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Date:	September 1, 2021
Witness:	Joseph Vellone
Commissioner:	Marybel Batjer
ALJs:	Brian Stevens
	Sarah R. Thomas

OPENING PHASE II PREPARED TESTIMONY OF

JOSEPH VELLONE

ON BEHALF OF

EV.ENERGY CORP

Rulemaking 20-11-003
Policies, Processes, and Rules to Ensure Reliable Electric Service in California in the Event of an Extreme Weather Event in 2021
September 1, 2021

I. INTRODUCTION

Q. Please state your name, occupation, and business address.

A. My name is Joseph Vellone. I serve as EV.ENERGY CORP's Head of North America. Our registered business address is 433 Kipling Street, Palo Alto, CA 94301. I am employed by EV DOT ENERGY LTD (UK), of which EV.ENERGY CORP is a wholly-owned subsidiary.

Q. On whose behalf are you testifying in this docket?

A. I am testifying on behalf of EV.ENERGY CORP ("ev.energy").

Q. Have you testified previously before the California Public Utilities Commission ("Commission")?

A. No, I have not testified previously in this proceeding or before the Commission.

Q. Have you testified previously before other state regulatory commissions?

A. No.

Q. Are you sponsoring exhibits in your testimony?

A. No.

II. EV.ENERGY AND RESIDENTIAL MANAGED CHARGING

Q. Please describe ev.energy's operations, and particularly the services it offers in California.

A. Ev.energy is a leading software platform that manages residential electric vehicle ("EV") charging for utilities and grid operators through direct load control. With services and customers in California and across all other 49 U.S. states, we provide an end-to-end solution for utilities, retailers, and grid operators to actively managed residential EV load through a suite of Application Programming Interface ("APIs") that connect to both vehicle telematic systems and networked Electric Vehicle Supply Equipment ("EVSEs"). Based on publicly-available market data, ev.energy's platform is compatible with approximately 90% of residential EV drivers in California.

Ev.energy's software delivers multiple sources of value to grid operators, utilities and their residential customers. Ev.energy can provide demand-response services by receiving dispatch signals from grid operators and using its vehicle telematics and EVSE APIs to curtail charging on all connected devices to deliver demand reductions and load shifting during specified windows. Beyond demand response, ev.energy can also actively manage the customer's charging and schedule it for off-peak hours on their time-of-use rate, as well as re-dispatch EV charging for periods of high renewable generation (e.g. the "belly" of the duck curve). By engaging and rewarding EV drivers for their participation through an award-winning mobile app, ev.energy enables more than 95% of the charging on its platform to be optimized in line with grid/utility signals, with the remaining 5% unmanaged through temporary customer overrides or opt-outs.

In California, ev.energy is currently delivering valuable flexibility services to the California Independent System Operator ("CAISO") and to Pacific Gas and Electric ("PG&E"), Southern California Edison ("SCE"), and San Diego Gas & Electric ("SDG&E"). More specifically, ev.energy is currently responding to CAISO Flex Alerts to deliver demand-response services via the approximately 2,000 California-based EV drivers that use our free mobile app to charge their vehicles each day.

In addition to the above, ev.energy has also partnered with Community Choice Aggregators ("CCAs") Silicon Valley Clean Energy ("SVCE") and Marin Clean Energy ("MCE") to deliver tailored managed charging programs to their customers. The SVCE program, called GridShift, is a technology-agnostic managed charging program that delivers two-tiered optimization to SVCE's participating residential customers. First, ev.energy's algorithm automatically schedules charging during off-peak hours based on the customer's time-of-use rate; then within the off-peak hours, ev.energy schedules charging for the lowest-carbon hours according to electricity generation forecasts published by the CAISO. As a result, SVCE customers are saving over $100/year off their energy bills through GridShift, and are charging their vehicles with electricity that is up to 70% lower-carbon than the overnight average. Ev.energy has recently launched another program with MCE called MCE Sync, which aims to deliver similar results while focusing on the inclusion of low-income and front-line communities.

Q. Please describe how ev.energy's products and services, and managed charging in general, could address California grid reliability needs identified in this proceeding.

A. Ev.energy firmly believes that for managed charging to be successful and widely adopted by consumers, managed charging programs must be customer-friendly, accessible, and valuable to both EV drivers and to the utilities. This goal can be met by developing technology-agnostic programs (i.e. programs that maximize customer participation and load coverage via both vehicle telematics and/or L1/L2 networked or non-networked chargers) that are delivered through a single customer touchpoint (i.e. a mobile app) and that incentivize customers for opting in to active managed charging (i.e. direct load management of connected EVs orchestrated by a vendor on the behalf of a retailer or utility) through on-bill or off-bill rewards.

Our vision for managed EV charging seems to broadly align with the Commission's interests in Vehicle Grid Integration ("VGI"), which includes the clear understanding (based in part on the findings of the "Final Report of the California Joint Agencies Vehicle-Grid Integration Working Group" ("VGI WG Report")) that "VGI can provide resiliency services, and a variety of other potential services."[1] Managed charging, and especially active managed charging, is the fundamental bedrock of VGI, potentially enabling additional and more sophisticated services such as bi-directional charging and frequency/balancing services. Yet growth in these programs in California has been notably slow to date. I estimate that there are hundreds of thousands of EVs in California that are currently precluded from participating in VGI programs due to the relevant pilot programs having limits to either size, vehicle make/model, charger manufacturer, or a combination thereof. It is critical that the Commission take steps to remove these barriers so that California can utilize VGI at a far greater scale than it does today.

Unlocking these nascent VGI programs would provide tremendous value to California and grid reliability. As the VGI WG Report indicates, VGI brings the following benefits:

> "
>
> - Accelerating the adoption of EVs by providing additional revenue streams that lower the total cost of vehicle ownership for individual owners and fleet operators

[1] See December 17, 2020 Decision 20-12-029, Finding Of Fact 1, at p. 71.

- Reducing costs to electricity ratepayers by reducing congestion on existing power distribution infrastructure and costly distribution system upgrades, as well as reducing the need to invest in new fossil-fuel electricity generation
- Supporting further decarbonization of the electric sector by avoiding curtailment of renewables and providing grid services
- Accelerating reduction of carbon and criteria pollutant emissions in the transportation sector
- Improving grid resiliency and security, including for public safety power shutoff (PSPS) events."[2]

Grid reliability enabled by managed charging can come in a variety of different flavors, including daily load shifting through active managed charging, peak demand reduction through event-based demand response programs, and even bi-directional charging and discharging. All of these solutions must be considered by the Commission, with particular attention to scaling existing or proposed programs using proven technology and solutions.

III. RECOMMENDATIONS

Q. Please summarize ev.energy's recommendations to the Commission.

A. Ev.energy recommends that the Commission take three actions to incorporate residential VGI into its suite of solutions to improve grid reliability:

1. Approve the existing VGI pilot programs that have been proposed by the utilities. Namely, these programs are the VGI pilots proposed by PG&E in Advice Letter 6259-E and SCE in Advice Letter 4542-E, and the Resilient Charging Pilot proposed by PG&E in Advice Letter 6226-E.
2. Expand existing pilot programs to support a broader range of eligible technologies, vehicles, and vendors.
3. Approve the Energy Division Staff Proposal with the modifications detailed herein that will ensure broader customer eligibility for participation and incentives.

Q. What actions should the Commission take to improve the availability of residential managed charging?

[2] See June 30, 2020 "Final Report of the California Joint Agencies Vehicle-Grid Integration Working Group", at p. 6. Available at https://gridworks.org/wp-content/uploads/2020/09/GW_VehicleGrid-Integration-Working-Group-1.pdf.

A. Ev.energy strongly recommends that the Commission take expedient action to approve the proposed VGI pilot programs still pending before the Commission. Two VGI proposals have directly come out of the work of the VGI Working Group, representing a collaborative effort across dozens of stakeholders. PG&E's proposal, outlined in Advice Letter 6259-E, would enable a variety of V2X functionalities for residential customers, while SCE's proposal, outlined in Advice Letter 4542-E, would create a V1G pilot specifically to accelerate demand response and capacity, among other services. Both of these pilots would lay the foundation to add much-needed managed EV capacity to the grid.

Ev.energy also encourages the Commission to approve PG&E's Resilient Charging Pilot contained in its Advice Letter 6226-E. This pilot would demonstrate the efficacy of managed charging to support both residential customer and grid resiliency prior to public safety power shutoff (PSPS) events, which often coincide with extreme weather events, including wildfires.

Q. How can the Commission evolve existing and proposed residential managed charging programs to maximize customer participation and program efficacy?

A. We believe that ratepayers would benefit from existing and future managed charging programs that maximize customer eligibility. Ev.energy believes there are at least four programmatic designs the Commission could encourage the program designers to adopt for residential managed charging that would maximize the value of such programs.

<u>First, managed charging programs should be technology agnostic.</u> In the managed charging sector, technology agnosticism means that customer participation (and therefore utility load control) is maximized via a variety of eligible technologies, including vehicle telematics (i.e. direct load control using vehicle APIs), networked Level 2 ("L2") chargers, and networked Level 1 ("L1") charging cables. As long as the technology can provide the basic functionality needed to manage charging – i.e. measuring of energy usage and power delivered, assessing whether the vehicle is plugged in, and providing direct load control through start/stop or throttling of charging – then that technology should be deemed eligible for a managed charging program.

Another benefit of a technology-agnostic approach is that it is highly cost-effective, because it makes full use of the hardware already deployed in California. Instead of

precluding thousands of customers from participating because they would have to buy a second piece of equipment, or burdening ratepayers with the additional cost of deploying networked EVSEs or required On-Board Diagnostics dongles to homes across California, such programs can maximize customer eligibility and enrollment at the lowest possible cost.

Programs that are technology-agnostic also address an important social equity angle – for example, data that ev.energy and its California partners have analyzed from CalEnviroScreen suggests that customers using Level 1 chargers tend to be lower-income due to legal/landlord and household wiring constraints that prevent Level 2 installation. A telematics-based solution, or one that utilizes a networked L1 cable that can plug directly into the wall, would be better-suited to enabling these customers to realize the financial benefits of active managed charging programs and ensure that LMI customers can participate in these programs in a meaningful way. And, as described above, there is no technological reason why a L1 charger could not also participate in - and add value to - a managed charging program as long as it were networked.

Second, managed charging programs should be open to multiple delivery vendors. A handful of the existing managed charging programs are administered by a single vendor, or are only available to customers with a specific charger brand or car make and model. The result of this paradigm is that of the over 400,000 EVs on the road in California, it is likely that only a small fraction actually participate in any grid-integrated programs.

Third, managed charging programs should ensure programs are designed to be customer-friendly and offer attractive incentives for participation. The use of a mobile application as the primary customer interface is an obvious way to ensure that residential managed charging programs are made simple and accessible for consumers to participate in. Ev.energy has found, based on its platform of over 25,000 EV drivers, that 80% of EV drivers stick with managed EV charging programs when utilizing its mobile app (or white-labelled version thereof). The use of a mobile app simplifies customer enrollment and participation, provides utilities and retailers with a direct interface to engage with customers, and enables the behavioral nudges and messaging that is necessary to maximize

load management and minimize attrition from the program. A mobile app has a number of benefits and advantages over web portals, emails, and/or text messages, specifically:

1. A mobile app enables seamless, visually-guided, step-by-step program enrollment and customer eligibility checks;
2. A mobile app enables the customer to transition between different program tiers through a single interface (if the program is designed for multiple participation levels);
3. A mobile app provides the customer with an interface to set their preferences for managed charging, and provides the customer with transparency over the status of their EV battery level and charging schedule, along with a detailed history of their EV charging consumption, costs, and savings;
4. A mobile app provides a direct interface for the utility or retailer to send messages, alerts and push notifications to the customer;
5. A mobile app encourages continued participation by displaying savings and incentives to the customer in real-time, along with providing the direct payment functionality for the customer to redeem/cash out any off-bill incentives (e.g. PayPal transfers) without utility or retailer involvement; and
6. The customer can use the mobile app to regain full control of charging if needed (e.g. temporarily override active managed charging or indicate an opt-out of a DR event).

If these four principles are applied to existing, proposed, and future managed charging programs, they will positively increase the impact of the programs while ensuring widespread program adoption and participation.

Q. Should the August 16th Energy Division Staff Proposal "Electric Vehicle/Vehicle to Grid Integration (EV/VGI) Aggregation Pilot" be approved?

A. Yes, with some modifications. These modifications, as described below and provided as a set of redlines in Appendix A, are essential to promote customer uptake and aggregator participation.

Q. What specific changes to the August 16th Energy Division Staff Proposal does ev.energy propose?

A. Ev.energy proposes that Energy Division modify its August 16th Staff Proposal, and specifically the "Electric Vehicle/Vehicle to Grid Integration (EV/VGI) Aggregation Pilot" proposal ("EV/VGI ELRP proposal"), in four ways in order to increase EV customer uptake and aggregator participation in the ELRP.

First, the Energy Division should define "aggregators" with sufficient breadth. The proposal as written is not clear as to whether aggregators are intended to only be inclusive of third-party demand response providers, any demand response provider, or more broadly any aggregator of flexible load. We believe that in order for the ELRP to maximize its coverage across California's 400,000+ EV drivers, the definition of aggregator should be inclusive of any managed charging company or vendor otherwise that is capable of controlling EV charging, including those that contract bilaterally with utilities and/or CCAs.

Second, the EV/VGI ELRP proposal should not require aggregators to integrate directly with the CAISO. A CAISO integration requirement should be avoided for two reasons. First, enrollment through the CAISO Demand Response Registration System is a lengthy and time-consuming process that, if conducted by the aggregator, will force the participating end-customer to go through a secondary flow (i.e. the utility Customer Information Service Request process) to provide the aggregator with information that is ultimately not needed for the customer to successfully participate in the program, as all the information needed to participate can be provided through vehicle telematics or L1/L2 charger data. Especially considering the number of utility programs that do not require direct CAISO integration (such as the utility smart thermostat programs), requiring this for managed charging participants would create additional unnecessary burdens. Second, the ELRP is already market-informed, with dispatches triggered by "a DA Alert, per the Alert, Warning, Emergency (AWE) process defined by the CAISO Operating Procedure 4420, declaration by CAISO."[3] An additional CAISO-integration component is duplicative.

Third, program settlement should use baseline methodology informed by counterfactuals rather than historical data. The use of historical data for crafting EV charging baselines is an inherently flawed practice for two main reasons. First, EV adoption is relatively new in

[3] See March 25, 2021 Decision 21-03-056, at p. 23.

California and many residential participants will be first-time EV drivers who recently purchased their vehicle and whose consumption may therefore not necessarily be reflected in their meter's historical data. Second, the actual load itself *at the individual EV* is relatively inconsistent in terms of when the EV demand will occur. The nature of unmanaged charging is such that the vehicle will often begin charging once it is plugged in at home, which is wholly dependent on the individual driver's schedule and behavior and is not well captured by averaging historic behavior. Furthermore, the work of Recurve indicates the need for a broader conversation around the applicability of existing CAISO baseline methodologies, almost all of which use historical data in some form which, as Recurve states "are limited by simplistic and easily biased methods, along with a lack of data".[4] A simpler alternative that is effective for measuring and verifying the performance of managed charging is to develop a counterfactual baseline based on the load draw that would have occurred *if the car was to start charging immediately upon being plugged in* - i.e., the counterfactual scenario is the one where unmanaged charging occurs.

Fourth, telematics and L1/L2 EVSE data should all be considered equally for the purposes of performance settlement. The Energy Division proposal spells out the scenario in which a separate meter can be used to settle the customer performance, and otherwise requires that settlement is to be "based on the measurements at the EVSE meter."[5] While an EVSE can provide the data necessary for settlement, so can vehicle telematics and L1 charging cables. There is no need to limit the technology to an expensive EVSE, or an even more expensive sub-meter option. In the interests of both social equity and minimizing cost to ratepayers, the Energy Division proposal should allow settlement using any technology that can provide the necessary information, such as vehicle telematics or L1/L2 chargers.

Q. What impact would the proposed changes have, and how would it be an improvement on the current Staff Proposal?

A. The proposed changes described above, and further adapted as redlines in Appendix A, would allow the EV/VGI ELRP proposal to be delivered at a lower cost to California

[4] See January 12, 2021 "Revenue-Grade Analysis of the OhmConnect Virtual Power Plant During the California Blackouts", available at https://www.recurve.com/blog/revenue-grade-analysis-of-the-ohmconnect-virtual-power-plant-during-the-california-blackouts.
[5] See August 16, 2021 "Energy Division Staff Proposal."

ratepayers by leveraging equipment that has already been deployed. In addition, the proposed hardware-agnostic approach would also ensure the proposed program is more accessible to as many California ratepayers as possible, particularly those who are LMI and who otherwise could not afford the equipment necessary to participate in the program as it is written. We estimate that opening up the EV/VGI ELRP proposed program to a broader suite of aggregators, not requiring CAISO integration, and developing the program as technology agnostic would materially increase the number of participating EV drivers. In addition, using an intuitive settlement system based on a counterfactual baseline will make the program incentives more attractive to potential participants.

Q. Does this conclude your testimony?

A. Yes, it does.

STATEMENT OF QUALIFICATIONS

Joseph Vellone

Q. Please state for the record your name, position, and business address.

A. My name is Joseph Vellone. I serve as EV.ENERGY CORP's Head of North America. Our registered business address is 433 Kipling Street, Palo Alto, CA 94301.

Q. Please describe your experience and qualifications.

A. I have been employed by ev.energy for two years, where I hold a general management position leading the company's North America business. In this capacity, I collaborate directly with utilities and CCAs on residential managed charging programs, speak directly with EV drivers across the country and shape our product and offering accordingly, and handle U.S. policy and regulatory matters. I was previously employed as a management consultant in the Boston Consulting Group's energy and environment practice. I hold a master's degree in Environmental Economics from the London School of Economics, and a bachelor's degree in Public Policy from Princeton University.

Q. Have you testified previously before the Commission?

A. No, I have not testified previously before the Commission.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of EV.ENERGY CORP.

Q. What is the purpose of your testimony?

A. I am sponsoring the Opening Phase II Prepared Testimony of EV.ENERGY CORP on the "Phase 2 – Reliability for 2022-23 - Update" phase of R.20-11-003. I am testifying to describe the benefits of residential managed charging and the actions that the Commission can take to increase the availability of residential managed charging in California.

APPENDIX A

Redlines to the Energy Division EV/VGI Pilot Proposal

Electric Vehicle/Vehicle to Grid Integration (EV/VGI) Aggregation Pilot:

Currently the ELRP pilot has at least one provision (Group A option A.3) to allow electric vehicles to support the grid at net peak through vehicle to grid export. Energy Division Staff believes there may be additional potential for VGI aggregation integration (V1G managed charging and/or V2G discharge) to support the grid at net peak and to increase the effectiveness of the ELRP. Aggregating and dispatching EV resources through the ELRP represents an opportunity to enable and demonstrate the technical capabilities and customer engagement strategies necessary to harness and deploy this nascent resource. These efforts could serve to establish a foundation for further deployment of VGI resources, which is a priority for the CPUC and EV stakeholders given the enormous potential of these resources. The pilot may require revisions to interconnection rules to enable streamlined and affordable access to the grid for EVs and EV Supply Equipment (EVSE) with bi-directional capabilities. Staff proposes:

- i. Allow aggregators to utilize networks of V1G or bi-directionally capable vehicles and/or charging stations (EVSEs) to be eligible to participate in ELRP, providing the aggregation can contribute incremental load reduction (ILR) exceeding the Minimum VGI Aggregation Size Threshold of 25 kW within an IOU service territory. Aggregators are defined as any managed charging company or vendor otherwise that is capable of directly controlling EV charging.
- ii. The IOUs shall dispatch the VGI aggregators for at least 30 hours per season including ELRP events and compensate the aggregators for the ILR delivered during the dispatched hours.
- iii. In case the EVSE is located on different meter (stand-alone EVSE) from the related host site meter (for example, Multi-Unit Dwellings), the aggregator is permitted to virtually aggregate the stand-alone EVSE meter(s) with the host site load on the different meter to partially bypass the V2G export restriction on the standalone EVSE meter(s). The virtual load aggregation of all stand-alone EVSEs and the related host site must not be negative at any time, even when the host site is participating in an event called by another DR program. V2G discharge is prohibited outside of the IOU dispatched hours.
- iv. The ILR settlement shall utilize a baseline methodology informed by counterfactuals rather than historical data and shall be based on the measurements at the L1/L2 EVSE meter or vehicle telematics system, or EVSE sub-meter if the EVSE is taking service through the host site meter.

AFFIDAVIT

I, Joseph Vellone, Head of North America for EV.ENERGY CORP, am authorized to make this Affidavit. I declare under penalty of perjury that the statements in the foregoing ***Opening Phase II Prepared Testimony of Joseph Vellone on Behalf of EV.ENERGY CORP*** are true of my own knowledge, except as to matters which are therein stated on information or belief, and as to those matters, I believe them to be true.

Executed on September 1, 2021, at London, England.

Joseph Vellone

Joseph Vellone