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Post-Workshop Comments of Shell Recharge Solutions on Electric Vehicle Charging Reliability

Additional submitted attachment is included below.

April 1, 2022

Docket No. 21-TRAN-03
-Via e-file-

California Energy Commission
Docket Unit, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

RE: Post-Workshop Comments of Shell Recharge Solutions on Electric Vehicle Charging Reliability

Dear Commissioners and Staff,

Shell Recharge Solutions (formerly Greenlots) submits these comments following the California Energy Commission's ("CEC" or "the Commission") March 11, 2022 workshop on Electric Vehicle Charging Infrastructure Reliability in response to the Commission's questions and stakeholder presentations.

Shell Recharge Solutions, a member of the Shell Group is a leading provider of electric vehicle ("EV") charging software and services committed to growing the market for transportation electrification in California. The Shell Recharge Solutions network supports a significant percentage of the DC fast charging infrastructure in North America, and an increasing amount of Level 2 infrastructure. Shell Recharge Solutions' smart charging solutions are built around an open standards-based focus on future-proofing while helping site hosts, utilities, and grid operators manage dynamic EV charging loads and respond to local and system conditions.

The Shell Recharge Solutions network is also supporting the deployment of Shell Recharge, which in the U.S. is beginning to be deployed to provide Shell's retail customers – including convenience stores, service stations, and drivers – on the go charging.

The state of reliability in the EV charging ecosystem

Shell Recharge Solutions appreciates the Commission's attention to these critical topics around EV charging reliability and methods to measure and assure an adequate level of uptime for EV drivers. We also appreciate the opportunity to offer these comments on the topics that were identified and discussed. As the EV charging market matures, and stakeholders look forward to a growing level of public and private investment and a significant increase in EV charging build out, it is timely for CEC to focusing on this topic.

The effectiveness of governments and industry in addressing charging infrastructure reliability and the driver charging experience will play an important role in the timeline in which the market can move past the early adopter phase. The tolerance of early adopters is not a good bellwether of what the mass market will tolerate. Indeed, we've already seen studies linking poor charging experiences with disturbing levels of EV discontinuance.[1] These impacts also exacerbate inequities, disproportionately affecting geographies and populations already underserved or otherwise disadvantaged when it comes to electric vehicle adoption and access to clean transportation. There is growing recognition that the driver experience will be a key factor in meeting the state's climate and clean transportation goals.

Concerningly, there currently are no standard definitions or meaningful data on the reliability of charging infrastructure, in California or elsewhere. Drivers are often left to rely on crowdsourced information on popular apps. Indeed, the Air Resources Board found in its February 2022 "Electric Vehicle Supply Equipment Standards Technology Review" that "[t]he lack of readily available information for the public on station uptime or downtime is particularly concerning," adding that "[t]o address that issue, staff recommends working with other State agencies to explore the development of metrics to measure and report station reliability."[2] The board further noted a significant gap between the high-level uptime figures electric vehicle service providers ("EVSPs") reported and what drivers experienced as noted in their surveys, stating that "[t]he data from the two surveys suggest there may be a disconnect between what drivers are experiencing and what the EVSPs are reporting, and more work is needed to understand this issue."[3] As these conclusions illustrate, critical work needs to be done expeditiously, representing a significant opportunity for California to once again lead in advancing clean transportation.

It is important to note that there are industry actors leaning in and taking concerted steps to address these challenges. For example, Shell Recharge Solutions offers SKY Care, a leading comprehensive warranty and maintenance program. While most charging stations come with a manufacturer's warranty and the ability to extend that warranty, those warranties may not cover all field service costs, such as required travel costs for the technician or preventative maintenance for the charging stations. They also may not include service level agreements and response times adequate to address issues when they arise at the urgency of driver or site host expectation. SKY Care offers a comprehensive, end-to-end maintenance service package to ensure charging station issues that arise are addressed quickly and seamlessly, and maintain a high level of uptime, with upper-tier offerings committing to at least 98% uptime.

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[1] See: https://ncst.ucdavis.edu/project/discontinuance-among-californias-electric-vehicle-buyers-why-are-some-consumers-abandoning

[2] See: https://ww2.arb.ca.gov/sites/default/files/2022-02/EVSE%20Standards%20Technology%20Review%204Feb22.pdf at p. 4.

[3] I.d. at p. 11.

These services, and those that other companies are beginning to offer, provide customers and the driving public assurance that charging stations will remain reliable, and that any issues that arise will be addressed quickly. They do, however, come with a real financial cost, and many charging station owners lack the budget pathway or otherwise choose not to make this investment. Unfortunately, reliability issues are likely to persist until the state requires the purchase of add-on service packages for already installed infrastructure, requires service packages in order to access future public funds, or the economics for deploying and operating charging infrastructure significantly change – such that not maintaining a very high level of reliability naturally results in an effective economic incentive to increase revenues by maximizing uptime. The former options would likely act as a forcing function that would lead all potential developers and site hosts to more sustainably strategize and budget for the upkeep of EV charging assets beyond their initial purchase point. Shell Recharge Solutions encourages the State and the Commission to seriously consider instituting such requirements – while being eyes wide open about the implication that fewer stations will likely be deployed per dollar of investment with the need to invest in reliability.

Data reporting versus reliability standards

While Shell Recharge Solutions encourages the Commission to explore reliability and uptime data reporting requirements, in particular for entities receiving public funds, we also encourage exploring the institution of reliability standards in parallel rather than waiting for a data reporting program and mechanism to be established, and then for results to come in from that data collection. Although a parallel pathway could create risk and a level of uncertainty for market participants, given the nature of the challenge and the associated implications of urgency, a parallel pathway can provide its own certainty and critically, progress can be made in increasing driver confidence.

To preview or illustrate the results that likely will come from an earnest data collection and reporting effort by the Commission, this is what we project will be seen for chargers on our network: chargers owned by customers who purchased a SKY Care package will have high levels of reliability and uptime reported for their chargers, in line with the committed minimum levels and service level agreements associated with the package they purchased, up to 99% uptime at the charger level. In contrast: chargers owned by customers who did not purchase these offerings and instead relied exclusively or primarily on hardware manufacture warranty service, or otherwise handled these considerations themselves, will show a notably lower level of uptime when measured with the same metrics. Indeed, these latter figures objectively could be seen as poor in certain deployment scenarios. Shell Recharge Solutions and other market participants also have clients who purchase software and network services only and procure or contract separately for equipment and/or maintenance – limiting the ability and responsibility of EVSPs/network providers to remedy charger level issues. Again, here, the expectation should be that some chargers will experience unsatisfactory levels of uptime when there may be no contracted accountability for ensuring otherwise or there are inadequately linked or interoperable processes and communications. As mentioned earlier, for these reasons and others, Shell Recharge Solutions encourages the state and

the Commission to seriously consider instituting requirements, at least when public funding is involved, to require contracting for a committed or guaranteed level of reliability and uptime.

Shell Recharge Solutions strongly urges that any reporting requirement, whether it be to inform decision making, or to monitor compliance with required/contracted reliability standards, conform with these high-level principles:

- Reported data should be transparent, granular, and specific. Reporting should be on the underlying disaggregated device-level data, rather than on aggregated device or site data. This is needed to understand the difference between reported uptime figures and what drivers actually are experiencing.

- Reported data, at a minimum, should be for chargers that are publicly available as defined by the Air Resources Board EVSE standards.[4] The Commission should also consider this for multi-unit dwelling and workplace charging, regardless of whether it is specifically implicated by the CARB definition. The Commission should consider leveraging its Title 20 authority to require this reporting.

- Reported data should be at the charging device level, reflecting actuals without exclusions. All exclusion time should be categorized and explained in reported data, e.g. grid power was lost. This is important, as whether an entity is "on the hook" or liable for any downtime is a separate consideration from whether a driver may be impacted.

- Reported data should differentiate chargers/clients that have purchased specific O&M solutions to realize a certain level of reliability and uptime. This should be clearly identifiable from those who have not, who instead rely exclusively on manufacturer warrantees, who may handle repairs and maintenance themselves, or who have other arrangements. The SLAs and committed minimum uptime levels for any specific O&M package should be clearly reported alongside the performance reporting.

- Publicly reported data should be aggregated and anonymized by CEC using the reported granular data, and not be rolled up or aggregated by the EVSP itself. Publicly reported data should be EVSP/developer agnostic, but clearly separate and group the reported reliability or uptime of chargers with O&M packages with uptime commitments from those without.

- For those who cannot adequately report data, CEC should work with those EVSPs and potentially limit their access and their clients' access to public funds until reporting deficiencies are remedied.

[4] See: https://ww2.arb.ca.gov/sites/default/files/2020-06/evse_fro_ac.pdf at p. A-2.

Proposed Uptime Calculation Formula and Definitions

As discussed, precision and consistency across vendors is critical to reliably collect meaningful data accurately on uptime. Shell Recharge Solutions proposes uptime be calculated as follows. Five charger statuses relevant for an uptime calculation:

Available – charger is ready for a new session to begin
Busy – charger is plugged into an EV with an active or inactive session
Faulted – error is detected by the EVSE and reported to the network
Unknown – network did not receive the expected pings and categorized the station as unknown
Offline – charger was turned off remotely or locally and returned a status of "unavailable"

These statuses are calculated as follows:

$$\text{Available \%} = \frac{\sum_{\text{For each port}} [\text{Duration of port in Available status (in minutes)}]}{\left\{\begin{array}{l}\text{If Commissioned date of the charger is earlier or equal to start date, then (End Date/Time - Start Date/Time) in minutes} \\ \text{If Commissioned date of the charger is between start date and end date, then (End Date/Time - Installed Date/Time) in minutes} \\ \text{If Commissioned date of the charger is after end date, then the charger should not be included in the uptime table}\end{array}\right\} \times \text{Number of Ports in the Charger}}$$

$$\text{Busy \%} = \frac{\sum_{\text{For each port}} [\text{Duration of port in Busy status (in minutes)}]}{\left\{\begin{array}{l}\text{If Commissioned date of the charger is earlier or equal to start date, then (End Date/Time - Start Date/Time) in minutes} \\ \text{If Commissioned date of the charger is between start date and end date, then (End Date/Time - Installed Date/Time) in minutes} \\ \text{If Commissioned date of the charger is after end date, then the charger should not be included in the uptime table}\end{array}\right\} \times \text{Number of Ports in the Charger}}$$

$$\text{Faulted \%} = \frac{\sum_{\text{For each port}} [\text{Duration of port in Faulted status (in minutes)}]}{\left\{\begin{array}{l}\text{If Commissioned date of the charger is earlier or equal to start date, then (End Date/Time - Start Date/Time) in minutes} \\ \text{If Commissioned date of the charger is between start date and end date, then (End Date/Time - Installed Date/Time) in minutes} \\ \text{If Commissioned date of the charger is after end date, then the charger should not be included in the uptime table}\end{array}\right\} \times \text{Number of Ports in the Charger}}$$

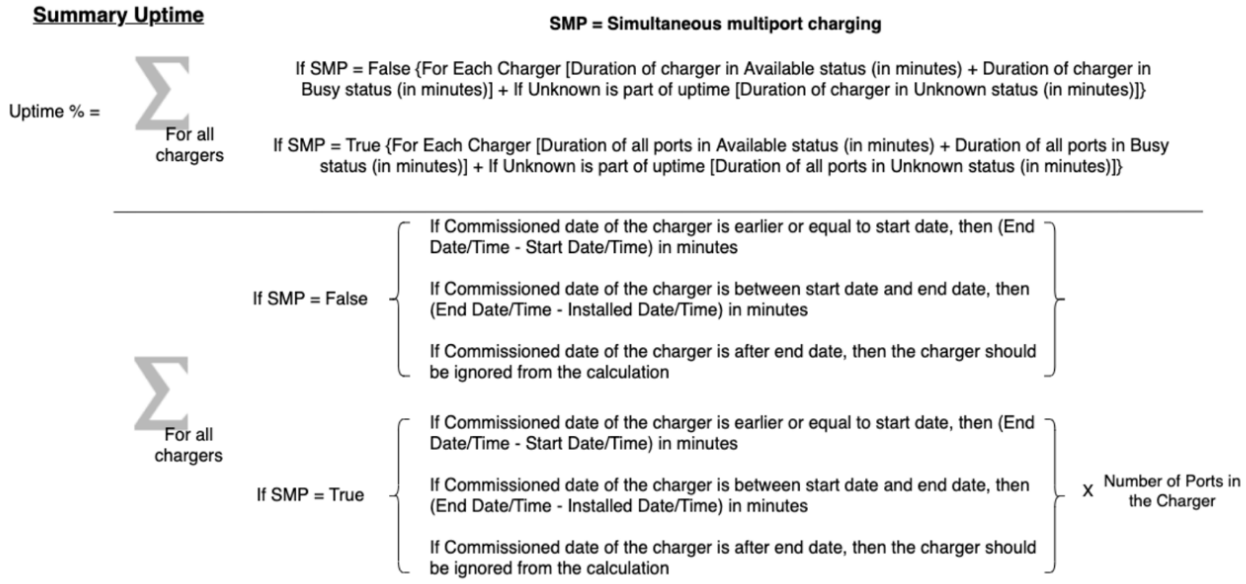
$$\text{Offline \%} = \frac{\sum_{\text{For each port}} [\text{Duration of port in Offline status (in minutes)}]}{\left\{\begin{array}{l}\text{If Commissioned date of the charger is earlier or equal to start date, then (End Date/Time - Start Date/Time) in minutes} \\ \text{If Commissioned date of the charger is between start date and end date, then (End Date/Time - Installed Date/Time) in minutes} \\ \text{If Commissioned date of the charger is after end date, then the charger should not be included in the uptime table}\end{array}\right\} \times \text{Number of Ports in the Charger}}$$

$$\text{Unknown \%} = \frac{\sum_{\text{For each port}} [\text{Duration of port in Unknown status (in minutes)}]}{\left\{\begin{array}{l}\text{If Commissioned date of the charger is earlier or equal to start date, then (End Date/Time - Start Date/Time) in minutes} \\ \text{If Commissioned date of the charger is between start date and end date, then (End Date/Time - Installed Date/Time) in minutes} \\ \text{If Commissioned date of the charger is after end date, then the charger should not be included in the uptime table}\end{array}\right\} \times \text{Number of Ports in the Charger}}$$

When measuring uptime performance, statuses should be aggregated into two categories: "Uptime" and "Downtime." "Uptime" is the combined time spent in "Available" or "Busy." "Downtime" is the combined time spent in "Faulted," "Unknown," or "Offline."

Uptime should then be measured at the port level with the condition that each port included is capable of simultaneous charging. Simultaneous charging is prevalent in Level 2 chargers with multiple ports that can be used at the same time but controlled by a single charger. This condition excludes DCFCs that typically have two port standards, CCS & CHAdeMO, but only can have one port used at a time.

Uptime should then be calculated as follows:



Achieving driver-focused uptime performance and enforcement options

Shell Recharge Solutions believes that the state and the Commission should focus on ensuring that public, MUD and workplace chargers supported with public funds are developed with the conditions that will realize a specific level of uptime and reliability, rather than focusing on trying to establish an incentive or grant claw back function, or only focusing on reporting. This is not to say that CEC should not also be monitoring data and compliance, and considering enforcement actions on developers or EVSPs stating a certain level of reliability that they do not meet. But when a certain level of uptime performance is contracted and paid for, there are also contractual recourses for underperformance, rather than just having to lean on uncertain mechanisms for attempting to claw back grant or incentive funds, which likely would compound the funding conditions that may well be the source of the underperformance in the first place. Indeed, many of the challenges with the driver experience can be tracked back to improperly funded charger deployments.

Ensuring that there are the underlying conditions that will realize a specific level of uptime and reliability means requiring the purchase of an O&M package that can commit to the level of reliability CEC wishes to enforce to, and having that level of reliability be contractually committed in order to access public funds. This will ensure that reliability issues that both primarily require site host support and those that require network operator support are addressed through contractual arrangements between the different parties, including measures to minimize exclusions/exclusion time.

Shell Recharge Solutions proposes the following foundational committed uptime levels and service level agreements:

- *Contractually committed uptime of 98%, calculated annually*
- *24 hours response time for DCFC and 1 business day for Level 2*
- *Spare parts strategy with small parts available on site in 1-3 business days, and in 3-5 business days for parts over 50lbs*

The Commission may wish to consider lower requirements for large deployments of chargers at a single location, but we encourage careful analysis before developing differentiated requirements.

Funding and assuring reliability and uptime

As noted earlier, many of the challenges with the driver experience can be tracked back to improperly funded charger deployments that may not have included adequate or realistic budgeting or consideration of what happens after commissioning. Therefore, Shell Recharge Solutions emphasizes that requirements to achieve the critical policy goal of more reliable chargers cannot be an unfunded mandate, otherwise there will be more chargers deployed that do not meet basic driver expectations or program requirements, or fewer chargers deployed by fewer entities at a level necessary to achieve state clean transportation goals and objectives.

State funding programs therefore should incentivize these operating costs minimally at the same level as capital costs, and possibly at *a higher level*. We encourage the minimum of a 5 year O&M package purchase in order to access public funds. Buying, installing and incentivizing chargers, without concern for or a plan for what comes next, should not be an activity that public dollars continue to support.

Make no mistake – appropriate uptime requirements will drive up infrastructure development and deployment costs. It will also likely narrow the pool of technology and service providers that EVSPs, developers, and grant/funding applicants feel comfortable working with in order to deliver a specified level of reliability. But these all appear to be necessary consequences to address the issue and deliver the expectations drivers and stakeholders reasonably have, especially the broader

market yet to get into an electric vehicle. Overall, while potentially painful on some levels, we see this as a necessary step to mature the industry.

Addressing insufficient reliability of already-installed chargers

While addressing the reliability of chargers yet to be deployed is an important first step, equally important is doing the same for chargers already in the ground, and those installed between now and whenever new programs and policies are developed to address this reliability and uptime challenge.

Therefore, Shell Recharge Solutions strongly urges the Commission to develop an incentive program for the purchase of maintenance/O&M packages that contractually commit a set minimum threshold of reliability and uptime. This program should require the same foundational committed uptime levels and service level agreements as proposed above, and again focus on public, MUD and workplace charging.

Importantly, this incentive program could be leveraged by site hosts/developers nearing the sunset of their originally contracted O&M package or their hardware manufacturer warranty. This is often a critical juncture where significant reliability challenges can be introduced as those packages or services are not renewed or extended. Indeed, the older a charger is, the more critical this becomes, and addressing this only in a go-forward manner will not meaningfully address the challenges and conditions that drivers currently face or will be likely to face over the next few years.

Such a program would also support the development of the support and services industry that is critical in ensuring and providing for reliable charging. It would also likely support innovation and competition with these services, encouraging the development of new products and services to deliver on reliability standards while also driving down their cost over time.

Conclusion

Shell Recharge Solutions appreciates the Commission's effort to lean in to better understand, analyze and address the conditions that result in poor EV charging station reliability and uptime, and the related effect on the EV driver experience, and the achievement of state clean transportation goals. We encourage analysis and action to occur swiftly and in parallel, and for this critical consideration to be incorporated into CEC grant or incentive programming moving forward. Shell Recharge Solutions stands at the ready to support the Commission's information gathering and decision making, and we appreciate the Commission's consideration of these comments.

Sincerely,

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