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Greenlots Post-Workshop Comments on VGI Integration and Charging Infrastructure Funding

Additional submitted attachment is included below.



July 17, 2020

Docket No. 20-IEPR-02
-Via e-file-

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

RE: Greenlots Post Workshop Comments on VGI Integration and Charging Infrastructure Funding

Dear Commissioner Monahan,

Greenlots appreciates the opportunity to have participated in the workshops regarding Vehicle-Grid Integration (VGI) and charging infrastructure funding, held June 22 and 24 as part of the California Energy Commission's (CEC or the Commission) 2020 update to its Integrated Energy Policy Report (IEPR). These workshops, held jointly with the California Public Utilities Commission (CPUC) and benefiting also from the participation of CPUC Commissioner Rechtschaffen, provided an important opportunity for stakeholders to discuss the current state of electric vehicle (EV) charging infrastructure deployment and VGI. Below Greenlots provides post-workshop comments on these important topics, as solicited at the workshop and in the Commission's June 12 workshop notice.

Greenlots is a leading provider of electric vehicle ("EV") charging software and services committed to accelerating transportation electrification across California, and a wholly-owned subsidiary of Shell New Energies. The Greenlots network supports a significant percentage of the DC fast charging infrastructure in North America, and a growing amount of Level 2 charging infrastructure. 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.

California has set pivotal goals for reducing emissions with 50% renewable energy generation and deploying at least five million zero-emission vehicles (ZEVs) by 2030, as well as deploying 250,000 charging stations, including 10,000 Direct Current (DC) fast charging stations by 2025. Additionally, local and regional targets, such as the City and County of Los Angeles' goal of having 25% of its total light duty vehicle fleet be zero emission by 2025, have further reinforced the state's commitments. Bold action at the regulatory level, including with CARB's Advanced Clean Cars, and more recently, Advanced Clean Trucks rules have complemented this goal setting, providing certainty to the industry and marketplace surrounding forward ZEV availability. While much more needs to be done, Greenlots applauds the state's and CEC's leadership in making progress and developing programs aimed at achieving these and related goals, and looks forward to continued development and execution of further goals.

Enduring market barriers to the development of EV charging infrastructure necessitate both innovation and creative thinking, but also a recognition that there is no short-term silver bullet for addressing these challenges.

The market for developing public EV charging infrastructure faces many challenges, stemming largely from the lack of a 'closed loop' sustainable market environment where infrastructure, development and technology costs can be fully recouped with a return over a reasonable time horizon from infrastructure users. Unfortunately, this condition is currently the norm in most market contexts and segments, and reflects the market conditions often described as being a 'chicken and egg' dilemma.

For example, while there is a market comprised of a relatively small field of sellers of EV charging products and services to motivated investors/site hosts in some market segments, such as residential and business Level 2 charging, those motivated buyers are relatively few and far between. Additionally, most of those buyers are not making those purchases with the intention of providing charging in a way that covers technology and infrastructure development costs. Instead, these purchases are often made for other reasons, including those beyond the actual charging of vehicles. These reasons include providing a value-added service or amenity to residents/customers/employees, perhaps to increase employee satisfaction, bolster their social/environmental responsibility, attract certain customers or otherwise differentiate themselves in the marketplace. While site host altruism should be applauded, and the marketing value of EV charging recognized, this type of site host decision-making should not be viewed as the foundation of a sustainable market for providing adequate charging services to drivers.

Similarly, for non-fleet public charging— DCFC in particular— we have largely not yet seen a sustainable structure or market for offering these services directly to drivers outside of certain specific emerging corner cases. Nor have we seen this for offering infrastructure to those select few third-party operators due to insufficient volume related to current market conditions. This is despite significant manufacturer investment in vehicle production and private investment in a variety of companies engaged in transportation electrification across technology, infrastructure, and services. It is no coincidence that the select few companies engaged in this business model, something that has been a strong positive for the market as a whole, have significantly leveraged opportunity capital flowing from settlements with regulators.

While private investment should be encouraged and supported, it is critical that this focus not have the unintended consequence of overextending or hamstringing the industry, exacerbating the conditions that thus far have largely inhibited private investment in charging infrastructure in the first place. At this point, the unpopular, enduring fact is that outside financial support is and continues to be needed to accelerate and result in a sustainable, virtuous cycle of private investment amongst drivers and EV charging equipment and service providers, where more drivers improve the business case for charging such that more charging is deployed, drawing

more drivers to adopt electric vehicles. And those are outside financial sweeteners, especially on the public charging infrastructure side of the ledger.

The Commission must focus on drivers of value in the EV charging marketplace in order to put in place the pieces necessary to support market sustainability.

An important component of breaking through these market barriers is attracting, leveraging and unlocking private investment, directly in infrastructure, but also in technologies, services, jobs and innovative solutions that are critical to moving the market, supporting EV drivers, and supporting the underlying charging infrastructure. Indeed, if one specific goal is increasing electric vehicle miles traveled, and charging port deployment to support this, for example, and increasing private investment in developing those ports and solutions to facilitate increased miles driven on electricity, it is necessary to support the broader industry and address the market dynamics involved in those deployments and results. Critically, that includes developing healthy, sustainable, market and business conditions for the industry.

This means that to achieve that particular specific result, California must include a focus on the broader macro environment for sustainably achieving those outcomes in an ongoing manner, not just the micro-level desired result. Indeed, if there is too narrow a focus on the more granular result that is divorced from the broader industry environment and health that is necessary to sustainably achieve those results, potential short term gains may well be at the expense of needed medium and long term market sustainability and the achievement of longer term goals.

Accordingly, Greenlots strongly encourages the Commission to refocus this discussion around desired outcomes and market conditions and work back from there. How do we ensure that EV charging hardware, software, and technology is appropriately valued, within the marketplace, and that there is incentive for differentiation and innovation? How do we incentivize and value not just quantity, but also quality? And how are higher upfront costs compared against their ability to deliver better long-term value, compared to their alternatives?

Greenlots believes there are opportunities to address these challenges not only with additive public dollars spent, but also potentially with innovative financial arrangements that address barriers related to time, scale and accessibility. This could implicate financial solutions that pull forward future value that may be more accessible down the road rather than now. And this could involve regulatory and market constructs that better allow for aggregation and access, for example, through leveraging and driving technology and standards to facilitate this.

It is Greenlots' strong view that the Commission's actions should be guided by a desire to support higher-quality projects and technologies, which inherently incentivize greater private investment in those products and services, but requires addressing these challenges. At this stage of the market, and despite understandable desires to look past this reality, EV charging and

related technologies are not ready for commoditization from a value standpoint, and policies and programs that support them should not treat them as commodities. Instead, to both maximize the system value of EV charging, and maximize value in the marketplace for solutions that facilitate this, the Commission should look beyond lowest common denominator bars and standards, and focus on ways to increase competition, value innovation and differentiation, while aggregating and pulling forward system value that may be more difficult to realize or account for upfront.

The discourse surrounding VGI use cases, pathways and protocols is stuck in a similar “chicken and egg” conundrum as EV adoption and EV charging infrastructure proliferation, and this is holding back adoption of both.

As the Commission’s 2017 Integrated Energy Policy Report stated in its recommendations regarding updating the original 2014 California VGI Roadmap, it discussed “the needs to use open standards, to return the value of grid integration to stakeholders, and to commercialize prior investments in research and maintain leadership in advanced technology development”.¹ Its recommendations also emphasized the need to “standardize electric vehicle charging equipment to enable resource dispatch” and “better integrate electric vehicles into the grid”.² These laudable recommendations encapsulate ambitions that regrettably now, after another three years involving working groups targeted at updating this VGI roadmap³, addressing VGI communication protocols⁴, further analyzing VGI use cases, value, and needed policy changes⁵, and even passing legislation related to VGI⁶, we unfortunately have little to show in terms of demonstratable progress on these issues other than in further analysis and reiterated ambitions.

Greenlots supports efforts to study and prove out VGI values across different use cases, including those that do not relate to state EV charging infrastructure investments (e.g. those involving OEM telematics). However, these efforts should not distract from the essential, overdue, deliverable of implementing actions that move the market towards greater adoption of existing and emerging open standards, with a specific focus on those that relate to the charging infrastructure being developed or supported by state agencies with public funds. Unfortunately, they have. While some stakeholders appear to have individual interests in doing this, we must not conflate or confuse the entire universe of VGI topics and issues with those that pertain to short and near-term infrastructure investments that are going in the ground.

¹ At p. 141.

² I.d.

³ See <https://www.energy.ca.gov/programs-and-topics/programs/california-vehicle-grid-integration-roadmap-update>

⁴ See <https://www.cpuc.ca.gov/vgi/>

⁵ See <https://gridworks.org/initiatives/vehicle-grid-integrationwg/>

⁶ SB 676 (Bradford), 2019

Greenlots recognizes that this goal of coalescing around standards is not easily achieved. The process and results thus far make this very clear. It is also a result that does not naturally emanate from middle-ground compromise or consensus policy making, which in this context has compromised results. The desire to do no harm and maximize flexibility, the comfort and safety of analysis rather than action, and the misguided notion that supporting VGI development over one pathway inherently disadvantages another, are collectively responsible for the lack of progress we've seen, despite stakeholders' significant collective efforts. We are bearing witness to perverse outcomes that Greenlots believes is holding back the progress of the industry: rather than ensuring charging stations deployed with the support of taxpayer and ratepayer funds can communicate VGI signals, we are seeing results which minimize the value of that public investment by potentially bypassing it almost altogether.

We should not be pitting one type of VGI against another, or one VGI pathway versus another. This is self-defeating. There is no need to be picking winners and losers, and supporting VGI over a certain pathway categorically is not doing this, as is sometime suggested. The notion that unless a specific action can be equally beneficial to all potential VGI pathways, it shouldn't be taken at all, is frankly absurd. Moreover, the now prevalent "show me the value first" mentality towards VGI inherently inhibits progress, and may relegate VGI development only to relatively low-tech pieces that largely already exist (bill management through rate design, etc.). California is no stranger to enacting policy and regulation that may be unpopular in some circles but is needed to move a market in a particular beneficial direction. For California to continue its leadership in advanced mobility and clean transportation through VGI, it is becoming increasingly clear that bold and pragmatic action will be required of its agencies to break through the current and historic circular discourse that has produced so few results. The financial risk associated with a continued failure to do so, resulting from value left on the table, will become increasingly large, detracting from the positive work the state is doing in so many other areas of advanced and clean mobility.

VGI and EV load management need to be central considerations in all EV charging use cases and applications.

Greenlots believes that the development of rates and programs that send accurate price signals to EV loads reflecting local or grid constraints and realities is essential to align the increased electrification of transportation with the interests of the grid and the broader public. Static EV time-of-use (TOU) rates represent a rather blunt but in some cases appropriate beginning instrument to deliver these price signals, especially at low levels of EV market penetration. Other strategies, including managed or smart charging and real-time or dynamic pricing represent more accurate instruments that can better shape, utilize, and dispatch flexible EV loads at charging stations with longer dwell times, such as residences and workplaces, to better maximize system-wide benefits and cost reductions. Other dynamic pricing instruments can also be deployed in higher power charging and shorter dwell time contexts, including DC fast charging.

Indeed, while Level 2 charging presents significant opportunity for managed charging given longer dwell times, there is also opportunity for DCFC. Unfortunately, there has been a trend towards unmanaged DC fast charging, premised on the notion that in this context, all drivers always need and want the same thing: full power immediately to be as fully charged as desired as quickly as possible. This presumptuous notion ignores well-known driver price sensitivity with respect to refueling costs with traditional fuels. For example, it is not uncommon for drivers to go miles out of their way to save cents per gallon on gasoline.

It is irrational to think that these desires, or openness to respond to price signals ends once in an EV. Moreover, there are in fact opportunities to reduce driver, site host and system costs through technology and dynamic rates or fee structures. For example, a driver could be given the option to save a few dollars on their charging session if they are able to wait a few minutes to begin charging. Or they could be offered a similar discount for a slightly longer session at a lower power level. Or, in a sufficiently harmonized and networked EV charging ecosystem, a driver could be encouraged to charge at a different location on their route for a discount. While there are implications if other drivers are queued up, there are very workable solutions to reduce site and system costs associated with DC fast charging.

Unfortunately Greenlots has seen the industry err too much on the side of perceived driver experience imposed limitations, illustrated by the general absence of offering drivers *options* for cost savings, instead presuming this is the one situation where such *options* would not be appreciated or utilized. Providing drivers options to choose from, and otherwise ensuring that drivers can see and respond to system costs should they choose to, should receive heightened focus as further public DCFC is developed. This is likely to become more critical over time with more public charging and the growing trend toward higher power charging.

The Commission can leverage its unique market position and abilities to provide needed market direction regarding VGI, and protect the prudence of public investments by requiring appropriate related hardware and protocol support for those investments.

Greenlots firmly believes that the adoption of open protocols and standards is essential to support transportation electrification, grow the market for EVs, enhance the driver/customer experience, integrate with the electricity system, and lower the cost of ownership of both EVs and EV charging infrastructure. Indeed, the proliferation of open protocols and standards provides a platform and ecosystem for innovation and customer choice that is critical in guarding against stranded assets and protecting the prudence of public investments.

With respect to VGI communication through the charger, or electric vehicle supply equipment as it is also known (EVSE), the only VGI pathway that is relevant in the context of funding for EVSE and supporting EVSE value, Greenlots strongly supports Commission requirements for networked chargers to include the physical hardware transceiver chip to allow for high-level VGI communication over this pathway. Without this, the EVSE is essentially cut out of the VGI value

chain by default. While some stakeholders with ulterior motives may like to see this outcome, it is the Commission's prerogative and duty to put in place requirements to avoid this. Five years from now, for example, the Commission will not want to be in a position where it is having to explain why the vast amount of chargers deployed throughout the state with taxpayer funds cannot communicate with vehicles to facilitate VGI through the charger, or why it shied away from its opportunity to avoid this outcome. The hardware costs of this chip is de minimis at reasonable scale, and having a sufficient fleet of deployed chargers with these hardware capabilities will create value and incentive for network and software providers to integrate, innovate with, and leverage these capabilities in their offerings. Without this, it is unlikely for this to happen; the hardware capabilities must come first. This simply puts the EVSE on the same equal footing as telematics-based VGI communication pathways from a capabilities standpoint- it in no way advantages it as some continue to argue.

ISO/IEC 15118 is the protocol most often associated with EVSE-centric VGI, which also supports "plug and charge", future V2G capabilities and a relatively seamless EV driver charging experience, providing likely the greatest benefits compared to other high-level communication protocols. Moreover, the standard is being deployed and supported internationally, with a broad group of automakers committed to equipping millions of EVs with ISO 15118 capability over the next several years. Indeed, inaction in California while much of the automotive market coalesces around this standard for EV-EVSE communication may prove detrimental to the growth of the EV market, and would be out of line with the State's longstanding leadership role in clean mobility. As such, and while recognizing there are various issues still being worked out with this protocol, Greenlots supports CEC's efforts to equip Commission-funded EVSE with the ability to communicate with EVs via ISO 15118, which critically means installing the requisite transceiver chip on networked chargers receiving state funds. This low-cost requirement will support VGI value to drivers and the grid, enhance the charging experience, and avoid unnecessary stranded asset risk.

The Commission should consider evolving EV charging infrastructure incentive programs, entertaining new concepts and ideas, and focusing on grants that spur innovation and drive value in EV charging technology, products and services.

Building on the Commission's tradition of supporting innovation, below Greenlots offers a selection of suggestions for refining and expanding CEC's work areas that support EV charging infrastructure and VGI:

- Modify or redesign existing programs to incentivize higher-quality projects and technologies. For infrastructure incentive programs, such as CALeVIP, introduce more competitive elements to make state funding go further, while providing an incentive for higher quality projects, products, and services. The value of minimum requirement, first come first served incentive program design comes largely from some degree of permanence and continued availability. When funds instead are subscribed within hours,

as continues to be the case with most CALeVIP DCFC programs, this program design instead is a liability. Moreover, relying entirely on a site-host focused, rebate-based, first come, first served structure has largely failed to introduce competitive forces into the program both on the project/site selection side, and the charging services procurement side. This ties up funding in speculative projects with high cancellation rates rather than deploying the funds towards projects that demonstrate themselves to deliver the highest value through a competitive process.

Relying solely on this program design rewards applicant speed rather than project quality. Speed and access to funding are valuable program elements – and indeed, CALeVIP has been effective through the specific lens of deploying charging infrastructure. However, program structures that do not support or incentivize applicants to shop around for charging solutions that are potentially of the greatest value or best fit their needs, and instead favor the solution they can most readily be identified, do not seem aligned with the support of an innovative and competitive marketplace for quality products and services.

The Commission could also consider mechanisms to aggregate demand for EV charging, similar to community solar programs, or community or neighborhood bulk purchase programs, and then have providers pursue those opportunities through competitive solicitations. This would both drive higher quality solutions, attract greater participation and potentially corresponding participant investment, and further leverage state funds. Requiring that site hosts develop and submit a load management plan, for example, would be another way to introduce mechanisms that values, incentivizes and supports related technology and beneficial charging.

- Focus on providing capacity resources for the state and other agencies accelerating transportation electrification. While smart funding distribution is critical, so too is supporting a coordinated environment of state and local action in advancing transportation electrification goals. For example, the Commission could serve in an information clearinghouse function for medium and heavy-duty transportation companies looking to electrify, presenting a ‘one-stop shop’ for available incentives, grants and programs, both for infrastructure and vehicles, to support electrification decisions. Electrification of certain medium and heavy-duty market segments can over time significantly leverage private dollars but has tended to need public funding to move forward. Currently this information and these resources are spread across a variety of state, local and utility entities and functions, presenting a challenging environment to navigate, especially when these programs are often fleeting or inconsistent, which itself represents a significant barrier to electrification decision-making and planning. Additionally, the Commission could support other agencies in the development of other local or state programs in a manner that best fills and addresses market gaps, complements other programs, and results in more consistent and aligned program and

participant requirements, in a similar manner as it does across its regional CALeVIP programs.

- Support VGI development through grants targeted at overcoming market barriers and nurturing VGI innovation. Greenlots highlights a few of the priority policy recommendations from the recently released “Final Report of the California Joint Agencies Vehicle-Grid Integration Working Group”, which Greenlots participated in, with “...the most urgent recommendations with the strongest level of agreement by a majority of participants”:⁷
 - “Create pilots to demonstrate V2G’s ability to provide the same energy storage services as stationary systems and let V2G systems participate in pilots for stationary storage.”
 - “Special programs and pilots for municipal fleets to pilot V2G as mobility resilience.”
 - “Demonstration to define the means to allow aggregators, EV network providers, and charge station operators to dynamically map the capacity and availability of EVSE resources, using open standards.”
 - “Incentivize use of multiple open standards for VGI communication, charging networks, cloud aggregators, and site hosts.”
 - “Create pilots to demonstrate V2G’s ability to provide the same energy storage services as stationary systems and let V2G systems participate in pilots for stationary storage.”
 - “State agencies coordinate and maintain consistency on TE and VGI across the different policy forums with no duplication of regulation, clear roles and vision on VGI and priority on state TE goals over VGI.”

These policy recommendations enjoy broad consensus from working group members and could form the basis of innovative CEC pilots, grants, or activity that in Greenlots’ assessment could be of high value in supporting VGI in California.

These represent just a few areas where Greenlots sees value in the Commission exploring new and different approaches to supporting and accelerating the market for VGI and EV charging infrastructure, including supporting and creating demand, further leveraging private investment and making state funding go further, all while supporting higher-quality projects or technologies, which inherently improves market conditions for private investment in those products and services. This is critical to supporting healthy, long-term development of the market, financial sustainability for the industry, and a future virtuous cycle of investment that is far less reliant on public funding.

⁷ At p. 10. Available at: <https://gridworks.org/wp-content/uploads/2020/07/VGI-Working-Group-Final-Report-6.30.20.pdf>

The Commission should hold a workshop for stakeholders to further review, discuss and better understand Commission Staff's TERPA concept

Greenlots greatly appreciates Staff's initiative and bold and innovative thinking in developing its Transportation Electrification Regulatory Policies Act (TERPA) concept proposal, introduced at the IEPR Workshop on June 24, 2020. The concept represents a unique approach building upon historical precedent and policy successes that very well could have valuable applicability to challenges associated with EV charging infrastructure deployment.

Given that there is a lot of detail and nuance to unpack, and since there was limited time for discussion and focus at the workshop beyond a brief initial overview, Greenlots would encourage dedicating time to further explain and discuss the proposal amongst ideally a broader set of stakeholders at a dedicated future workshop. The Avoided Cost of Charging (ACC) metric, which the concept largely hinges on, in particular encapsulates many variables and significant market analysis and nuance that deserves further exploration, especially in its applicability across different market segments, technologies and use cases. A focus on making the content presented as approachable as possible with practical examples may help elicit broader participation and input from different relevant stakeholders with different areas of expertise.

Conclusion

Greenlots appreciates the Commission's consideration of these comments, its ongoing efforts to support transportation electrification and advanced mobility, and looks forward to the road ahead.

Sincerely,

A handwritten signature in black ink, appearing to read 'Thomas Ashley', with a stylized, cursive script.

Thomas Ashley
VP Policy