the climate center

theclimatecenter.org
1275 4th Street #191
Santa Rosa, CA 95404
(707) 525-1665

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Honorable Gavin Newsom
Governor, State of California
1021 O Street, Suite 9000
Sacramento, CA 95814

Honorable Phil Ting
Chair, Assembly Budget Committee
1021 O. Street, Suite 8230
Sacramento, CA 95814

Honorable Toni Atkins
President pro Tempore, California State Senate
1021 O Street, Suite 8518
Sacramento, CA 95814

Honorable Nancy Skinner
Chair, Senate Budget and Fiscal Review Committee
1020 O. Street, Suite 8630
Sacramento, CA 95814

Honorable Anthony Rendon
Speaker, California State Assembly
1021 O Street, Ste. 8330
Sacramento, CA 95814

Subject: Recommendations to Ensure State Investments in Zero-Emission Vehicles (ZEVs) Also Support Enhanced Grid Reliability

I am writing to respectfully suggest that California's large and rapidly growing ZEV fleet be leveraged utilizing bidirectional vehicle-grid integration (VGI) technologies, and related applications, to enhance grid reliability. Recent comments by state officials have highlighted the magnitude and importance of this opportunity.[1]

[1] See April 20, 2022 VGI comments by CA public officials the IBEW Training Center in Pasadena, CA; September 16, 2022 remarks by Governor Newsom at the climate bill signing ceremony; October 4, 2022 remarks by CEC Chair David Hochschild, CAISO President and CEO Elliot Mainzer during the opening plenary of CEC's EPIC Forum; November 10, 2022 remarks by CEC Vice-Chair Siva Gunda and CPUC Commissioner Cliff Rechtschaffen at a VGI press conference at COP 27 in Egypt; December 6, 2022 remarks by CEC Vice-Chair Siva Gunda and CPUC Commissioner Cliff Rechtschaffen at the Vehicle-Grid Integration Council meeting in Berkeley, CA

California has already registered over a million ZEVs. If California puts 8 million light duty ZEVs on the road by 2030, as might be expected based on current market trends, the total aggregate power capacity[2] would be approximately 80 GW. Assuming 10% of that could be available during evening peak periods, 8 GW of dispatchable energy could potentially serve as a flexible grid asset to enhance grid reliability in 2030.[3] Such a massive clean energy reservoir could reduce emissions from use of fossil peaker plants and also save ratepayers by avoiding overdevelopment of additional stationary capacity needed to cover shortfalls during peak conditions such as what occurred on September 6, 2022.

To harness this ZEV capacity to enhance grid reliability California, should implement the following, utilizing already-appropriated funds[4] to the extent possible:

- **Develop uniform standards for bidirectional charging**. Rather than having individual EV and EVSE manufacturers developing proprietary standards and to capitalize on the unused battery storage capacity in EVs, California should create open standards for hardware and software that would apply to all, so individual consumers can decide if and how they want to utilize the energy available in their car battery to power their home or share with the broader grid.[5]

- **Mandate that Zero Emission Vehicle purchases that are supported by state funds include bidirectional capability, so state-funded ZEVs can serve as grid reliability assets to the extent practical.** California has budgeted $10 billion in multiyear funding to support the adoption of ZEV's. Failure to utilize this public investment to also support grid reliability would be a huge missed opportunity. One obvious use case for this requirement is school buses, which have predictable schedules that are ideal for providing grid support services during the evening ramp. For example, the Cajon Valley Union School District uses its seven electric school buses funded by federal and state grants as a virtual power plant that can discharge electricity back to the grid.[6]

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[2] Assuming instantaneous power export capacity of 10kW per passenger vehicle

[3] A newly published MIT study explains benefits of how this can work, see https://pubs.rsc.org/en/Content/ArticleLanding/2022/YA/D2YA00204C

[4] The CEC is currently contemplating how to effectively invest in clean energy resources in order to enhance grid reliability pursuant to SB 846 and AB 205

[5] Note that existing and near-term bidirectional charger deployment will necessarily rely on proprietary approaches. While we recommend California support uniform standards that support scalability and long-term market sustainability, we advise against excluding technologies that currently rely on proprietary capabilities from near-term programs and funding opportunities.

[6] https://abc7.com/cajon-valley-union-school-district-buses-electric-gas-powered-vehicles/12169230/

- **Create a new program to incentivize installation of bidirectional EV charging equipment at existing public facilities that already have on-site PV capacity.** For example, roughly 2,800 schools already have publicly-funded solar PV installed on-site. To the extent practical, state funding should support load-shifting of solar.

- **Provide compensation structures and technology incentives for consumers to utilize privately-owned EVs as grid reliability assets.** One of the keys to unlocking ZEVs as a grid resource is a compensation structure that pays ZEV owners for the actual electrons that they provide to the grid, as well as for having their batteries available to be drawn upon during critical times, akin to a capacity payment. Another key component is technology incentives that offset the high upfront costs of installing the necessary bidirectional chargers and associated equipment. PG&E recently announced it will offer the nation's first export rate for commercial electric vehicles in California, which provides both a compensation structure and technology incentive, though it is limited in scope and budget. While PG&E's new offering supports commercial EVs, incentives are also needed for individual bidirectional ZEV owners, including those charging at home. For example, $/kW subsidies for bidirectional chargers and enabling equipment could help accelerate utilization of privately-owned ZEVs as grid assets. Incentives for bidirectional EVs and EVSE not only benefit the owners of the assets, they also benefit all ratepayers: by leveling supply and demand of the grid through VGI, peaks and valleys of the duck curve are also leveled, lowering the cost of energy for all ratepayers. Lastly, California is home to several VGI technology and equipment manufacturers, providers, and installers, a sector that would see significant job growth resulting from this set of incentives.

- **Prioritize development of ZEV-based energy resilience for project development in frontline communities that suffer the most from air pollution and power outages**. For example, the Oakland Public Library is developing a project[7] that will use ZEV buses as a resilience asset during blackouts.

California policymakers should aspire to achieve a future in which the duck curve problem has been solved because a substantial portion of the evening load is served daily using millions of batteries that are (mostly) not paid for by ratepayers or taxpayers, at a far lower cost to ratepayers than other options. It is a future vision that California is ideally suited to achieve, building upon its existing million solar roofs and million ZEVs.

[7]https://www.microgridknowledge.com/editors-choice/article/11436854/schneider-and-partners-to-pilot-unusual-ev-microgrid-in-oakland-california

Please let us know if you have any questions (we can recommend lots of additional related information resources[8]) and thank you for your consideration.

Respectfully submitted,

Ellie Cohen
CEO, The Climate Center

[8] For example, see VGI Comments filed with the CEC (docket 21-ESR-01) November 30, 2022 by The Climate Center et al and also comments filed by the Vehicle-Grid Integration Council at https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-ESR-01 and also recent press including "What's Bi-directional Charging and Which EVs Offer It?" September 28, 2022 article in Cars.com: https://www.cars.com/articles/whats-bidirectional-charging-and-which-evs-offer-it-457608/
also "How electric cars can keep California's power on without more natural gas" San Francisco Chronicle Op-Ed by Climate Center CEO Ellie Cohen, July 28, 2022: https://www.sfchronicle.com/opinion/openforum/article/electric-cars-california-power-17333054.php