

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Application of San Diego Gas & Electric
Company (U 902E) for Approval of SB 350
Transportation Electrification Proposals.

Application 17-01-020
(Filed January 20, 2017)

And Related Matters.

Application 17-01-021
Application 17-01-022

**OPENING BRIEF OF THE
CALIFORNIA ENERGY STORAGE ALLIANCE**

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Pursuant to the *Scoping Memo and Ruling of Assigned Commissioner and Administrative Law Judges* (“Scoping Ruling”) issued on April 13, 2017 and the *Administrative Law Judge’s Ruling Summarizing Clarifications Made in May 25, 2017 E-Mail* issued on June 6, 2017, and in accordance with the Rules and Procedure of the California Public Utilities Commission (“Commission”), the California Energy Storage Alliance (“CESA”)¹ hereby submits this opening brief for the priority review projects that have been proposed in these three applications.

¹ 8minutenergy Renewables, Adara Power, Advanced Microgrid Solutions, AES Energy Storage, AltaGas Services, Amber Kinetics, American Honda Motor Company, Inc., Bright Energy Storage Technologies, BrightSource Energy, Brookfield, Consolidated Edison Development, Inc., Customized Energy Solutions, Demand Energy, Doosan GridTech, Eagle Crest Energy Company, East Penn Manufacturing Company, Ecoult, EDF Renewable Energy, ElectriQ Power, eMotorWerks, Inc., Energport, Energy Storage Systems Inc., Geli, Green Charge Networks, Greensmith Energy, Gridscape Solutions, Gridtential Energy, Inc., Hitachi Chemical Co., IE Softworks, Innovation Core SEI, Inc. (A Sumitomo Electric Company), Johnson Controls, LG Chem Power, Inc., Lockheed Martin Advanced Energy Storage LLC, LS Power Development, LLC, Magnum CAES, Mercedes-Benz Energy, National Grid, NEC Energy Solutions, Inc., NextEra Energy Resources, NEXTracker, NGK Insulators, Ltd., NICE America Research, NRG Energy, Inc., Ormat Technologies, OutBack Power Technologies, Parker Hannifin Corporation, Qnovo, Recurrent Energy, RES Americas Inc., Sharp Electronics Corporation, SolarCity, Southwest Generation, Sovereign Energy, Stem, STOREME, Inc., Sunrun, Swell Energy, UniEnergy Technologies, Viridity Energy, Wellhead Electric, and Younicos. The views expressed in this Opening Brief are those of CESA, and do not necessarily reflect the views of all of the individual CESA member companies. (<http://storagealliance.org>).

I. INTRODUCTION.

CESA supports the transportation electrification projects that the investor-owned utilities (“IOUs”) proposed to be included in the Commission’s “priority review” process. As noted in the September 14, 2016 Assigned Commissioner’s Ruling in R.13-11-007,² the expedited review process is designed for smaller, shorter-duration, non-controversial projects that experiment in diverse market segments to inform the eventual design of scaled programs. These experimental programs should work to achieve reductions in criteria air and greenhouse gas (“GHG”) pollutants from the transportation sector. CESA focuses here on using the opportunity in these priority review projects to experiment with the integration of energy storage resources to electric vehicle (“EV”) charging station and associated dynamic charging rates to better support the grid while providing customers with the flexibility of charging their EVs at their convenience.

II. THE INVESTOR-OWNED UTILITIES SHOULD CONSIDER HOW ENERGY STORAGE RESOURCES CAN SUPPORT TRANSPORTATION ELECTRIFICATION IN THEIR PRIORITY REVIEW PROJECTS.

Adding energy storage systems to EV charging infrastructure creates an opportunity to more intelligently manage a facility’s load schedule, avoid costly demand charges, and enable additional EV charging without expensive distribution upgrades. Demand charges are particularly detrimental to the value proposition for customers as these costs may be incurred for any momentary spike in electricity demand to charge an EV, especially from DC fast chargers that can draw anywhere from 50 to 125 kW over a short 30-minute period with one charge and that attract more “on the go” drivers whose driving and charging schedules are less predictable and regular. This has the potential to become the largest operating cost component and surpass

² *Assigned Commissioner’s Ruling Regarding the Filing of the Transportation Electrification Applications Pursuant to Senate Bill 350*, filed September 14, in R.13-11-007.

the initial acquisition cost within a few years of operation. With a fully-integrated energy storage system paired to a DC fast charger, the power flow from the grid can be decoupled from that of the vehicle, reducing the peak load and associated demand charges significantly. Furthermore, for similar reasons, a fully-integrated energy storage system paired to a DC fast charger may allow various constrained sites to avoid costly distribution upgrades by managing the site's peak load within the capacity of its service panels and wires. At this point in time, it is important to note that the economics of pairing energy storage and renewables with DC fast chargers are still difficult. Therefore, a pilot program that integrates energy storage could provide an opportunity to gather additional data on the costs and benefits of this type of configuration. At the same time, the capacity factor of a charging station should be utilized to evaluate the opportunity for the economics of pairing it with energy storage.

CESA generally supports San Diego Gas and Electric Company's ("SDG&E") proposal to test two Grid-Integrated Rates ("GIRs") aimed at incentivizing customers to charge during off-peak hours. Their proposed GIRs include a combination of a monthly fixed charge based on annual peak demand, an hourly base rate plus the California Independent System Operator's ("CAISO") day-ahead hourly price, and a dynamic adder similar to Critical Peak Pricing ("CPP") for the top 200 system hours and the top 150 circuit hours. Notably, SDG&E's \$3.5-million Green Taxi/Shuttle/Rideshare Program proposes to have one of the five DC fast charging units to be integrated with energy storage and solar energy.³ CESA supports this pilot project to the extent that the GIRs do not propose the use of demand charges to recover distribution costs

³ *Application of San Diego Gas & Electric Company (U 902-E) for Authority to Implement Priority Review and Standard Review Proposals to Accelerate Widespread Transportation Electrification*, submitted on January 20, 2017, p. 7; *Prepared Testimony of Randy Schimka on Behalf of San Diego Gas & Electric Company Chapter 3*, submitted on January 20, 2017, p. 70.

and that the Public GIR used for the Green Taxi/Shuttle/Rideshare Program does not include a monthly fixed charge.

Even so, CESA is concerned that the proposed Public GIR may lack sufficient incentive to customers to charge during off-peak hours. Other than the dynamic adders for the ‘peakiest’ hours on the system and distribution grid, the incentives to guide charging behavior is based on the proposed hourly base rate of \$0.13871/kWh plus the CAISO’s day-ahead hourly price,⁴ thereby requiring sufficient differentials in the day-ahead market to economically arbitrage hourly prices given the inherent roundtrip efficiencies of energy storage systems. The day-ahead hourly price from the CAISO is the only regular time-based variable in the Public GIR. In a September 2016 report on Pacific Gas and Electric Company’s (“PG&E”) Vaca-Dixon and Yerba Buena Sodium-Sulfur Battery Energy Storage Systems, however, it was revealed that day-ahead energy prices did not, in some instances, exhibit enough difference between high and low priced hours to offset efficiency losses for energy arbitrage purposes.⁵ CESA understands that the one DC fast charging unit in the Green Taxi/Shuttle/Rideshare Program with energy storage and solar energy may have the energy storage system charge from the onsite solar generation, but to the extent that it may charge from the grid, there may be little given incentive to do so given the likely insufficient differential between high- and low-priced hours.

Instead, to better promote renewable integration and provide clearer signals to EV drivers to charge during a defined time period, it may be beneficial to send a stronger pricing signal to charge during solar overgeneration hours. As one solution for the Public GIR (and potentially

⁴ *Prepared Testimony of Cynthia Fang on Behalf of San Diego Gas & Electric Company Chapter 5*, submitted on January 20, 2017, p. 28.

⁵ *EPIC Project 1.01 – Energy Storage End Uses: Energy Storage for Market Operations*, EPIC Final Report submitted by PG&E on September 13, 2016, pp. 2, 36.

for the Commercial GIR as well), CESA recommends that super-off-peak hours be defined and promoted to customers as major “discount charging hours” wherein customers only pay the CAISO’s day-ahead hourly prices to charge from the grid, without the proposed hourly base rate. Whether through managed EV charging or through energy storage integration, the additional \$0.13/kWh in savings on top of the differentials between high- and low-priced hours at the CAISO could provide significant economic incentives for drivers to charge during these discount hours, while simultaneously providing significant benefit to the grid in integrating renewables. By also translating and displaying this information in a familiar dollars-per-gallon format, it will send clear economic signals to drivers on the benefits of charging during these hours.

By the same token, for the Commercial GIR, CESA is concerned that the use of a monthly fixed charge based on the maximum annual demand of the customer may limit the value proposition for customers to reduce their electricity bills by managing their charging schedules. As discussed above in relation to the Public GIR, the only time-variant portion of the Public GIR is the hourly base rate of \$0.0969/kWh plus the CAISO day-ahead hourly price. Insufficient differentials in the day-ahead market to arbitrage charging schedules combined with the fixed charge is likely to limit charging behavior on a regular basis.

Broadly, CESA believes that additional priority review projects proposed by the IOUs could include some element that tests how energy storage systems could be integrated with EV charging stations. Currently, the only other priority review project with some element of energy storage included is PG&E’s \$3.4-million Medium or Heavy Duty Fleet Customer Demonstration, wherein PG&E proposes to support the customer in procuring potential charge management and energy storage systems. In general, there may be opportunities to test the synergies between energy storage and EV charging stations for customers and users that seek EV

charging on a less predictable schedule and require quick fast-charging that would otherwise create significant power draws from the distribution grid – *e.g.*, in major travel corridors or urban charging hubs. On the other hand, using PG&E’s Electric School Bus Renewables Integration Pilot as an example, it is reasonable to believe that energy storage integration with EV charging for buses makes less economic sense, given that bus drivers operate their vehicles regularly during the morning and late afternoon commutes and park their vehicles during mid-day. For similar reasons, there may be less of a use case for energy storage integration in off-road infrastructure (*e.g.*, airports) where the vehicles operate on regular schedules that allow for predictable, longer-duration charging.

Additionally, it may be more reasonable, for example, to test the integration of energy storage in Southern California Edison’s (“SCE”) Urban DCFC Pilot, where target customers for this pilot likely require quick charges and come at all hours of the day, making it more difficult for the site to manage its peak demand or operate on a regular time-of-use charging schedule. Similar integration of energy storage systems could be done in SDG&E’s Electrify Local Highways Program, which places customers on the proposed Public GIR and targets a customer segment requiring quick charges at all times of the day. CESA thus recommends that the IOUs review their priority review projects, including the aforementioned Urban DCFC Pilot from SCE and Electrify Local Highways Program from SDG&E, to include piloting of energy storage integration at select sites, as appropriate. CESA understands that the integration of energy storage in these use cases may require the installation of large capacities of energy storage, which may be cost prohibitive or difficult to install if there are space constraints. Like the Commission, however, CESA views these priority review projects as an important opportunity to experiment and test new ideas, concepts, and project designs, while accounting for the utilization

rate or capacity factor of potential EV charging stations to identify the best project locations and use cases for cost-effective pairing opportunities. Without more robust testing of energy storage integration, CESA finds the proposed priority review projects are missing an important opportunity to support customer choice, GHG reductions, and renewables integration.

III. CONCLUSION.

CESA appreciates the opportunity to submit this opening brief on the priority review projects and looks forward to working with the Commission and stakeholders to develop ideas on how to integrate energy storage into transportation electrification proposals.

Respectfully submitted,



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