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Ample Comments on Docket No 20-TRAN-04 SERVE Funding Concept

Additional submitted attachment is included below.

Levi Tillemann
VP, Policy and International Outreach

Matt McGovern, Policy Counsel

Ample, Inc.
100 Hooper St., Suite 25
San Francisco, CA 94107
mmcgovern@ample.com

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-VIA ELECTRONIC FILING-

California Energy Commission
Docket No. 20-TRAN-04

Ample, Inc. Comments on CEC Cost Effective, Performance-Based Charging Funding Concept, Serving Electric Range for Vehicle Electrification (SERVE)

Ample appreciates the opportunity to provide feedback on the California Energy Commission's (CEC) January 26, 2023 Workshop on Funding Allocations for Light-Duty Passenger Electric Vehicle Charging Projects.

Ample Background

Ample is a San Francisco-based startup that provides battery swapping services to California rideshare EV fleets. Today, the high operational and capital costs of electric vehicle supply equipment (EVSE) and lengthy charge times make it impractical and uneconomical for most rideshare drivers and fleets to use EVs in high-intensity applications. Because of this, in California EVs are mostly driven by individuals with access to at home, overnight charging. Ample's modular battery swapping system enables a seamless transition to electric vehicles for those without home charging by providing a 100% charge in minutes. Additionally, Ample's battery swapping system does not require fleet owners to install costly charging equipment.

Ample now has nine battery swapping stations in the Bay Area where the company is continuing to improve and expand its battery swapping network. Starting in 2023, Ample will also deploy swapping stations internationally in both Spain and Japan.

Speed of deployment is a key differentiator for Ample. Most EV charging stations take many months if not years to site and build. Because Ample stations are designed to be assembled onsite and require no construction (trenching, pouring concrete pads, etc.), they can be deployed in days. Perhaps most importantly, Ample's battery swapping system is inherently synergistic with renewable energy. Stations can store renewable energy when it is available and deliver clean energy to an EV quickly when it is needed. This energy storage capacity fills a huge gap in California's energy supply system.

On average, DC fast chargers operate much less than 5% of the time.[1] Battery swapping stations can charge batteries up to 100% of the time because batteries charge while they are in the swapping station. This means that a vehicle is not required to be onsite as its batteries are charged. Instead, swapping station batteries are charged *in situ* and quickly transferred to the vehicle when it arrives. The success of battery swapping in China demonstrates the important role the technology will play in large, diverse economies with high levels of EV penetration.

Workshop on Funding Ideas for Light-Duty Passenger Electric Vehicle Charging Projects

On January 26, 2023, the CEC held a workshop on current solicitations for light duty vehicle EVSE. CEC staff presented a number of project concepts for future EVSE solicitations. Ample will focus its comments on the concept for Cost-Effective, Performance-Based Charging (Working name: Serving Electric Range for Vehicle Electrification or "SERVE").

Cost-Effective, Performance-Based Charging (Serving Electric Range for Vehicle Electrification or "SERVE")

Ample appreciates the clear intent underlying CEC's SERVE funding concept. It is important for CEC to support innovative EVSE technology pathways in addition to DC fast charging and hydrogen.

Public DC fast charging is an important part of the EV ecosystem. Combined with home charging and public L2 stations, it has helped EVs achieve penetration rates of 18.7% of new car sales in California.[2] However, the current EV charging model assumes that the vast majority of

[1] A recent study showed that the national average utilization for a public DC fast charging port was .69 charging sessions per day, dispensing 13.5 kWh per port, per day. B. Borlaug et al. (2023) *Public electric vehicle charging station utilization in the United States,* Transportation Research Part D: Transport and Environment, Volume 114, January 2023, 103564 https://www.sciencedirect.com/science/article/pii/S136192092200390X accessed February 17, 2023).

[2] CEC New ZEV Sales Dashboard, https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/new-zev-sales (accessed February 14, 2023). Cited figure is the combined sales of EVs and PHEVs in California in 2022.

repowering will be done at home or the workplace. It also explicitly assumes that DC fast charging will serve as an occasional supplement to low-power home or workplace charging. But for many drivers the at-home or at-work charging model is a non-starter: Less than half of US vehicles have access to overnight home charging[3]; Workplace charging is expensive to build and operate; And even DC fast charging is too slow for most high-use fleet applications – where extended downtime for charging makes EVs uneconomical and impractical.

Less than one percent of the 2.9 trillion vehicle miles traveled (VMT) in 2021 were electrified.[4] Electrifying the remaining 99% of VMT will require new technologies and business models that "SERVE" fleets and drivers without access to home charging.

All of these factors highlight why CEC's SERVE concept is an important contribution to CEC's efforts to develop widely accessible EVSE and why the SERVE solicitation should encompass EV repowering technologies beyond DCFC.

We strongly support the performance-based approach proposed by CEC staff, to "[l]et industry propose the most innovative and cost-effective deployments that meet minimum energy throughput targets (that is, range served to EVs)."[5]

Ample's response to the guiding questions from Slide 33 of the deck presented at the January 26 workshop are as follows:

1. The SERVE concept intends to help capture deployment types that may not fit into existing CEC solicitations. Is there a need to address this concern?

Yes. It is critical for CEC to expand support for innovative EVSE technologies.

CEC's solicitations have focused unidimensionally on home, workplace and DCFC. These technology pathways do not adequately serve the needs of fleets and individuals without access to home or other dedicated charging. Without additional repowering options, California will be unable to meet its aggressive climate and clean air goals.

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[3] E.J. Traut et al. (2013) *US residential charging potential for electric vehicles*, Transportation Research Part D 25139–145, chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.cmu.edu/me/ddl/publications/2013-TRD-Traut-etal-Residential-EV-Charging.pdf (accessed February 14, 2023).

[4] DOE: Light-Duty PEVs in US traveled 19B miles on electricity in 2021; less than 1% of total VMT, Green Car Congress, November 22, 2023 https://www.greencarcongress.com/2022/11/20221129-doefotw.html (accessed February 14, 2023).

[5] Light-Duty Electric Vehicle Infrastructure Allocation Workshop presentation slide 35, https://www.energy.ca.gov/event/workshop/2023-01/workshop-funding-allocations-light-duty-passenger-electric-vehicle-charging (accessed February 14, 2023).

For example, the Clean Miles Standard requires rideshare companies to electrify 90% of VMT by 2030.[6] CMS interim targets are also aggressive, ramping up from 2% in 2023, to 13% in 2025, and 30% in 2026.[7] CEC should help California meet these laudable climate targets by funding EVSE that serves the needs of rideshare and other fleet drivers.

Battery swapping is one such technology. It has proven its importance in fleet applications around the world, but is still new to America. In China (which is the world's largest auto market and has over 80% of the world's public DC fast chargers) a major shift towards battery swapping is already underway. China has learned through experience that public fast charging alone is not sufficient to expand EV use beyond early adopters. Most major OEMs in China now have battery swapping solutions for repowering electric vehicles. EV manufacturer Nio has over 2000 battery swapping stations in China and Europe and these stations likely deliver more electric miles than all the public fast chargers in the U.S. combined (because of the high capacity factor of their battery swapping stations). By 2025, Nio claims it will have 4,000 battery swap stations in operation, while Chinese auto manufacturer Geely has set a goal of deploying 5,000 battery swapping stations by 2025.[8] In August of 2022, the Chinese battery swap station operator Aulton announced that it had completed its 30 millionth swap.[9]

California should look towards these more advanced EV markets for technology and market guideposts, learning from their experience. California policy makers must also realize that global growth in all EV technologies (including battery swapping) is enabled by robust policy support. Failure to support battery swapping has put California behind international competitors with respect to this critical technology. At very minimum, CEC should offer non-discriminatory solicitations open to diverse technologies including battery swapping – as well as other EVSE that does not fit current solicitations for DCFC.

2. SERVE could evaluate project proposals based on their cost-effectiveness and the validity of their estimated energy serving capacity. Are these reasonable evaluation metrics? Should other metrics be considered to ensure projects meet their cost and performance targets?

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[6] Attachment A, Final Regulation Order, Clean Miles Standard at p. A-9, chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2021/cleanmilesstandard/fro.pdf (accessed February 14, 2023).

[7] Id.

[8] China's Geely to set up 5,000 battery swapping stations by 2025, Reuters, Sep. 26, 2022 https://www.reuters.com/business/autos-transportation/chinas-geely-set-up-5000-battery-swapping-stations-by-2025-2021-09-26/ (accessed November 22, 2022).

[9] Aulton says it has achieved 30 million cumulative battery swap services, CNEVPost, August 12, 2022 https://cnevpost.com/2022/08/12/aulton-says-it-has-achieved-30-million-cumulative-battery-swap-services/ (accessed November 22, 2022).

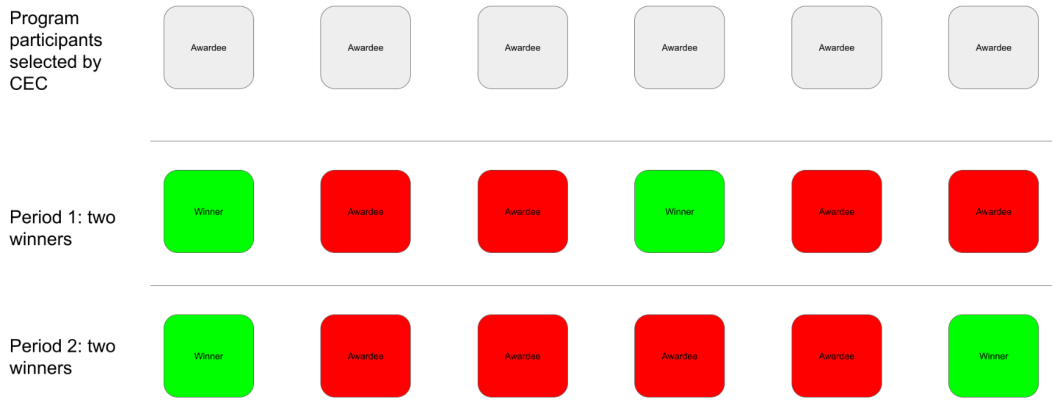
The goal of SERVE should be to support innovative, reproducible, low-cost, high throughput EVSE. “Cost-effectiveness and the validity of estimated energy serving capacity of EVSE” are both relevant metrics. However, other evaluation criteria will be equally important. For instance:

- CEC should require candidates to justify EVSE capacity based on **reasonable real-world operational assumptions**. For instance, in the case of fast chargers, customer willingness to queue should be taken into account – high utilization rates for DCFC lead to long wait times due to queuing. Requiring drivers to waste hours queuing and charging represents an inefficiency and a real cost to society that should be accounted for.
- One-off **projects made possible by exceptional circumstances should be avoided**. For instance, if Company A secures an old industrial facility with access to a high power grid connection, this does not necessarily represent a replicable model for high power charging systems. The company would have to prove that this model can be scaled and that such facilities are widely available in California and the U.S.
- CEC should **consider applying standard calculations for certain make ready and operational costs** (e.g. grid connections; demand charges; and standardized site site costs based on square footage). Otherwise, CEC risks creating perverse incentives for underreporting of costs. Such underreporting will not result in scalable solutions, and will instead induce a “race to the bottom” to capture CEC subsidies. Such projects will not be economically replicable, and replicability should be a key criteria for receiving SERVE funding.

Awarding points based on a replicability, economics, CO2 savings and passenger or freight kilometers traveled will encourage the deployment of EVSE service models that will be maximally effective in reducing carbon and criteria pollution. For instance, all other things being equal, a vehicle driven by a single individual should receive a lower score than a vehicle that is used in car pooling applications because the carpooled vehicle will deliver more passenger miles traveled.

Additionally, CEC should consider designing a competitive program in which the number of awardees exceeds the number of companies that will receive funding during a given time period (see graphic). CEC could encourage awardee performance through such competitive awards. Rewarding top performers during a given time period (e.g. monthly, quarterly, etc.) would create performance incentives for program participants.

Example of Competetive EV Charging Award



Finally, CEC should ensure that its evaluation committee has adequate technical expertise to fairly judge the reasonableness of the estimated energy serving capacity of the EVSE described in grant applications.

3. How could CEC ensure that these projects would not already have been built by industry (that is, avoid free ridership of public funding)?

The question of whether a project would have been built without public funding is legitimate. However, much more important is the question of whether a project is innovative, replicable and scalable. Questions CEC should ask include:

- Will this approach compete with incumbent technologies, operational models and business models?
- What are the reasonable prospects for long-term CO2 reductions?
- Will the proposed project accelerate the deployment of ZEVs and ZEV-related technologies into the market and contribute to the state's goals of zero-emission transportation?

It is most important to ensure that a project creates a scalable charging service, fills a niche that does not currently exist, and fulfills a distinct market need.

To this end, it is important that fleets and EVSE reserved for fleets be eligible for the solicitation. Electrifying fleets has a greater climate benefit than electrifying individually-owned vehicles

because they are driven so much more. On average, taxi or rideshare vehicles are driven 50,000 miles per year compared to about 12,000 miles per year for individually-owned vehicles.

Fleets are currently a severely underserved market. Even though operating costs of EVs are lower than gas-powered vehicles, it is difficult for private companies to electrify fleets because of the high upfront costs for EVs and EVSE, and the cost of charging downtime. In California electrification of high-utilization fleets has lagged behind sales of EVs to individuals.

4. How could CEC ensure that projects provide benefits to priority communities?

CEC should award higher scores to applications that fulfill needs of individuals from priority communities. For example, CEC should recognize that for individuals who drive for a living, time is money. Accordingly, CEC should award extra points for EVSE that provide fast, convenient powering solutions for EV drivers from priority communities. CEC should also consider prioritizing high mileage vehicles that are responsible for a disproportionate amount of air pollution in priority communities (e.g. delivery and rideshare).

5. Would it be reasonable to require projects to focus deployments within a local area or region? This would help ensure that energy throughput is concentrated in a local area as opposed to being spread out across the state.

CEC should allow applicants geographic flexibility for EVSE deployments and focus on the replicability of the project. The current solicitation should focus on proof of concept, acknowledging that applicants will have the best insight into where to deploy pilots. CEC should consider requiring a list of future locations in which the project can be replicated.