BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON THE ADMINISTRATIVE LAW JUDGE'S RULING SEEKING PROPOSALS AND COMMENTS ON IMPLEMENTATION OF ASSEMBLY BILL 693

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In accordance with Rules of Practice and Procedure of the California Public Utilities Commission ("Commission"), the California Energy Storage Alliance ("CESA")[1] hereby submits these comments on the *Administrative Law Judge's Ruling Seeking Proposals and Comments on Implementation of Assembly Bill 693*, issued on July 8, 2016 ("Ruling").

I. INTRODUCTION.

CESA strongly supports Assembly Bill ("AB") 693 that created the Multifamily Affordable Housing Solar Roofs Program ("AB 693 Program") and the financial incentives

[1] 1 Energy Systems Inc., Adara Power, Advanced Microgrid Solutions, AES Energy Storage, Amber Kinetics, Aquion Energy, Bright Energy Storage Technologies, Brookfield, California Environmental Associates, Consolidated Edison Development, Inc., Cumulus Energy Storage, Customized Energy Solutions, Demand Energy, Eagle Crest Energy Company, East Penn Manufacturing Company, Ecoult, Electric Motor Werks, Inc., ElectrIQ Power, ELSYS Inc., Enphase Energy, GE Energy Storage, Geli, Gordon & Rees, Green Charge Networks, Greensmith Energy, Gridscape Solutions, Gridtential Energy, Inc., Hitachi Chemical Co., Ice Energy, Innovation Core SEI, Inc. (A Sumitomo Electric Company), Invenergy LLC, Johnson Controls, K&L Gates, LG Chem Power, Inc., Lockheed Martin Advanced Energy Storage LLC, LS Power Development, LLC, Mercedes-Benz Research & Development North America, Nature & PeopleFirst, NEC Energy Solutions, Inc., NextEra Energy Resources, NGK Insulators, Ltd., NRG Energy LLC, OutBack Power Technologies, Parker Hannifin Corporation, Powertree Services Inc., Qnovo, Recurrent Energy, RES Americas Inc., Saft America Inc., Samsung SDI, Sharp Electronics Corporation, Skylar Capital Management, SolarCity, Sovereign Energy, Stem, SunPower Corporation, Sunrun, Swell Energy, Trina Energy Storage, Tri-Technic, UniEnergy Technologies, Wellhead Electric, Younicos. The views expressed in these Comments are those of CESA, and do not necessarily reflect the views of all of the individual CESA member companies. (http://storagealliance.org).

provided for the installation of solar photovoltaic ("PV") systems on qualified multifamily affordable housing properties. CESA certainly commends the Commission for its consideration of energy storage in the ten-year, $1-billion AB 693 Program focused on residential customers in disadvantaged communities. As the Commission seeks proposals for implementing the AB 693 Program, CESA urges the Commission to very clearly confirm program eligibility for energy storage systems and electric vehicle ("EV") chargers paired with solar PV systems, which together provide disadvantaged communities with well-recognized benefits of improved housing quality, lower energy use and cost, and reduced environmental impacts.

To maximize the benefits of energy storage paired with solar PV systems, the AB 693 Program should also provide post-installation, fixed rebates for energy storage systems and EV chargers that are paired with solar PV systems to help offset the upfront cost of installing new energy storage systems and EV chargers. In these comments, CESA makes the case for the synergistic benefits of energy storage and EV chargers paired with solar PV systems in the AB 693 Program, and offers its response to Questions 7 and 8 in the Ruling specifically related to the eligibility of energy storage systems and EV chargers for AB 693 Program funds.

II. ENERGY STORAGE SYSTEMS AND ELECTRIC VEHICLE CHARGERS PAIRED WITH SOLAR PHOTOVOLTAIC SYSTEMS PROVIDE ADDITIONAL ECONOMIC AND ENVIRONMENTAL BENEFITS TO DISADVANTAGED COMMUNITIES.

To date, not enough energy storage systems paired with solar PV systems have served disadvantaged community customers for a combination of reasons, including – the 'split incentives' financing issue between building owners and tenants, upfront capital costs, and 'newness' of the option for an entity to install energy storage in addition to the on-site solar PV offering. Regardless, in a May 2016 report, the Clean Energy Group, California Housing Partnership Corporation, and Center for Sustainable Energy presented their case study findings

of energy storage systems paired with solar PV systems, which provide demand charge savings for multifamily affordable housing properties that standalone solar systems cannot sufficiently provide.[2] While solar-PV-only systems offset all energy charges and a small portion of demand charges under virtual net metering ("VNM"), the study showed that energy charges typically represent only half a multifamily affordable housing property's electricity bills, with demand charges composing almost one third of electricity bills.[3]

Importantly, the report demonstrates that energy storage systems paired with solar PV systems virtually eliminate electric bills for many multifamily affordable housing properties and double the electricity bill savings as compared to those properties with only standalone solar PV systems. For one affordable housing property analyzed under current utility rate structures,[4] the report highlights how a multifamily affordable housing property with a standalone $385,000 solar installation achieved electricity bill savings of $15,000 per year, while the same property with the addition of a $112,100 battery storage system achieved electricity bill savings of $27,900 – an 85% increase in savings for only a 29% increase in cost (see figure below).[5] As California shifts to mandatory time-of-use ("TOU") rates for net energy metering ("NEM") customers when the investor-owned utilities ("IOUs") hit their NEM cap and implement default TOU rates for all residential customers in 2019, the economic case for energy storage systems plus solar PV systems for multifamily affordable housing properties will become even stronger

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[2] *Closing the California Clean Energy Divide: Reducing Electric Bills in Affordable Multifamily Rental Housing with Solar+Storage*, published by the Clean Energy Group, California Housing Partnership Corporation, and Center for Sustainable Energy on May 2016, pp. 11-12. http://www.cleanegroup.org/wp-content/uploads/Closing-the-California-Clean-Energy-Divide.pdf

[3] *Ibid*, p. 3.

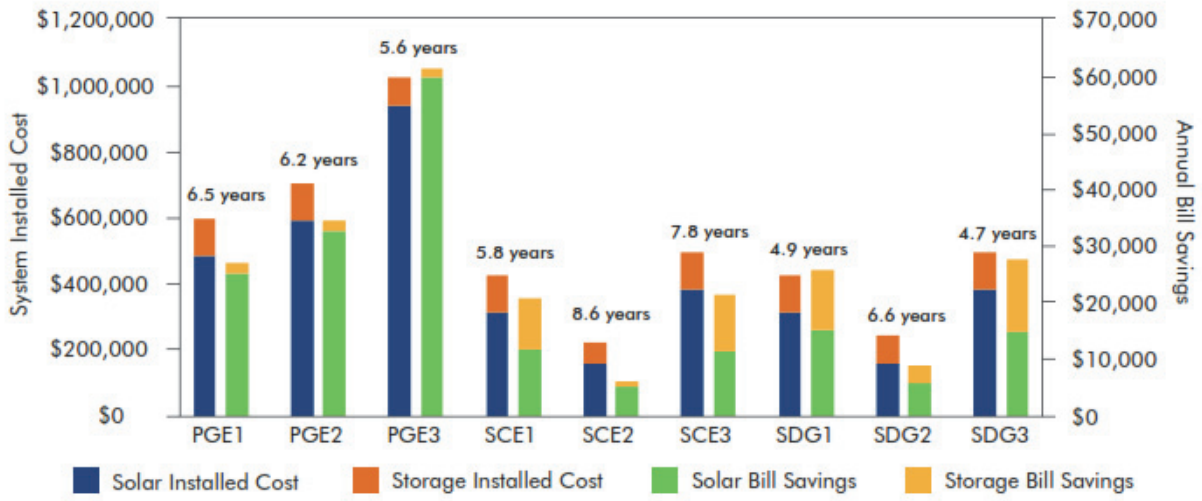
[4] The report examined three affordable rental housing properties in each of the utility territories and focused on bill savings for common area building loads.

[5] *Ibid*, pp. 3, 5-6, 12.

and allow low-income communities to be protected from financial risks tied to more dynamic rates. Furthermore, by deploying energy storage paired with solar PV systems installed on multifamily affordable housing properties, these communities will be positioned to potentially take advantage of additional revenues in the future (beyond just solar PV self-consumption) from providing grid services such as frequency regulation and demand response.

FIGURE 4

Installed Costs and Bill Savings for Building Common Area Loads



Installed cost of solar and battery storage systems to cover building common area loads (left axis) and the resulting annual electricity bill savings for the building (right axis). Project payback periods range from 4.7 to 8.6 years, noted above bars. Note that project payback periods factor in all available incentives, which are detailed in Appendices A and B.

In addition to the economic benefits, there are also environmental benefits for energy storage systems paired with solar PV systems being deployed at affordable housing properties. Low-income and minority communities tend to be disproportionately located near traditional fossil-fueled power plants[6] and experience the most cumulative environmental health burdens.[7] Another study found that peaker plants in particular, which contribute a disproportionate share of

[6] EPA, 2015. *EJ screening report for the Clean Power Plan*. Tech. Rep. Docket: EPA-HQOAR-2013-0602, U.S. Environmental Protection Agency.

[7] Cushing, L., Faust, J., August, L.M., Cendak, R., Wieland, W., Alexeeff, G., 2015. *Racial ethnic disparities in cumulative environmental health impacts in California: Evidence from a statewide environmental justice screening tool*. American Journal of Public Health 0, e1–e8.

GHG emissions given their share of total generation and their usage on poor air quality days, are disproportionately sited in locations (84% of all peaker plants in California) with higher than average scores according to CalEnviroscreen 2.0 – *i.e.*, communities with significant environmental burdens.[8] Increasing deployment of distributed energy resources such as energy storage systems paired with solar PV systems in disadvantaged communities could displace a significant amount of power plant emissions by reducing the usage of these plants.

Furthermore, energy storage systems paired with solar PV systems provide resilience benefits that stand-alone solar PV systems cannot provide because they are typically configured to shut down when the power system goes down. The Clean Energy Group's October 2015 report showed that these important but difficult to quantify resilience benefits can be achieved for "nearly free" because of the financial benefits of energy storage systems paired with solar PV systems in providing demand charge savings and/or in generating supplementary revenue from providing wholesale grid services.[9] While extreme weather driven power outages are less frequent in California as compared to the hurricane and storm prone Northeast states, the Aliso Canyon gas leak situation represents an instance in which energy storage systems paired with solar PV systems would have provided critical resilience benefits and mitigated grid reliability issues from the moratorium on usage of gas storage from the Aliso Canyon facility.

Finally, CESA requests that the Commission also consider the eligibility of EV chargers paired with solar PV systems in the AB 693 Program. The Ruling does not mention EV chargers

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[8] Krieger, Elena M., Joan A. Casey, and Seth B.C. Shonkoff. *A framework for siting and dispatch of emerging energy resources to realize environmental and health benefits: Case study on peaker power plant displacement*. Energy Policy, May 27, 2016, pp. 304, 306, 308-309. http://www.sciencedirect.com/science/article/pii/S0301421516302798

[9] *Resilience for Free: How Solar+Storage Could Protect Multifamily Affordable Housing from Power Outages at Little or No Net Cost*, published by the Clean Energy Group on October 2015. http://www.cleanegroup.org/wp-content/uploads/Resilience-for-Free-October-2015.pdf

as a possible technology eligible for AB 693 Program incentives, but CESA believes that EV chargers warrant inclusion in this program when paired with solar PV systems because of the additional economic, environmental, and resilience benefits that they provide to affordable housing properties similar to paired energy storage systems. Inclusion of EV chargers in the AB 693 Program potentially increases EV adoption for low-income citizens (who have less financial resources to access EVs) by enabling the use of solar PV generation for EV charging and by offsetting the cost and GHG emissions impact of gasoline. Low-income and disadvantaged communities potentially benefit financially from owning and driving EVs that have an equivalent cost of gasoline of approximately $0.99 per gallon[10] and generally have lower maintenance costs as compared to gas-powered cars. Similarly, smart EV chargers have the potential to tap into additional revenue streams by providing grid services such as demand response and load balancing. Significantly, inclusion of EV chargers in the AB 693 Program also supports multiple objectives of Senate Bill ("SB") 350, which aims to enhance transportation electrification efforts and minimize localized air pollutant and other GHG emission impacts, particularly in disadvantaged communities.[11]

The economic and environmental benefits of energy storage systems and EV chargers paired with solar PV systems in disadvantaged communities, including multifamily affordable

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[10] An EV typically consumes about 0.34 kWh/mile when driving, which at the PG&E EV Tariff off-peak rate of $0.1174/kWh, equates to $0.04/mile. With average US gas mileage at 25 miles/gallon and with California gas prices at $2.725/gallon, it costs $0.11/mile or $0.99/gallon to drive an EV.

Source: PG&E EV Tariff, http://www.pge.com/tariffs/tm2/pdf/ELEC_SCHEDS_EV.pdf. California Energy Almanac, http://energyalmanac.ca.gov/gasoline/. Edmunds, http://www.edmunds.com/car-news/average-fuel-economy-for-new-cars-pegged-at-254-mpg-in-january.html.

[11] Senate Bill 350 Section 740.12(a)(1) and Section 454.52(a)(1)(H). https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350

housing properties, presents a compelling case for energy storage systems to be considered eligible for the Commission's AB 693 Program when combined with a solar PV system.

III. CESA'S RESPONSE TO THE ADMINISTRATIVE LAW JUDGE'S REQUEST SEEKING COMMENTS.

CESA focuses its comments here on two questions specifically addressing the eligibility of energy storage systems paired with solar PV systems. In Reply Comments, CESA may respond to proposals and comments addressing other questions in the Ruling as well.

Question 8: Would a solar energy system paired with a storage device meet the definition in Section 2870(a)(4) of "solar energy system"? Why or why not?

CESA believes that a solar PV energy system paired with a storage device meets the definition in Section 2870(a)(4) of "solar energy system." Section 2870(a)(4) defines "solar energy system" as "a solar energy photovoltaic device that meets or exceeds the eligibility criteria established pursuant to Section 25872 of the Public Resources Code." The California Energy Commission ("CEC") specifies that "solar energy systems" eligible for financial incentives "must have the primary purpose of collecting and distributing solar energy for electricity generation."[12] According to the CEC definition, energy storage systems qualify for financial incentives if the energy storage system is charging from and shifting the time of consumption of the solar PV generation.

Furthermore, energy storage systems are defined as an "addition or enhancement" according to the CEC's Renewable Portfolio Standard ("RPS") Guidebook as long as they are directly connected or integrated with an RPS-eligible generator. The Commission determined in

[12] *Guidelines for California's Solar Electric Incentive Programs (Senate Bill 1)*, 5th Edition, California Energy Commission, p. 6. http://www.energy.ca.gov/2012publications/CEC-300-2012-008/CEC-300-2012-008-ED5-CMF.pdf

D.14-05-033 that energy storage systems qualify as an "addition or enhancement" to a NEM-eligible resource and therefore should be treated as part and parcel of those systems – *i.e.*, be subject to the same treatment as the NEM-eligible system with which they are paired. Lastly, the Federal Investment Tax Credit ("ITC") requires energy storage systems to annually charge with at least 75% of the paired on-site renewable energy.

In sum, the CEC and Commission have each determined that energy storage systems should be subject to the same treatment as the RPS-eligible or NEM-eligible system with which they are paired, and federal tax policy incentivizes energy storage charging primarily from the renewable generator. Thus, energy storage systems demonstrably meet the definition in Section 2870(a)(4) of "solar energy system" and therefore should be eligible for incentives in the AB 693 Program.

<u>Question 8</u>: If you believe that a solar energy system paired with a storage device meets the Section 2870 definition, should the Commission adopt incentive levels or structures for these projects that differ from the incentive structure that you have recommended in response to Question 7 for systems without storage? If so, how should the incentive differ?

CESA understands that the AB 693 Program has a 300-MW solar PV installation capacity goal to be accomplished using $1-billion budget over ten years and recognizes that meeting the capacity goal for the AB 693 Program is important. At the same time, CESA believes that a small portion of the budget should be allocated to paired energy storage systems given the additional economic and environmental benefits that they can provide. CESA believes that there is sufficient evidence at this time to establish a 'carve-out' within the AB 693 Program to pair a minimum MW level of energy storage systems with solar PV generation. This minimum MW level can be determined based on the incentive level to be determined and the AB 693 Program budget. The Commission should balance the preservation of sufficient funds to

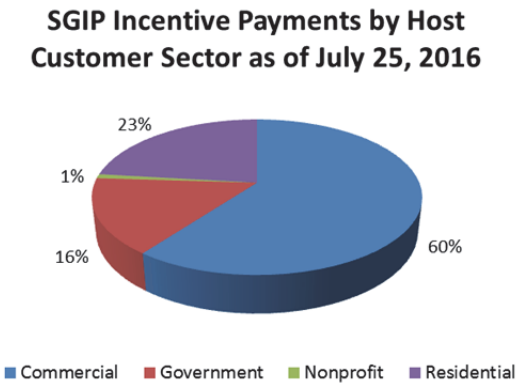
achieve the capacity goal intended by AB 693 while allocating a portion of the budget to paired energy storage systems to maximize the benefits to multifamily affordable housing properties and to provide optionality in light of future regulatory changes and uncertainty.

The lack of excess operating income to cover upfront investment costs and complex ownership structures leads CESA to believe that the Commission should adopt the appropriate incentive levels for the energy storage portion of costs for energy storage paired with solar PV systems in the AB 693 Program. Even with recent reforms to the Self-Generation Incentive Program ("SGIP"), which allocates 75% of its budget to energy storage technologies, CESA believes that SGIP funds are competitive, only extends through 2019, and therefore will likely not go to low-income and disadvantaged communities. Moreover, SGIP is intended to be a 'market transformation' program rather than one dedicated to providing localized economic and environmental benefits to low-income and disadvantaged communities. Given these factors, SGIP is not a meaningful and long-term incentive support mechanism for energy storage for multifamily affordable housing properties.

While the SGIP reports do not directly report the level of funding directed toward low-income or disadvantaged communities, a cursory review of the SGIP weekly reports show that 76% of funds to date for advanced energy storage systems have gone to the commercial and government customer sectors, which certainly do not support energy storage deployment for low-income or disadvantaged communities.[13] The share of residential and nonprofit customer recipients of SGIP funds that are low income or disadvantaged is unclear and warrants further review for the purposes of the AB 693 Program. Notwithstanding comprehensive data from

[13] CESA's analysis of the SGIP Weekly Statewide Report as of July 25, 2016. https://www.selfgenca.com/documents/reports/statewide_projects

SGIP, without a dedicated and directed incentive support mechanism, CESA believes that SGIP funds may not be sufficient for energy storage deployment for multifamily affordable housing properties.



	Incentive Amount ($)	Installed Capacity (kW)
Commercial	9,185,878	4,308
Government	2,402,828	1,197
Nonprofit	131,388	69
Residential	3,531,591	1,651

At this time, CESA does not propose a specific incentive level but will collaborate with other parties to conduct the analysis needed to determine the appropriate level. While CESA also believes that the AB 693 Program incentive structure should differ for solar-PV-only systems versus energy storage systems paired with solar PV systems given the differences in benefits and in upfront capital costs, CESA will soon have a specific proposal to structure these differences, but will need to conduct further analysis and work with other stakeholders in doing so.

In addition to AB 693 Program incentives for energy storage systems, CESA requests that the Commission also consider an incentive structure for EV chargers and EV batteries. As previously discussed, smart EV chargers provide significant benefits to these communities and therefore could have a similarly structured incentive when paired with an energy storage system

and/or a solar PV system. Likewise, EV batteries also can provide similar benefits to stationary energy storage systems and therefore could have a smaller portion of its costs offset by AB 693 incentives, considering the EV battery also serves a transportation function. CESA believes that only the costs of the battery bank of the EV should be supported with incentives. But again, CESA does not propose a specific incentive level for qualifying EV chargers and EV batteries at this time until further analysis is conducted.

IV. CONCLUSION.

CESA appreciates the opportunity to submit these comments on the Ruling and looks forward to working with the Commission and parties in establishing a sustainable AB 693 Program that maximizes the clear societal benefits for multifamily affordable housing tenants and property owners.

Respectfully submitted,

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