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WeaveGrid Response to DER Orchestration Research RFI

Additional submitted attachment is included below.

375 Alabama Street
Suite 325
San Francisco, CA 94110

Amanda Myers Wisser
Director, Policy and Regulatory Affairs
amanda.myers.wisser@weavegrid.com

March 28, 2025

California Energy Commission
715 P Street
Sacramento, CA 95814

Re: WeaveGrid Response to DER Orchestration Research RFI

WeaveGrid respectfully submits our response to the California Energy Commission (CEC) Distributed Energy Resource (DER) Orchestration Research Request for Information (RFI), filed to Docket Number 23-ERDD-01 on February 26, 2025.

WeaveGrid is a leading electric vehicle (EV) virtual power plant (VPP) provider that helps utilities support increased adoption of EVs through greater understanding of customer charging behaviors, managed charging programs, and distribution-level charging optimization. WeaveGrid's technology leverages utility and charging data, including embedded vehicle telematics—data, controls, and communication systems—and charging equipment data to transform unpredictable and disaggregated EV charging loads into a cohesive network of controllable grid resources. We also support utilities in engaging their EV customers with personalized messages, insights, and notifications via the web, email, and text. Our approach enables broad participation in utility programs, including vehicle-grid integration programs, while helping reduce the costs to serve EV loads. WeaveGrid is a market leader in providing these solutions.

WeaveGrid appreciates the opportunity to provide a response to the CEC on the topic of VPPs. Our response is focused on how we recommend that EVs can comprise and/or contribute to VPPs. EVs are a unique class of DERs and differ in

their advantages and uses from other DERs in the context of VPPs, particularly inverter-based DERs, in the following ways:

1. EVs are primarily mobility assets for users.
2. EV adoption is often geographically clustered and represents significant, concentrated new loads on service transformers and other distribution assets. This makes them uniquely-suited to provide localized distribution level benefits. Therefore, VPPs that take advantage of EVs should be designed to address not only bulk system peaks and event-based DR, but also peaks on distribution assets.
3. Unlike thermostat-focused VPPs, where bulk market value streams tend to dominate, EV-focused VPPs derive more value from non-market services. These include mitigating transformer and feeder overloading and managing localized load patterns, which are not currently captured in wholesale markets but are critical for grid resilience and affordability
4. Due to the downstream distribution benefits that EV charging optimization offers, utilities play a key role in developing EV VPPs.

WeaveGrid designs and operates our charge managing solutions with the above core principles in mind. Our experience to date with utility vehicle-grid integration (VGI) pilots and programs is directly translatable to other EV VPPs. **Overall, WeaveGrid recommends that EVs be considered as its own VPP asset class with distinct characteristics and benefits that require a strong utility role in VPP creation and orchestration. While this RFI emphasizes bulk power grid services, we believe it is critical to also consider the substantial value that EV charging orchestration can provide at the distribution level.** These services can and should be pursued through complementary RFIs, projects, and programs.

Regarding point 1 above, EV VPPs require a driver-centric approach, prioritizing driver trust, control, and mobility for every VGI offering we deploy. For example, WeaveGrid enables drivers to set a minimum state of charge and ready-by time for mobility needs, before shifting load for grid benefits.

Per point 2 above, EV VPPs should utilize the unique grid services EVs can offer, which differ from other DERs. In particular, EVs can offer downstream distribution grid benefits (i.e., feeders, circuits, and transformers) through locally managed charging.[1] WeaveGrid collaborates with vehicle and EV charger manufacturers to enroll drivers in VGI programs that leverage EVs as DERs for continuous charge optimization and load management - not only event-based load management - thereby providing distribution value in addition to bulk system value. While some of our VGI programs focus on event-based demand response as a primary objective, including California's Emergency Load Reduction Program and Dominion's Electric Vehicle Telematics Program, most of our active managed charging programs seek to maximize grid benefits by providing charge schedules each time a user plugs in for "continuous optimization." In many traditional bulk system VPPs, managed charging is not cost-effective. However, the value of managed charging is significant for localized distribution optimization and transformer protection.

As for point 3 above, EV-focused VPPs can derive the majority of their value from non-market services, unlike thermostat-based VPPs and other DERs that are primarily designed to access wholesale market revenue streams. Optimizing EV charging provides critical, localized benefits—such as reducing non-coincident peak loads on overloaded distribution transformers and feeders—that are not currently monetized in energy markets but are essential for maintaining system reliability and affordability. For instance, WeaveGrid's Distribution Integrated Smart Charging Orchestration (DISCO) product is specifically designed to target these distribution-level constraints, using real-time utility data to shape load in ways that defer infrastructure upgrades and improve grid resilience. This non-market value stream is a core differentiator for some EV VPPs and underscores the importance of utility partnerships and distribution system planning.

[1] California Public Advocates Office, DGEM 2.0, October 21, 2024, https://www.publicadvocates.cpuc.ca.gov/-/media/cal-advocates-website/files/press-room/reports-and-analyses/241024-public-advocates-office-dgem-20-preliminary-results.pdf.

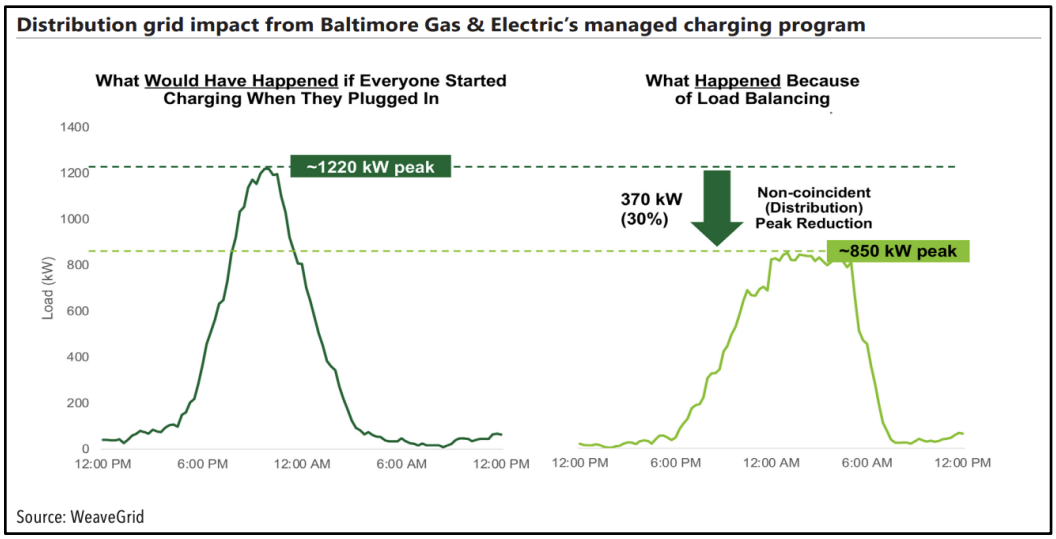

Figure 1: DOE VPP Report visual showing distribution benefit of an EV-focused VPP.[2]

As for point 4 above, because EVs offer significant distribution grid benefits, utilities play a key role in EV VPPs. WeaveGrid works with utilities to incorporate grid data and market signals to consistently leverage EV charging load flexibility and increase grid benefits. U.S. Department of Energy's (DOE) *Pathways to Commercial Liftoff: Virtual Power Plants 2025 Update* report states:

> "Utilities that have launched active managed EV charging VPPs are leading examples of utilities investing in the capability to optimize distribution grid conditions. Rather than setting EV charging schedules (or calling events ad hoc) only in response to day-ahead energy prices from wholesale markets, these VPPs are also managing charging in response to real-time grid conditions based on data collected from distribution grid equipment. Examples include programs operated by VPP provider WeaveGrid with utility partners Baltimore Gas & Electric, Pacific Gas & Electric, and others."[3]

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[2] U.S. DOE, *Pathways to Commercial Liftoff: Virtual Power Plants 2025 Update*, January 2025, p. 14, https://liftoff.energy.gov/wp-content/uploads/2025/01/LIFTOFF_DOE_VirtualPowerPlants2025Update.pdf.

[3] U.S. DOE, *Pathways to Commercial Liftoff: Virtual Power Plants 2025 Update*, January 2025, p.30, https://liftoff.energy.gov/wp-content/uploads/2025/01/LIFTOFF_DOE_VirtualPowerPlants2025Update.pdf.

EVs are the largest potential residential VPP asset type, both by aggregate capacity and by capacity per asset. Specifically, EVs represent an estimated 9.6 GW of capacity in California today and, for Level 2 home charging, ~5-7kW average nameplate capacity per device under management.[4] As a second marker of scale, installed EV charging capacity in the U.S. now exceeds rooftop solar capacity.[5] EVs are vastly underutilized in the VPP space today and could deliver more value, especially as flexible resources to minimize loading at the distribution level and to support distribution deferral.

In areas of high EV adoption, we are seeing concentrated, non-peak coincident charging behaviors that heavily load specific distribution transformers and feeders - particularly in residential neighborhoods during overnight hours. These localized peaks are shortening the lives of expensive, often hard to replace, distribution assets. This is where unidirectional (V1G) EV charging can become highly valuable grid services within a VPP framework- not for shaving system peak, but for targeted load shaping and distribution asset protection. By leveraging connected vehicles and intelligent charging platforms, EV charging can be orchestrated to stagger charging, reduce transformer load diversity loss, and curtail charging during thermal stress windows and act as a distributed, responsive load bank, dynamically adapting to real-time constraints of the load grid, including via dynamic hosting capacity.

Looking ahead, WeaveGrid sees advancements with bidirectional (V2X) applications for 1) home energy backup solutions during system peaks or when local distribution assets are constrained and 2) export opportunities to provide a host of grid services.

As with V1G use cases, it is imperative that drivers' preferences are kept front and center with V2X opportunities. For example, in a 2022-2023 pilot with a California utility, WeaveGrid surveyed participants to understand their interest in future vehicle-to-home (V2H) use cases. While many participants showed interest in using the stored energy in their vehicles for home back-up /resiliency in the future,

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[4] Total California capacity estimate calculated using Experian EV data for number of EVs in California multiplied by 5 kW of nameplate charger capacity.

[5] CNET, *Rooftop Solar Panel Capacity Will Be Overtaken by EV Chargers in 2023*, June 30, 2023, https://www.cnet.com/home/energy-and-utilities/rooftop-solar-panel-capacity-will-be-overtaken-by-ev-chargers-in-2023/.

respondents also indicated that even in back-up power use cases, drivers want to prioritize a portion of their battery for mobility purposes.

Finally, WeaveGrid applauds the CEC's callout of end-to-end cybersecurity for VPP aggregations. Given the scale and frequency of data exchange between EVs, aggregators, and utilities, secure data practices are critical to delivering reliable VPP performance. We want to emphasize the importance of direct and authorized integrations and commercial partnerships with vehicle and EV charger manufacturers that ensure EVs can serve as reliable grid resources. EV solutions that rely on screen scraping and reverse engineering APIs create risks, including unreliable data and controls, can lead to poor customer experiences and less effective load management. We recommend the CEC require aggregators and platforms to license data and controls directly from vehicle and EV charger partners. This ensures that EVs are well-positioned to meet cybersecurity and grid standards and deliver value for customers and the grid.

Overall, WeaveGrid's recommendation to the CEC is to consider EVs as a unique class of DERs that can comprise VPPs as the grid services are different from other DERs. Moreover, given the strong tie to the distribution grid services, utilities should play a stronger role in developing EV VPPs.

We welcome continued discussion and engagement with the CEC and appreciate the opportunity to provide our response on this important topic.

Respectfully submitted,

/s/ Amanda Myers Wisser
Amanda Myers Wisser
Director, Policy and Regulatory Affairs
WeaveGrid
Email: amanda.myers.wisser@weavegrid.com