for a typical vending machine credit card reader?
- Is there an FMEA?
- What are the error codes?
- How will the DC Fast Charger system communicate with the credit card reader to obtain those fault codes?
- Is the third-party network service provider the recipient of the fault codes?
- What actions is the third-party network provider going to take based on those fault codes?

What about cash, the good old fashion dollar bill? To ensure equity across all incomes and locations what devices could be used for cash payments to enable an EV Charging System? Most of the public charging sites will NOT have an attendant for the purpose of accepting cash and authorizing the EV Charging process.

External Payment System Failure

The payment system includes the following hardware: The connection to the credit card reader, the 4G wireless modem, the external 4G antenna, the IP address for the system will need to register, wireless modem setup including a phone number and high data rate usage mobile telephone plan from a provider: AT&T, T-Mobil or similar.

Now that the EVSEs network setup is complete, verification of functionality is required. Can the EVSE credit card reader (PCI payment system), communicate with the third-party network service provider?

Remember, the cell phone tower and all the associated cabling could fail at any time and the site operator will not be able to determine this failure.

Failures for the system include modem loss of connection cell phone tower, credit card reader magnetic strip reader is dirty, credit card magnetic strip is not readable, PCI compliance and certificate are missing or not correct.

For the loss of connection to the cell phone tower, an external 3dB antenna may be required for the EVSE installation if the cell tower is within the operating range of the modem. If this doesn't work, a different wireless provider (switching from AT&T to T-Mobil) may be a better solution due to the location of the cell phone tower.

Dirty credit card readers are the typical failure mode after a rainstorm and/or windy conditions. There are cleaning cards commercially available from "amazon" called Ci Kyan Credit Card Reader Cleaner or POS Swipe Terminal Cleaning Cards. A package of 50 cleaning cards will cost approximately $20 from amazon. The EVSE credit card reader will remain inoperable until the magnetic device inside the credit card reader is cleaned. This process of cleaning the credit card reader is man-power intensive. Once the credit card reader has been cleaned, to clear the fault codes, it will require that the credit card reader be powered off for a period of at least six (6) minutes as the internal power supply has a 'keep-alive' circuit as part of the PCI compliance.

To shut down AC power input to the customer facing credit card system, it now requires a skilled and trained technician. This trained technician will need to have the keys to open the correct service doors and knowledge of which circuit breakers to turn off.

Let's now discuss the 4G wireless communications system and the opportunities for things to go wrong. There is going to be a monthly service fee for the EVSE cell phone service. If the corporate office fails to pay the cell phone invoice, the wireless communications will be turned off. How can this be avoided? Most EVSEs do have an optional ethernet connection for communication to the internet. During the site-design and construction, conduit with a CAT-6 cable will be required from the central building to the first EVSE. If the site has more than one EVSE, the contractor can provide additional conduit between each of the EVSEs to continue the daisy-chain of the CAT-6 cable.

Caution – Be sure to not exceed the maximum allowed length of CAT-6 cable. You might need an amplifier and DC power to boost the signal.

Another option is to use a high-power Wi-Fi system versus the 4G wireless modem. Again, be sure to evaluate the Wi-Fi signal strength (Rain, storms, Snow,

windy conditions, evening, and daytime) at the EVSE from the base modem at the central building.

Electronic payments using Apple Pay, PayPal, smart phone wallet and other similar methods. EVERYONE has a smart phone that can and should be considered as a payment option.

RFID Cards (Subscription required) will work when the payment system will not. The EVSE software will recognize and store the ID information for the RFID card holder. This will allow for the EVSE to energize and provide charging to the ZEV. Once the network communications are restored, the card holder information, date, time and total kWh will be transferred to the third-party network provider for processing and payment records.

RFID cards... Where and how to obtain them? Are they universally accepted on all EVSEs by all EVSPs? If not, then the CEC / PUC will need to establish rules and regulations for the creation, distribution and acceptance of these payment devices.

Finally, redundancy is vital to any critical process like communications. The communications design should have at least two of the methods discussed above as part of a comprehensive design.

Reporting and record keeping activities

Data is required from the sensors that will provide information on the status of the EVSE and functional outcomes, outputs, etc.

What data is desired? e.g., Voltage, Amperage, kWh, start and stop SOC of the BEV, time of day are just a few to discuss here.

For the data to have any true value, the sensors used need to be standardized. Range of the sensor input: minimum to maximum range, tolerance for the readings: numeric value +/- 2 % for example and sampling rate for each data type needs to be defined and consistent with all EVSEs.

For example: Once per second for voltage and amperage sampling rate. – Once these requirements are determined, the data storage method shall be determined to support the future statical analysis and other mathematical methods.

Reporting of the data, when and to whom and by what means? Encryption means should be considered as a priority to protect the data. How often are the data statistics provided to anyone who wants them? Is the raw data going to be available too?

A localized software application for smart phones to provide the status of the site EVSEs, functioning and availability, and energy prices depending on which type of EVSE is desired: 150-, 250- or 350-KW DC Fast Charging. The price will vary depending on the desired speed of the charging. Just like today's gasoline station with 87, 89 and 91 grade fueling choices.

NIST Handbook 44 and Handbook 130 requirements for signage, metrology devices and certification, placards and decals will also impact the data types and collection processes. Compliance with these requirements is mandatory. How will the site owner / operator meet these requirements. For example, the price signage at the ingress to the site and at the site must reflect the current prices to the customer including all taxes and fees. Most utilities are billing on a TOU (time of use rate plan). Will the site owner have a fixed price, regardless of the TOU rate OR will the price fluctuate just like a typical gasoline station?

Metrics should be designed to reflect the small, medium, and large size fleets as well as the type of EVSE used (Level 2 versus DCFC) and the speed at which the charger is providing power to the BEV (150KW, 250 KW or 350KW). Additionally, the vehicle miles traveled should be collected as a point of reference for the metrics.

Programmatically, it is vital to record keeping process that the communication protocols transfer the data collection processes, automatically. A fault tolerant system design shall be required (redundancy). Record keeping is important for data collection to determine the causes of other trending issues globally. With this requirement, one can use the data to develop standardized best practices processes.

In an example of a charger connector being damaged by a user and the site host cannot get the unit back up and running for full charging sessions until their connector is delivered by the supplier, but the connector is delayed due to supply and demand issues, then we would want to consider this situation as ab exception and exclude it from the calculation of 97% uptime. This is not to say that it is not

important to include, because it is, but at this time it is important to record keep these instances for improvement and considering the situations that just cannot be overlooked. Developing a list of situations that are considered exceptions to exclude from 97% uptime should be important to consider as a rubric in relation to reliability and uptime.

Unmonitored Charging Failures

with unmonitored EVSEs, there are no communications methods to determine the status of the device. It is important to stress to EVSPs, EVSPs to clients, and vendors in general in the EV Industry, that monitoring the EVSE is a key component to reliability. As Alex at ABB said in a recent Reliability webinar, it's not an equipment that is made to set it and forget it, it is a high-powered unit that needs to be monitored for safety and reliability reasons.

A decal or similar type of visual communications may be used to provide the public with toll free phone number to report the condition of the EVSE. The decal, banner or sign shall have large font, bold black and be visible (readable) in both night and daytime.

The Identifier or site location number on the decal will be required. Who determines this numeric identifier and keeps the records for this identifier? This decal will need to be weather resistant, UV resistant, and have a QR Code for the website and/or phone number for reporting of the site conditions.

Preventative Maintenance

Every UL listed EVSE manufactured by a EVSP must provide an operational manual, installation manual and service manual to the NRTL at time of the application for testing and compliance to the appropriate standards.

CALSTART would like to recommend that the CEC / CPUC consider a uniform procedure for preventative maintenance of the EVSEs. A task force or committee to work with the EVSPs on what is required for preventative maintenance for a level 2 and a DC Fast Charger. This new universal procedure shall be used for all maintenance and to establish the skills, training and educational requirements for "work force development".

This new uniform method of preventative maintenance document would then be for all charging sites. The CEC block grant programs would be the means to roll-out this preventative maintenance document.

The outcome from this committee should be used to establish required skills and training to address the work force development issues. It is a technical trade school, the appropriate institution for training and education. Is a community college program a better solution?

Development of the curriculum, textbooks (if they exist), teaching staff and accreditation of the program through the appropriate state agencies.

With respect to investing dollars where they are needed, we need to consider how and who is going to maintain and operate the EVSEs. Setting up the site hosts for success (experienced or not) is important to help them feel well equipped by these well invested Reliable and Trained set of EVSE technicians. In many cases there seems to be more attention and priority towards the beginning and middle of the project cycle up to commissioning, but the project is not done there.

Workforce Development and Skilled Labor

We need to educate and point out how important Maintenance and Operation is and how vital it is in order to obtain high reliability uptime as well as the length in lifetime of this equipment. If we get thousands of chargers installed but in a few years from now the equipment fails or is not operating due to negligence of maintenance, then what is the point of investing these dollars now if we are not checking for the operational status at a regular rate. The installation, the operation, and maintenance should all be housed in the same priority bucket to meet these reliability goals through 2035.

Training centers for skilled laborers Where are the skilled labors going to come from? The existing “minute lube shops” and “tune up shop” are all going to be out of business soon. Have you given any thought to retraining the displaced workers from the automotive industries?

What about community colleges' training and teaching programs? Development of the curriculum for the classroom, books and teachers. The typical high school,

are they teaching awareness of STEM so that the students believe there is a future in this new technology?

One example is the EVITP program, it is the most comprehensive training for the *installation* of EVSE equipment in North America today. More than a technical installation course, EVITP offers a full overview of *the Electric Vehicles industry*, including an extensive section on Customer Relations & Customer Satisfaction.[1] A decision made by the PUC, the Energy Commission, and the state board, to require all electric vehicle charging infrastructure and equipment to be installed by a contractor with the appropriate license classification, as determined by the Contractors State License Board, and at least *one electrician on each crew, at any given time, who holds an Electric Vehicle Infrastructure Training Program certification*. The bill requires the Electric Vehicle Infrastructure Training Program to offer Electric Vehicle Infrastructure Training Program *courses* in an online format that would remain available through December 2024.[2]

- This decision was a correct move to ensure the feasibility of the equipment being installed by a certified and trained electrician. As high-level and informative as this training program is, the cost is below $300 to certify, and is setting up the State Goals for success.
- When hiring a trained and certified technician for the job, this project is more likely going to stand longer than a technician unfamiliar with the product trying it for the first time (trial in error). With an industry with ambitious goals to rapidly deploy millions of chargers, trial in error will not be the way to go.
- The same goes for Preventative Maintenance – It would be an ideal move to ensure that this properly installed product is also properly maintained by a trained, and experienced preventative maintenance technician. As it is important to install and maintain an EVSE, it is also as important to operate and maintain it with care and good knowledge of the EVSE. Because there are so many units and they may possibly be troubleshot differently, it is a logical idea to train

[1] Training | EVITP

[2] Bill Text - AB-841 Energy: transportation electrification: energy efficiency programs: School Energy Efficiency Stimulus Program.

and certify maintenance and preventative maintenance technicians uniformly on the process of maintenance and upkeep for each EVSE. This will equally help us meet our state goals and help maintain its success.

Customer Experience

The site should have high-power lights for night operations, the lights should be downward facing to prevent night skylight contamination. Motion detectors to control the light intensity.

Site remediation is the responsibility of the owner / operator which also includes not just the trash but vandalism, graphic artist, wear, and tear of the parking areas payment markings for ADA, markings for ingress and egress as well as path of travel. These seem like minor requirements; however, if the customer doesn't feel safe ... the blog comments will reflect this.

Fire alarm pull box or other similar public safety call box should be considered for public sites and public safety.

Ultimately, the customer experience will determine the reliability of the EV charging system. We have discussed many different items throughout this document, if the customer isn't able to charge their vehicle in a manner that is to their satisfaction, the (reliability) experience will be negatively impacted and the vehicle owner will blog their individual experiences. What is the CEC and CPUC plans to recover from this type of bad press in social media outlets?

While EVs and EV charging equipment were generally found to be reliable, participants experienced some operational challenges.

In SCE's CRT, the six fleet manager survey respondents found the charging equipment reliable, while four of six found the EVs to be reliable. Respondents also mentioned vehicle reliability and range as key limitations of EVs when discussing EV options in their sector. Additionally, of the 15 sites visited, five fleet operators discussed co-costs associated with their fleet electrification. These five operators noted that they experienced vehicle recalls or reliability issues that often required repairs to be conducted by the vehicle manufacturer or dealer during the initial warranty period. Four of these operators said they experienced reduced flexibility with EVs compared to conventional vehicles, specifically for school buses. Two of these operators had to adjust their routes to accommodate the new buses or had to keep more conventional buses than they would have liked. Two operators reported increased maintenance costs.

Survey respondents in PG&E's EV Fleet program found that, overall, both EVs and EV charging equipment were reliable (11 of 13 respondents rated the EVs as reliable, while 10 of 13 respondents rated EV charging equipment as reliable). However, two respondents rated the charging equipment as *not at all reliable*, while two others rated it as *very reliable*, which indicates inconsistent experiences with the equipment. Three respondents reported some challenges with EV charging equipment due to regular failures, and one of these participants believed their chargers were not sized properly for school buses and that the failures were due to the limited amps provided. When asked about what they would have done differently if they were to go through fleet electrification again, four respondents noted issues with charging, saying they would have found a better charging solution, made sure the power source and chargers were more powerful than what was required, had a larger power supply brought in, and considered solar panels with storage batteries to supplement high demand during peak times to reduce costs and grid impacts.

The intent of uptime and reliability is the longevity of the equipment being deployed and used to meet our 2035 goals, but it also impacts customer experience satisfaction, will the consumers be on the same page? If the units and equipment are not reliable the user will not be happy and therefore the applicant who invested in this project will not be thrilled either. It is important to consider that we prioritize our efforts in reliability to make the customers happy and overall make this effort work out for all those who will be transitioning today, and tomorrow. This also shall reflect payment system experience easy, accessible, customer service and reliability.

97% Uptime

Is the uptime based upon a single EVSE on the site or is the summation of all EVSEs on the site: Is it a day-to-day value, Weekly value, Monthly value, Quarterly, or all the above? BEV usage of the EV infrastructure as a function of a total day's operations and vehicle miles traveled. Drayage vehicles, School bus, Transit bus, MD/HD trucks. How do charging as a service metrics differ from all the other models?

97% uptime should be considered a goal not an enforcement – Yet. EVSPs are growing as quickly as possible, considering being under pressure due to supply chain issues. There are hundreds and thousands of EVSPs in the market that are developing technology and working toward making their technology reliable and efficient with or without a requirement. The industry is fragmented with many players and different business models – and no clear line of responsibility for maintenance and upkeep.[3] To meet this advantageous goal (Uptime and Reliability), there are several steps to consider, which include other regulations that trickle up to this requirement and investments to consider that will impact this effort.

Regulations could further be determined through collecting data and analyzing that data to find common issues across the industry and as a result understand, execute, and resolve those issues first. Putting our time and effort towards resolving this issue rather than bottleneck EVSPs from focusing on meeting this goal at a decent pace with their true potential, is important to understand and consider. We need to support these EVSPs and standardize processes where they are needed, globally, and uniformly.

A proposal to consider in the future would be to gain attention towards reliability at *public stations first only*. Public stations would be beneficial first because the EVSEs would be heavily used by multiple daily drivers, therefore any common issues would quickly show and help us determine those trends with this crowd, the public station site users – This would be an excellent customer service

[3] Hot job of the future: Fixing electric car chargers (axios.com)

approach by prioritizing this uptime effort with the public crowd. For those applicants that opted for private infrastructure, we would still collect data but not press on this heavy 97% uptime requirement yet. Private charging should be owned and operated by the private organization and be accountable for keeping up with their equipment to supply to their employees, or applicable private drivers. Once we have found better solutions then we can focus on the general private and public infrastructures.

According to UC Berkeley study, three of nine EVSPs tested were able to account for meeting 97% uptime. UC Berkeley also referenced a study of EV drivers in California reporting mixed experience with existing EV chargers. They reported broken plugs (9%), unexpected shut off during charging (6%), charging and not functioning (22%), payment problems (18%), and the need to contact customer service via cell phone (53%). UC Berkeley study further states “The use of uptime as the reliability metric is controversial since there is no standard definition nor is there a standard calculation methodology. "Given the complexity of the EVSE ecosystem and technology stack, from hardware to software, ensuring a high uptime and assigning “uptime ownership” of each EVSE may be difficult and may require standardization across different jurisdictions.”