BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Regarding Policies, Procedures and Rules for the California Solar Initiative, the Self-Generation Incentive Program and Other Distributed Generation Issues.	Rulemaking 12-11-005 (Filed November 8, 2012)

REPLY COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE IN RESPONSE TO ASSIGNED COMMISSIONER'S RULING SEEKING COMMENT ON UPDATING THE GREENHOUSE GAS EMISSION FACTOR FOR SELF-GENERATION INCENTIVE PROGRAM ELIGIBILITY

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The California Energy Storage Alliance ("CESA")[1] hereby submits these reply comments pursuant to the Rules of Practice and Procedure of the California Public Utilities Commission ("Commission"), and the *Assigned Commissioner's Ruling Requesting Comment on Updating Greenhouse Gas Emission Factor for Self-Generation Incentive Program Eligibility*, issued by Assigned Commissioner, President Michael Picker on March 27, 2015 ("ACR").

[1] 1 Energy Systems Inc., Abengoa, Advanced Microgrid Solutions, AES Energy Storage, Aquion Energy, ARES North America, Brookfield, Chargepoint, Clean Energy Systems, CODA Energy, Consolidated Edison Development, Inc., Cumulus Energy Storage, Customized Energy Solutions, Demand Energy, Duke Energy, Dynapower Company, LLC, Eagle Crest Energy Company, East Penn Manufacturing Company, Ecoult, EDF Renewable Energy, Elevation Solar, ELSYS Inc., Energy Storage Systems, Inc., Enersys, EnerVault Corporation, Enphase Energy, EV Grid, Flextronics, Former Michigan State Representative, GE Energy Storage, Green Charge Networks, Greensmith Energy, Gridtential Energy, Inc., Hitachi Chemical Co., Ice Energy, IMERGY Power Systems, Innovation Core SEI, Inc. (A Sumitomo Electric Company), Invenergy LLC, K&L Gates, LG Chem Power, Inc., LightSail Energy, Lockheed Martin Advanced Energy Storage LLC, LS Power Development, LLC, Manatt, Phelps & Phillips, LLP, Mitsubishi Corporation (Americas), Mobile Solar, NEC Energy Solutions, Inc., NextEra Energy Resources, NRG Solar LLC, OutBack Power Technologies, Panasonic, Parker Hannifin Corporation, Powertree Services Inc., Primus Power Corporation, Princeton Power Systems, Recurrent Energy, Renewable Energy Systems Americas Inc., Rosendin Electric, S&C Electric Company, Saft America Inc., Sharp Electronics Corporation, Skylar Capital Management, SolarCity, Sony Corporation of America, Sovereign Energy, STEM, SunEdison, SunPower, Toshiba International Corporation, Trimark Associates, Inc., Tri-Technic, Wellhead Electric, Younicos. The views expressed in these Reply Comments 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's reply comments address several broad themes articulated in opening comments of parties that understandably are biased in favor of continued emphasis on, or even increased support for, technologies that rely on fossil fuels eligible for participation in the Self-Generation Incentive Program ("SGIP"). Contrary to the clear intent of SB 861, these parties advocate for adoption of greenhouse gas ("GHG") methodologies and assumptions that would increase GHG emissions factors from their current levels. This counterintuitive bias ignores the fact that current emissions factors are based on a 20% renewables portfolio standard ("RPS"), and certainly flies in the face of California's policy priorities that continue to move us toward a cleaner grid by steadily increasing RPS targets. Not adjusting GHG emission levels to reflect RPS standards would run directly counter to what the legislature intended with enactment of SB 861 and the direction the state is actively moving toward regarding climate change.

II. THE COMMISSION SHOULD RELY ON A LONG-RUN VS. SHORT-RUN AVOIDED COST METHODOLOGY TO MEASURE THE EFFECTS OF THE SELF-GENERATION INCENTIVE PROGRAM ON UTILITY PLANNING PROCESSES.

Bloom Energy and Fuel Cell and Hydrogen Energy Association ("FCHEA") base their advocacy on the false premise that individual SGIP projects are not considered in the utilities' generation capacity planning processes. Bloom Energy, as one example, cites a study that claims, "…if grid operators give no consideration to the project activity in determining their capacity requirement, then the project activity may not displace new capacity." This reasoning would support a rationale for use of the "short-run" methodology, and the conclusion that SGIP projects "by definition" are not deployed to provide grid capacity, "and therefore cannot be

assumed to offset the build margin."[2] The aggregate number of SGIP projects has always been, and continues to be, included as part of the state's capacity planning process. This is made clear both in both the Commission's Long-term Procurement Plan ("LTPP") and Distributed Energy Resource ("DER") Plan rulemaking proceedings, among others.

The LTPP proceeding drives utilities' capacity procurement, and is based on the state's load forecast provided in the California Energy Commission's Integrated Energy Policy Report ("IEPR"). The IEPR includes a 10-year energy demand forecast that reflects, among other things, distributed generation and "all major programs designed to promote self-generation," including the SGIP.[3] Using Bloom's logic, demand response ("DR"), as an example, should not be included in the IEPR's 10-year load forecast because it does not account for individual DR program participants. However, in practice, this is simply not the case.

CESA also notes that the long run "build margin effect" approach for the SGIP is also consistent with Commission policy articulated in the DER proceeding, which explicitly includes coordinating with existing commission-approved programs, incentives, and tariffs to maximize locational benefits and minimize incremental costs of distributed energy resources DERs.[4] The DER proceeding's goals include: "Integrate DERs into distribution system planning and operations; specifically, propose cost-effective methods of effectively coordinating existing

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[2] *Opening Comments of Bloom Energy, Inc. to the Assigned Commissioner's Ruling Requesting Comment on Updating Greenhouse Gas Emission Factor for Self-Generation Incentive Program Eligibility*, filed on April 17, 2015, p 5.

[3] *See*, *California Energy Demand 2014-2024 Final Forecast. Volume 1: Statewide Electricity Demand, End-User Natural Gas Demand, and Energy Efficiency*, pp. 9, and 38-39, B-1. http://www.energy.ca.gov/2013publications/CEC-200-2013-004/CEC-200-2013-004-V1-CMF.pdf.

[4] *Order Instituting Rulemaking Regarding Policies, Procedures and Rules for Development of Distribution Resources Plans Pursuant to Public Utilities Code Section 769*. R.14-08-013, p. 5. http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M103/K223/103223470.pdf.

commission-approved programs, incentives, and tariffs to maximize the locational benefits and minimize the incremental costs of distributed resources."[5]

Finally, CESA finds Bloom Energy and FCHEA's comments curious. If fossil fuel powered baseload SGIP-incentivized systems are not intended to ever displace or support an increasingly renewable utility generation mix, then why are they being incented? If they cannot or will not ever support California's long term clean energy plan; then that should be considered in evaluating their incentive eligibility. The value of SGIP funding is not just in the systems deployed today, but in the systems that will be installed in the future as a result of SGIP incentives. The Commission should explicitly verify that the technologies incented will provide long term benefit in a high (at least 40%) renewable grid scenario.

III. THE COMMISSION SHOULD REJECT THE SPECIOUS ARGUMENT THAT THE RENEWABLES PORTFOLIO STANDARD ADJUSTMENT IS A "RENEWABLE PENALTY."

Several parties urge the Commission in their Opening Comments to exclude renewable energy in the calculation of the emissions factor. The California Clean DG Coalition, as an example, argued that it is "premature" to consider renewables, and Southern California Gas Company argues the RPS "artificially penalizes customer measures relative to wholesale measures by 20% today and as much as 50% in 2030."[6]

CESA does not view the inclusion of the RPS as a "penalty." The renewables portfolio standard adjustment is consistent with the SGIP's current emission-factor methodology, and it should be carried forward if the SGIP is to support the state's GHG targets. CESA strongly recommends that the Commission place first priority on the existing legislation, policies,

[5] *Ibid*. p. 5.

[6] *Comments of Southern California Gas Company (U 904-G) on Assigned Commissioner's Ruling on Updating Greenhouse Gas Emission Factor for Self-Generation Incentive Program Eligibility*, filed April 17, 2015, p. 3.

planning efforts, and related modeling that are already moving the state toward its long-term goals of reducing GHGs. Incentivizing systems that will be in place for at least 10 years (if not longer), which have higher GHG emissions profile than the grid is simply a very poor use of SGIP funds. Ratepayers should not subsidize technologies that would ultimately make it more expensive to reach the state's GHG targets (due to the need to procure additional renewables).

Curtailment will begin to be a major concern as the state exceeds the current RPS target level of 33%.[7] Inflexible resources will increasingly exacerbate renewable curtailment. As noted in CESA's Opening Comments, the California Independent System Operator is projecting ever-increasing amounts of renewable curtailment and ramping issues due to a lack of system flexibility. Mid-day inflexible fossil generation will increase the number of kilowatt hours curtailed, directly displace renewable generation. The Commission should not let any remaining uncommitted SGIP funds be used to subsidize technologies that will make system-wide GHG reductions more difficult to attain.

IV. THE COMMISSION SHOULD DISREGARD MOST OF SOUTHERN CALIFORNIA GAS COMPANY'S METHODOLOGY, ASSUMPTIONS, DATA SOURCES, AND RESULTING EMISSION FACTORS.

In its Opening Comments, Southern California Gas Company ("SCG") refers to three characteristics of energy storage systems CESA takes strong issue with. First, SCG states, "when AES is paired with PV, the AES system seldom charges form the renewable source."[8] The foundation for this statement is uncertain, as the majority of products provided by CESA members are designed to minimize grid consumption when paired with PV by charging the

[7] *See*, *Investigating a Higher Renewables Portfolio Standard in California*, E3. 2014. https://www.ethree.com/documents/E3_Final_RPS_Report_2014_01_06_ExecutiveSummary.pdf.

[8] *Comments of Southern California Gas Company (U 904-G) on Assigned Commissioner's Ruling on Updating Greenhouse Gas Emission Factor for Self-Generation Incentive Program Eligibility*, filed April 17, 2015, p. 7.

storage either primarily or exclusively by solar. Regardless, energy storage systems may not always be charging from a paired PV resource; however, that is not a requirement to offering a GHG emission reduction or grid benefit. With regard to stand-alone energy storage, as highlighted in CESA's PLEXOS modeling work discussed in its Opening Comments, energy storage with a 60% round-trip efficiency ("RTE") factor provided GHG emissions savings under a 40% RPS and enabled dramatic reductions curtailment and unit starts. Thus, the system level GHG benefits are independent of whether or not there is a direct pairing of energy storage with a co –located renewable generation source. Clearly, if a standalone energy storage system is charged directly with renewable energy, then the GHG benefits will be much, much greater. Ultimately, if the SGIP-incentivized energy storage can help enable electric vehicle charging with renewable energy, then direct displacement of fossil fuel use by cars and trucks with clean renewable energy will result in even more dramatic GHG savings for California.

Second, SCG disputes the assumptions that combined cycle plants are marginal during off-peak hours and simple cycle plants are marginal during peak hours. Instead, SCG asserts that "stakeholders should be using the same assumption for all SGIP eligible technologies."[9] By its very nature, energy storage can act as a dispatchable generator and flexible load. It does not have the same operating characteristics as fuel cell or CHP technologies and therefore should not be compared with the same measuring stick as other SGIP-eligible technologies. CESA agrees that energy storage should be held to the same rigorous standard when it comes to enabling GHG emission savings. However, the means by which energy storage systems do so is inherently different.

[9] *Ibid.*, p.8.

Finally, SCG argues that "not all AES technologies are the same and evaluating them in the same manner or with one single RTE number is inappropriate." As a matter of process, the GHG emissions factor provides a *threshold* for SGIP eligibility – it establishes a minimum requirement. Eligibility is binary in this case – a project is either eligible or not eligible. Furthermore, there are cases in which a 90% RTE system may not be the right type of technology for a particular application. The value proposition of an energy storage technology is highly application-dependent. Host customers should not be penalized for purchasing a lower RTE energy storage system if that system provides as much value as a higher RTE system and is more affordable. As is shown in CESA's production cost modeling, many of the system benefits of energy storage are due to the improvement in overall system dispatch, including reduced unit starts. These benefits are not related to RTE.

V. THE COMMISSION SHOULD DISREGARD CERTAIN OF THE METHODOLOGY, ASSUMPTIONS, DATA SOURCES, AND RESULTING EMISSIONS FACTORS RECOMMENDED BY SOUTHERN CALIFORNIA EDISON COMPANY.

CESA agrees with SCE's emission factor methodology in the sense that it adjusts the emissions factor to account for the state's RPS. CESA disagrees, however, with a number of other assumptions. First, SCE starting point of 9,506 Btu/kWh for gas-fired generators appears to be unreasonably high. This is almost 1,000 Btu/kWh higher than the CEC's average of the gas-fired fleet from 2009-2013, which includes "aging" plants, currently being phased out or repowered with cleaner, combined cycle gas turbine ("CCGT") technology. In the same report, the average heat rate for a CCGT, which is assumed to be the marginal generator for much of the time (combustion turbines over the same time period have a capacity factor of only 4%), between

2009-2013 was 7,211 Btu/kW.[10,11] CESA has been unable to replicate SCE's 9,506 Btu/kWh figure. However, it seems high relative to other published CEC data.

Second, SCE methodology fails to account for the fact that systems subject to the SGIP's GHG eligibility requirement will likely not be installed until 2017 or 2018. At the end of 10 years (2027-2028), the GHG emission profile of the grid will be much cleaner than it is today. It is highly likely that all of the SGIP projects installed under the new GHG emission factor will be in operation in 2030, when it is likely that 50% of the state's electricity generation will be coming from renewables. As stated above, the Commission should utilize the SGIP to promote technologies that enable the transition toward a cleaner grid.

Third, the SGIP should be oriented toward enabling technologies that will benefit Californians beyond the SGIP's horizon. As highlighted in the SGIP Handbook, market transformation for DER technologies is one of the program's core purposes. Solar PV is a very successful example of a technology incentivized through the SGIP, one that has now graduated beyond state incentives. The SGIP enabled the cost reduction, business model development, and customer acceptance of PV technology critical to California's energy future. This success story should serve as a guide for future SGIP technology eligibility.

Fourth, CESA must note that in its Opening Comments SCE seriously mischaracterized the rate of degradation of battery storage systems in its chart entitled "Capacity Drop as Part of Cycling."[12] The degradation projections presented are for *smartphones*, provided by Cadex, a

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[10] *See*, Nyberg, Michael. California Energy Commission. *Thermal Efficiency of Gas-Fired Generation in CA: 2014 Update,* Staff Paper. http://www.energy.ca.gov/2014publications/CEC-200-2014-005/CEC-200-2014-005.pdf.

[11] *Ibid*., p 6.

[12] *Southern California Edison's (U 388-E) Opening Comments on Assigned Commissioner's Ruling Requesting Comment on Updating Greenhouse Gas Emission Factor for Self-Generation Incentive Program Eligibility*, filed April 17, 2015, p. 5.

manufacturer of battery "rejuvenation devices" for the consumer electronics market. The performance reflected in the chart is not reflective of performance of lithium ion batteries designed for grid-use. Smartphone-style pouch pack batteries are substantially different than those used in SGIP-eligible technologies and should not be considered as equivalent - even though they share the word "lithium" in their names.

Like many electrochemical storage technologies, an increase in temperature will affect capacity. However, the impedance of lithium-ion is not substantially affected by temperature, so the round trip efficiency of the technology remains consistent. In practical effect, the battery will not lose its capacity to perform the same work. Moreover, there are many different types of lithium-based chemistries – all, of which, have markedly different operating characteristics and parameters. SCE's discussion of degradation also did not include non-lithium solid-state chemistries, flow batteries (which have an entirely different set of operating characteristics), mechanical storage, or thermal storage systems. CESA also notes, however, that after its discussion on lithium-ion degradation, SCE correctly assumed a 1% degradation factor for its emissions factor analysis.

Finally, CESA was unable to recreate SCE's proposed line loss factors; however, they appear closely related to the line loss adjustment factors listed in Wong (2011) which are used by the CEC to "gross up" its forecast of electricity consumption in the biennial IEPR to account for line losses.[13]

[13] Wong, Lana. *A Review of Transmission Losses in Planning Studies. California Energy Commission*. August 2011. Page 19. http://www.energy.ca.gov/2011publications/CEC-200-2011-009/CEC-200-2011-009.pdf.

CEC line loss factors used to adjust its 10-year Energy Demand Forecast

(Table 5; Wong, 2011)[14]

	Loss Factor		Losses	
	Peak	Energy	Peak	Energy
PG&E	1.097	1.096	8.84%	8.76%
SMUD	1.077	1.064	7.15%	6.02%
SCE	1.076	1.068	7.06%	6.37%
LADWP	1.112	1.135	10.07%	11.89%
SDG&E	1.096	1.0709	8.76%	6.62%
Burbank, Glendale, Pasadena	1.051	1.064	4.85%	6.02%
IID	1.060	1.128	5.66%	11.35%
Department of Water Resources	1.060	1.038	5.66%	3.66%

Source: California Energy Commission, *California Energy Demand 2010-2020, Adopted Forecast.*

SCE's proposed line loss rates for SGIP[15]

Utility	On-Peak Line Loss Rate	Off-Peak Line Loss Rate
PG&E	8.84%	8.75%
SCE	7.06%	6.30%
SDG&E	8.76%	6.25%

Assuming SCE is, in fact, using these line loss factors, they appear to be using adjustment factors for peak demand and energy as a proxy for on-peak and off-peak line loss rates. It is important to note that the "Energy" adjustment listed in the CEC's table is not used to reflect off-peak line losses. It is used to upwardly adjust the amount of generation needed to meet forecast load for the entire service territory. On a more fundamental level, CESA believes that these adjustment factors, used for resource planning purposes, may not reflect actual observed line

[14] *Ibid.*

[15] *Southern California Edison's (U 388-E) Opening Comments on Assigned Commissioner's Ruling Requesting Comment on Updating Greenhouse Gas Emission Factor for Self-Generation Incentive Program Eligibility*, filed April 17, 2015, p. 6.

losses. As stated in CESA's opening comments, actual line losses are calculated using the formula I^2R. This reflects the fact that line losses increase by a squared function as load increases in linear fashion.

VI. CONCLUSION.

CESA thanks the Commission for the opportunity to submit these reply comments on the ACR.

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