BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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Order Instituting Rulemaking Regarding Policies, Procedures and Rules for the California Solar Initiative, the Self-Generation Incentive Program and Other Distributed Generation Issues.	Rulemaking 10-05-004 (Filed May 6, 2010)

OPENING COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON ADMINISTRATIVE LAW JUDGE'S RULING REQUESTING COMMENTS ON STAFF PROPOSAL REGARDING MODIFICATIONS TO THE SELF-GENERATION INCENTIVE PROGRAM

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November 15, 2010

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The California Energy Storage Alliance ("CESA")[1] hereby submits these comments pursuant to the Administrative Law Judge's Ruling Requesting Comments on the Staff Proposal Regarding Modifications to the Self-Generation Incentive Program, issued September 30, 2010 ("ALJ's Ruling").

I. INTRODUCTION.

CESA begins these comments by expressing deep appreciation for the work of the Energy Division Staff. The Staff Proposal ("Proposal")[2] represents a tremendous amount of high quality work, offers a number of excellent potential solutions to complex problems, and highlights opportunities to further improve the Commission's Self Generation Incentive Program ("SGIP")[3] in the future. Subject to resolution of the points discussed in these comments, CESA

[1] The California Energy Storage Alliance consists of A123 Systems, Altairnano, Applied Intellectual Capital, Beacon Power Corporation, Chevron Energy Solutions, Debenham Energy, Deeya Energy, East Penn Manufacturing Co., Inc., Enersys, Enervault, Fluidic Energy, General Compression, Greensmith Energy Management Systems, Ice Energy, Lightsail Energy, International Battery, Inc., Primus Power, Powergetic, Prudent Energy, PVT Solar, Redflow, ReStore Energy Systems, SAFT, Samsung SDI, SEEO, Silent Power, Suntech, Sunverge, SustainX, and Xtreme Power. 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://www.storagealliance.org.

[2] Attachment 1 to the ALJ's Ruling, *Self Generation Incentive Program (SGIP) Staff Proposal*, September 2010.

[3] AB 970, codified as Public Utilities ("P.U.") Code § 399.15(b), Paragraphs 4-7; Load Control and Distributed Generation Initiatives (2000).

strongly supports the expeditious implementation of SB 412[4] and the recommendations contained in the Proposal.

II. STAND-ALONE ENERGY STORAGE SYSTEMS SHOULD BE ELIGIBLE TO PARTICIPATE IN THE SGIP INDEPENDENT OF ANY OTHER PROCEEDING OR POLICY DEVELOPMENT.

At Section 4.2.3 *Need for Financial Incentives*, (pp. 25), the Proposal points out that the White Paper Proposal Appendix C), to which it refers as authoritative elsewhere, "explicitly considers customer investment in energy storage as a stand-alone resource and in applications where it is coupled with distributed solar PV." CESA strongly disagrees with the conclusion later in the Proposal that:

> "Although the stand-alone storage analysis demonstrates that there may be some need for financial support for that technology, staff recommends that the Commission wait until the utilities have completed the cost-effectiveness evaluation of their permanent load shifting (PLS) pilot programs, undertaken in their Demand Response portfolios, before determining whether to include stand-alone storage in SGIP." (p. 28).

The same "wait and see" approach is suggested again in the Proposal at Section 4.3 *Technology Recommendations*. (p. 30). Finally, at Section 4.3.6 *Energy Storage*.

> "Stand-alone Energy Storage – Staff notes that many of the same benefits provided by energy storage coupled with renewable DG can be provided by stand-alone energy storage. However, staff notes that that through the Commission's Demand Response programs, each of the three large IOUs currently has a pilot program for permanent load shifting (PLS) resources. These pilot programs provide incentives for resources that permanently shift load from on-peak to off-peak times, including energy storage resources. The Commission has ordered the IOUs to conduct a cost-effectiveness evaluation of the PLS pilot programs, which is expected in November 2010. Staff recommends that since the PLS pilot programs and stand-alone energy storage incentives through the SGIP might serve similar purposes, the Commission should be cautious about duplicating efforts." (p. 37).

The staffs concern about duplication of effort is inexplicably misplaced. The history of the SGIP, compared with that of Permanent Load Sifting ("PLS") makes this abundantly clear. Further, enactment of SB 412 clearly provides the Commission the latitude to include any

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[4] Stats. 2009, ch. 182, effective January 2010.

distributed energy resources that achieve reduction of greenhouse gas ("GHG")[5] emissions – without conditioning eligibility on events outside the purview of the SGIP. Beginning with enactment of AB 970, the statute that authorized the Commission to create the SGIP in 2001,[6] the program was intended to progressively evolve in step with advances in energy technology and California's energy policy. There is no policy or practical reason to exclude stand-alone energy storage from the SGIP.

In D.99-10-065, issued October 21, 1999,[7] the Commission articulated its very broad frame of reference for encouraging development of distributed energy resources:

> "In this decision we use the term 'distributed generation' to refer to those small scale electric generating technologies such as internal combustion engines, microturbines, wind turbines, photovoltaics, and fuel cells. We use the term DER to refer to the distributed generation technologies, storage technologies, end-use technologies and DSM technologies.
>
> 'Distributed generation' has also been referred to as 'distributed energy resources' (DER) or 'distributed resources' (DR). (OIR, p. 2, fn. 1). *DER appears to be the broadest of all three terms, and includes distributed generation, as well as energy storage technologies such as battery energy storage, superconducting magnetic energy storage, flywheel energy storage, and compressed air energy storage.* DER can also refer to targeted "end-use technologies" or targeted DSM techniques [Emphasis added]" (Mimeo, p. 14).

To date the SGIP is the *only* incentive program that supports energy storage systems. There are no income or production tax credits, like those that have existed for many years to encourage renewable resource development. Because its market situation is unique it is critical that the SGIP include all energy storage technologies, and specifically include stand-alone energy storage. The SGIP has also been a very successful commercialization program for many emerging technologies (e.g. solar, fuel cells, mall wind, etc). Its role for energy storage is even more strategically important because of the absence of any other energy storage incentives at the state or federal levels

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[5] At a minimum, SB 412 requires the Commission to administer the SGIP so as to assure, in consultation with the California Air Resources Board ("CARB"), that eligible technologies meet or exceed standards adopted by the CARB pursuant to the Global Warming Solution Act of 2006 (AB 32).

[6] AB 970, codified as Public Utilities ("P.U.") Code § 399.15(b), Paragraphs 4-7; Load Control and Distributed Generation Initiatives (2000).

[7] Rulemaking on the Commission's Own Motion to Solicit Comments and Proposals on Distributed Generation and Competition in Electric Distribution Service, R.98-12-015, filed December 17, 1998.

As noted above, the Proposal recommends that the Commission consider the results of the PLS study of ways to encourage PLS that is currently being conducted by Southern California Edison Company, Pacific Gas and Electric Company, and San Diego Gas and Electric Company (collectively the "Utilities") ordered by the Commission in D.09-08-027 [8]before deciding how to proceed with incentives for stand-alone energy storage in the self Generation Incentive Program ("SGIP")[9]. Reasons given for the recommendation are (a) there may be distinct types of technologies that could be supported through SGIP incentives that are not fully valued in the PLS context, and (b) the Commission may decide that PLS does not belong in the Demand Response programs.

There are at least two fundamental problems with the Proposal's recommendation: (a) there is no necessary logical or policy nexus between the SGIP and the PLS study, and (b) the report that will be produced at the conclusion of the PLS Study is intended to simply inform the applications for approval of demand response programs and budgets that the Utilities must file by January 31, 2010, that will be implemented during 2011-1014. The SGIP is a mature program that has been existence since 2001, and is being modified in accordance with policy mandated by SB 412. PLS, by contrast, is one form of demand response, or energy storage, that has thus far been funded by the Commission only as a small pilot program, and any expansion of scope or pace of implementation is entirely unknown at the present.

Presumably because the SGIP, although strategically important, is only a subset of much broader policy initiatives contemplated by the Commission, the Proposal does not mention the possibility that there will soon be a new energy storage proceeding dedicated exclusively to energy storage.[10] Recognizing that there will be such a proceeding in the relatively near future, Ice Energy urges the Commission not to slow down the momentum of this proceeding to allow it to "catch up" to one that does not yet exist.

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[8] Decision Adopting Demand Response Activities and Budgets for 2009 through 2011, issued August 20, 2009 in A.08-06-011, et al.

[9] Pursuant to D.09-08-027, Ordering Paragraph 32, the Utilities are conducting a study and have been ordered to deliver a report of their findings and conclusion by December 1, 2010.

[10] *See*, *Electric Energy Storage: An Assessment of Potential Barriers and Opportunities*, Commission Policy and Planning Division White Paper, July 9, 2010, *and see* AB 2514, enacted September 29, 2010.

III. <u>PEAK LOAD MANAGEMENT SHOULD BE *THE* FUNDAMENTAL PROGRAM POLICY GUIDING PRINCIPAL FOR THE SGIP.</u>

At the November 1, 2010 workshop it was noted that the Proposal does not refer to the importance of peak load reduction, and the response was given that it is there implicitly included though out the entire Proposal.[11] As discussed above, the SGIP was originally created for the *sole* purpose of encouraging managing of California's peak load usage of electricity. That focus has, if anything, increased since then, as was highlighted by amendment of P.U. Code §399.15 by AB 1685 in October 2003. AB 1685 added emissions requirements, and also the following reaffirmation of the original impetus for the SGIP:

> "(b) In consultation with the State Energy Resources Conservation and Development Commission, adopt energy conservation demand-side management and other initiatives in order to reduce demand for electricity and reduce load during peak demand periods. Those initiatives shall include, but not be limited to. . . . (6) Incentives for load control and distributed generation to be paid for enhancing reliability."

The Legislative Counsel's Digest described the purpose of AB 1685 as follows:

> "AB 1685, Leno. Energy: self-generation incentive program: peak reduction. Existing law requires the Public Utilities Commission on or before March 7, 2001, and in consultation with the Independent System Operator, to take certain actions, including, in consultation with the State Energy Resources Conservation and Development Commission (Energy Commission), adopting energy conservation demand-side management and other initiatives *in order to reduce demand for electricity and reduce load during peak demand periods*, including, but not limited to, differential incentives for renewable or super clean distributed generation resources.[Emphasis added]"[12]

SB 412 is focused on GHG reduction, of course, but it did not reverse, or eliminate the importance of emphasis on peak load reduction that still remains in P.U. Code §379.6 (renumbered by AB 1536):

> "(e) In administering the self-generation incentive program, the commission may adjust the amount of rebates and evaluate other public policy

[11] The fact that the Commission remains steadfast in its historical commitment to maintaining emphasis on peak is also reflected in the Commission's memoranda submitted as part of the legislative records of SB 412, and its companion bill in the 2009 session, AB 1536 (Blakeslee)..

[12] *See also*, *Opinion Responding to Petition of the California Independent Petroleum Association,* D.05-10-025, issued October 27, 2005; and *Opinion Denying the Petition of Tecogen for Modification of D.04-12-045*, issued February 16, 2006.

interests, including, but not limited to, ratepayers, and energy efficiency, peak load reduction, load management, and environmental interests."

IV. THE MINIMUM ROUND TRIP EFFICIENCY REQUIREMENT FOR PROGRAM ELIGIBILITY SHOULD BE BASED ON THE MINIMUM RTE REQUIRED TO BE 'ON PAR' WITH A NATURAL GAS FIRED PEAKER.[13]

The Staff Report's analysis of the greenhouse gas ("GHG") emissions impacts of energy storage, described in Appendix "A" to the Proposal, indicates that "a minimum round trip efficiency ("RTE") of approximately 67.9% is necessary in order to ensure that energy storage technologies reduce GHG emissions". CESA strongly supports the need to reduce GHG, as required by SB 412. CESA also appreciates Staff's analysis and conclusion that energy storage, as a technology class, will reduce GHGs by reducing the need for natural gas fired peak generation resources.

CESA supports establishing a minimum round trip efficiency requirement for technology-specific storage eligibility in the SGIP. Energy storage can and will reduce GHG emissions as compared to those of a centralized natural gas peaker. However, the specific round trip efficiency requirement and methodology to arrive at this requirement in order to achieve GHG reduction goals is debatable. CESA strongly disagrees with the Proposal's specific minimum round trip efficiency requirement of 67.9% and its underlying methodology on several key points, each of which will be discussed in greater detail below, followed by a specific alternative GHG methodology recommendations:

1. Minimum RTE when coupled with renewable energy – Minimum RTE requirements should factor in the renewable inputs to charge the system, and should be treated differently for the purpose of calculating a minimum RTE standpoint for program eligibility.
2. Staff's analysis Incorrectly uses the same line loss factor for both charging and discharging – it is well accepted that line losses on peak will be far greater than during off-peak times.

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[13] CESA comments in this Section do not represent a consensus view of all CESA members. Perspectives may differ on any particular issue in these comments. Minimum required RTE is one area where there are significantly diverging views. Some CESA members are in favor of postponing a round trip efficiency minimum requirement until accurate field data on the energy storage systems under the SGIP system can be gathered and analyzed.

3. Staff should not utilize an annual RTE degradation, as this does not apply uniformly to all energy storage technologies.
4. Staff's marginal analysis of a combined cycle gas turbine ("CCGT") over-estimates emissions of baseload generation – Staff incorrectly uses the marginal emissions profile of a CCGT to determine the emissions profile of the energy used to charge the storage system. The emissions profile of the actual 'energy mix' used at baseload/off peak times would be a far more accurate representation – this mix should include renewables and other carbon neutral sources, and should factor in potential future renewable over generation in the mix as well as changes in the overall baseload composition over time.

Minimum RTE When Storage is Coupled with Renewable Energy

Staff assumed that energy storage technologies, regardless of whether they are coupled with a renewable SGIP-eligible technology, would charge primarily from the grid and primarily during off-peak hours. Although there will be times in most energy storage coupled with renewable distributed generation projects that the energy storage system is charged off the grid, the energy storage system will often use a combination of both the renewable energy and grid provided power, and there will be other times when it is charged only by renewable energy.

It is widely recognized that renewable energy resources do not always produce power when it is most needed at times of peak demand, and, that existing levels of distributed renewables are rapidly approaching statewide net metering caps[14]. Additionally, at the project level, net metering is limited to projects less than 1 MW in size. Thus for all projects that exceed 1 MW, there may be excess generation that might not be net-metered and instead could be used to charge the on-site energy storage system. For example, this could either be excess wind energy at night or solar generation before or after the period of peak demand during the day. If this generation exceeds coincident demand and if net metering is unavailable, then without energy storage, this "off-peak," excess generation would go to waste. Instead, energy storage can be used to store this excess generation for use at other high-value times. This is one of the

[14] http://www.cpuc.ca.gov/PUC/energy/DistGen/netmetering.htm

main benefits of coupling large capacity energy storage systems with renewable resources, a benefit that was not taken into consideration in the Proposal.

CESA recommends that minimum RTE requirements for integrated energy storage coupled with renewable energy projects should factor in the absence of emissions from renewable inputs to charge the system for the purposes of determining minimum round trip efficiency to meet GHG requirements established by SB 412. The following discussion relates only to the roundtrip efficiency minimum requirement for stand alone storage.

Staff's Analysis Incorrectly uses the Same Line Loss factor for both Charging and Discharging

Line losses of 7.8% were assumed for *both* charging and discharging. It has been scientifically proven that as more current passes through power lines and the ambient temperature increases (which is the case during peak times), line losses will increase as well. This invariably results in the line losses during peak times being greater than during off peak times. A Sandia report published in 2010[15] describes these losses as follows:

> "As with any process involving conversion or transfer of energy, energy losses occur during electric energy transmission and distribution. These T&D energy losses (sometimes referred to as I^2R or 'I squared R' energy losses) tend to be lower at night and when loading is light and higher during the day and when loading is heavy. T&D energy losses increase as the amount of current flow in T&D equipment increases and as the ambient temperature increases. Thus, losses are greatest on days when T&D equipment is heavily loaded and the temperature is high."

Transmission and distribution ("T&D") line loss factors were presented by E3 at the November 10, 2010 PLS Workshop and broken down by summer and winter peak, mid-peak, and off-peak time periods.[16] As an example, the net difference between summer peak and off-peak line losses in PG&E territory was approximately 5%. Based on these findings, CESA recommends factoring in different line loss assumptions for peak vs. off peak times to determine minimum RTE requirements for stand alone storage.

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[15] Eyer, Jim and Garth Corey. Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide. Sandia Report SAND2010-0815. Printed February 2010. Page 138

[16] Slide No. 44 of the CPUC November 10th PLS Workshop (http://www.ethree.com/documents/SCEPLS/PLS%20Workshop%202%20Final.pdf)

Staff Should Not Utilize an Annual RTE Degradation Across all Technologies

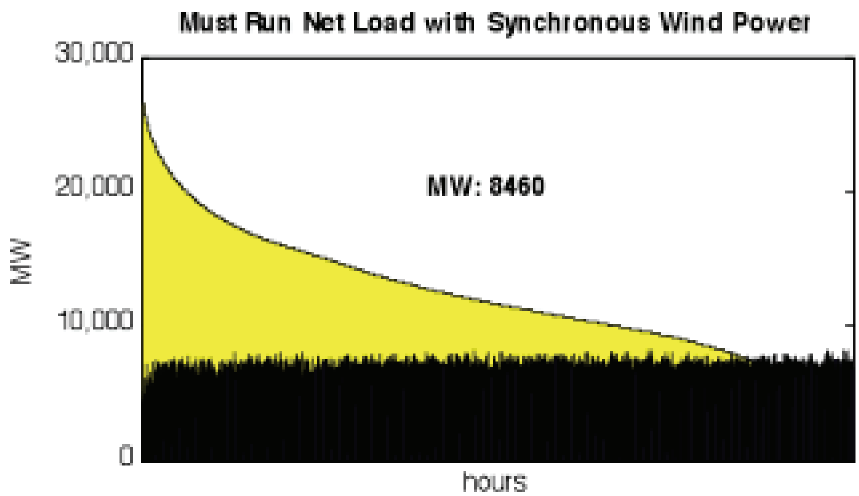
According to the Proposal, "Round trip efficiency was assumed to degrade by 1% per year, resulting in a greater charging requirement to achieve the same discharge." Energy storage technologies span a wide range of major classes (chemical, thermal, mechanical, etc.) technology types (within chemical, for example, there are Li-ion, Sodium Sulphur, many types of flow batteries for example). For some technologies, as they age, capacity may be affected while round trip efficiency remains unchanged. On its face, it follows that the degradation percentage assumption made in the Staff Report simply cannot be applied across the board to all types of energy storage technologies. CESA thus recommends that the minimum RTE requirement not include an annual degradation factor.

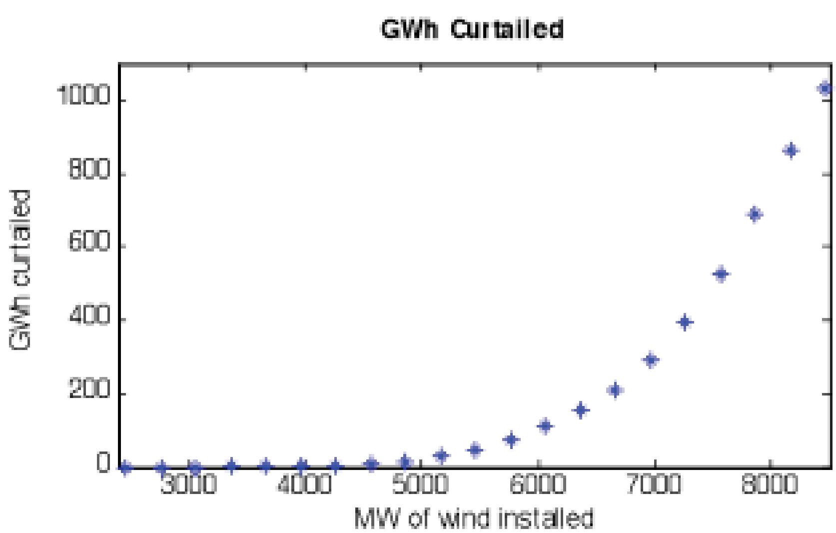
Staff's Marginal Analysis of Combined Cycle Gas Turbine Over-estimates the Emissions Profile of Baseload Generation and Should Factor in Over generation

To arrive at the recommended 67.9% roundtrip efficiency minimum, the Proposal assumed that on-peak emissions would be equal to "a combustion turbine ("CT") with a heat rate of 10,807 Btu/kWh, which translates into an emissions factor of approximately .575 Tonne CO2E/MWh." Off-peak emissions would be equal to a CCGT "with a heat rate of 6,917 Btu/kWh, which translates into an emissions factor of approximately .368 Tonne CO2/MWh." This latter assumption is perhaps the most significant flaw in the staff methodology for a couple of reasons. First, energy storage systems deployed under the SGIP will not be solely charged by a CCGT – they will be charged from either on-site renewable energy systems or grid energy during off peak times. Grid energy tends to be much cleaner than pure CCGT output, as it represents a mix of gas generation, renewables and baseload hydro and nuclear generation. Secondly, the emissions profile of off-peak generation will, over time, increasingly factor in more renewable generation, and potentially, the over-generation of wind power.

Renewable over-generation (occurring during off-peak times) is forecasted to be quite significant by 2020. The following charts were presented by E3 at the November 10, 2010 PLS Workshop. The yellow area under the curve represents the must-run net load and the black area represents the anticipated synchronous wind generation expected in 2020 under a 33% Renewables Portfolio Standard ("RPS"). The underlying analysis assumes wind penetration of

8800 MW and a resulting 1700 hours of over-generation, occurring for the most part in the spring and off-peak hours. If energy storage systems are absorbing the wind over generation during these times, then there will be no need to curtail the valuable wind generation in the system.





The above over-generation analysis also implies that California's off-peak energy mix will be come cleaner over time, as more and more renewable generation is phased in. This also implies that off-peak charging of energy storage systems will become cleaner over time making the SGIP GHG-neutral minimum round trip efficiency requirement a moving target that is decreasing over time. Thus, any minimum round trip efficiency requirement established today must be revisited on a regular basis, annually at a minimum.

As described above, California's off-peak generation mix will increasingly become cleaner as renewable, especially wind penetration increases. Therefore, using CCGT emissions assumptions will not be accurate for the actual emissions profile of the resource that will be used to 'charge' the energy storage systems during off-peak times

CESA's Recommended Minimum RTE Calculation Approach: CESA recommends the following approach to calculate the minimum round trip efficiency required for GHG neutrality. Specifically, CESA's approaches use the following assumptions:

1. Keep assumptions for CT (0.575 Tonne CO2E/MWh) and CCGT (0.368 Tonne CO2/MWh) the same key assumptions as used in the Proposal
2. Use separate assumptions for on-peak line losses and off-peak line losses based on the information presented above, assuming a 5% differential.
3. Remove the round trip efficiency annual degradation factor using the arguments listed above
4. Calculate the off-peak charging emissions profile based on the entire generation mix, not solely the marginal CCGT emissions as used in the Staff Proposal because of the following:
    a. Generation assets in California currently have excess capacity, which include base load, off-peak assets[17]
    b. Over-generation of renewables (particularly wind), will increase over time and will have to be curtailed without technologies such as energy storage to utilize the excess generation[18]
    c. GHG neutral assets within the generation mix include nuclear, large hydro, and renewables (the CCGT and CT emissions has already been adjusted for renewables in the CO2/MWh emissions estimate from the

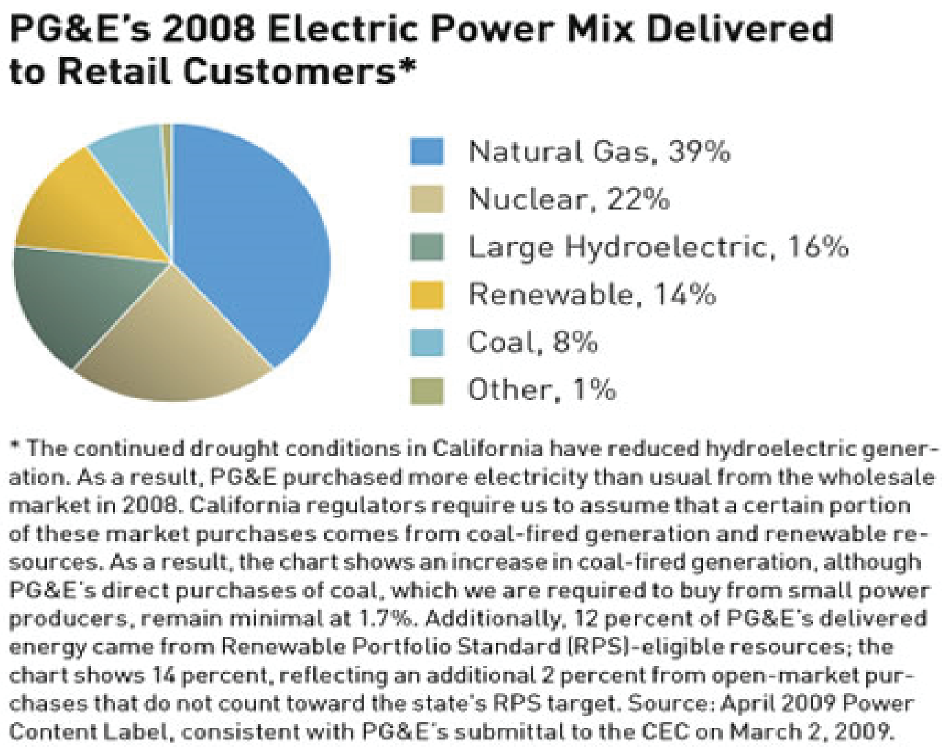
[17] Slide No. 37 of the CPUC November 10th PLS Workshop (http://www.ethree.com/documents/SCEPLS/PLS%20Workshop%202%20Final.pdf)

[18] Slide No. 54 of the CPUC November 10th PLS Workshop (http://www.ethree.com/documents/SCEPLS/PLS%20Workshop%202%20Final.pdf)

Staff Proposal and is excluded from CESA's GHG neutral generation mix to avoid double counting of GHG benefits)

5. Calculate the on-peak discharging emissions reduction using the same methodology as the Staff Proposal—storage is a CT substitute

Using the assumptions listed above, and choosing PG&E territory as an example location, below are CESA's minimum round trip efficiency requirements for GHG neutrality. PG&E-specific assumptions were taken from PG&E's available information on 2008 generation mix data[19] and E3's November 10, 2010 PLS Workshop that included line loss data for PG&E[20].



[19] PG&E 2008 Generation Mix (http://www.pge.com/myhome/edusafety/systemworks/electric/energymix/index.shtml)

[20] Slide No. 44 of the CPUC November 10th PLS Workshop (http://www.ethree.com/documents/SCEPLS/PLS%20Workshop%202%20Final.pdf)

The percentage of carbon neutral generation (nuclear and large hydro) in PG&E territory is 38%, as a percentage of total generation. Assuming the rest of the mix is marginal CCGT generation, the CCGT emissions should be weighted by 62%, and further adjusted for net reduction in T&D line losses (assume 5% for PG&E) due to the distributed nature of the SGIP projects. Using these assumptions, one can then solve for the minimum roundtrip efficiency similar to the process used in the Staff Proposal's GHG Analysis Workbook. This methodology indicates that the minimum RTE to be 'on par' with a natural gas peaker is 38%.[21]

In summary, the Proposals's minimum RTE assumptions are not reasonable and should be significantly reduced. CESA strongly recommends that round trip efficiency should be based on minimum efficiency required to be 'on par' with a centralized natural gas-fueled CT power plant, assuming that energy storage is 'charged' either with 100% renewables or a reasonable mix of baseload power which over time, will contain more and more renewables, particularly when factoring in renewable energy over-generation. Certainly, energy storage coupled with renewables should be completely exempt from having to meet any minimum round trip efficiency requirement at all.

Finally, it is worthwhile to mention there are several technology classes which would be **at risk** of being excluded if the minimum RTE was set at 70%, including for example, sodium sulfur, compressed air ("CAES"), and flow batteries (several different types/chemistries). This is very problematic as these technology classes make up a significant number of emerging energy storage technologies, and, such technologies may perform as well if not better in the field under certain field conditions than their higher efficiency-rated (from a specification standpoint) counterparts.

Energy storage, similar to renewable energy, represents a diverse range of technology classes ranging from chemical, mechanical, thermal and gravitational, with many different

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[21] The calculation steps for getting to a 38% minimum round trip efficiency requirements for GHG neutrality are similar to the process used in the Staff Proposal's GHG Analysis Workbook:

1. The marginal CCGT emissions is weighted by 62% to account for the GHG neutral generation mix: 0.368 Tonne CO2/MWh * 62% = 0.228 Tonne CO2/MWh
2. Step #1 result is adjusted for net T&D line loss reductions: 0.228 Tonne CO2/MWh * (100%-5%) = 0.217 Tonne CO2/MWh
3. The minimum round trip efficiency required to equal CT on-peak emissions given the result in Step #2 is solved for: 0.217 Tonne CO2/MWh / 0.575 Tonne CO2/MWh = 38% RTE

specific technologies within each class. Renewable solar energy, for example, includes many different technologies and technology subclasses: photovoltaics ("PV" polycrystalline, thin film, etc.), solar thermal (domestic hot water), concentrating solar thermal (industrial hot water), solar thermal electric and so on. Each of these solar technologies is used in a different application and has a different efficiency metric. It would be impossible to create an efficiency metric that would apply consistently to all of these subclasses of solar technologies. Similarly, it is difficult to create a meaningful efficiency metric that would apply to all storage technologies, especially since the actual round trip efficiency will vary tremendously in the field depending on the application, how the energy storage system is used, and other specific field parameters such as ambient temperatures etc.

For grid PV California is fortunate to have several decades of field performance to guide our understanding of how such technologies perform in the field relative to the PV module factory rating. Unfortunately for energy storage, there are today no consistent standards for setting the factory rating, much less the anticipated field performance.

From a policy standpoint, the minimum RTE should be set high enough so that the GHG goals set forth in SB 412 are achieved, yet not too high so as to exclude technologies that can positively contribute to GHG reductions in the field. CESA further recommends that installed systems under the SGIP would be required to monitor necessary performance data (see Appendix 1 to these comments for suggested monitoring requirements) to retroactively analyze actual field performance – this analysis could then be used to amend round trip efficiency requirements at a future date based on actual field performance and actual off-peak generation mix emissions.

V. A PERFORMANCE BASED INCENTIVE THAT INCENTIVIZES BOTH DEMAND AND ENERGY WILL RESULT IN GREATER ACCOUNTABILITY AND OPTIMIZED BENEFITS FOR RATEPAYERS

The Proposal contemplates a new incentive structure, which would distribute incentive payments over time and link the payments to performance as measured by availability. CESA recognizes the need for long-term project accountability, and strongly supports the need for performance-based incentives for all eligible SGIP technologies. However, CESA disagrees with the Proposal in three key ways:

1. Payment conditions - annual project specific performance payments should not be linked to meeting project-specific round trip efficiency targets.

2. Performance-Based Incentive Payment Structure – should not be tied to availability. A better and more direct way of incentizing performance is to provide incentives directly tied to SGIP program goals; in the case of energy storage, this would for energy storage's direct demand and energy benefits.
3. Performance-Based Incentive Levels – should factor in the time value of money if incentives are to be paid at a future time.

Each of these points will be discussed in more detail below, with suggestions for an alternate approach that would incentivize performance and ensure that SGIP funds are wisely used on behalf of all ratepayers:

Payment Conditions

CESA recommends against using RTE as a condition for payment for performance based incentives. From a ratepayers' perspective, true performance and compensation for performance should be tied to the program goals/objectives to achieve maximum accountability. For distributed generation resources, true performance should be tied to total kWh delivered – thus, for these technologies, one would expect SGIP incentives to be paid on a $/kWh delivered basis, similar to how incentives are currently paid in the California Solar Initiative program. For energy storage in the SGIP, the key goal is peak load reduction. Peak load reduction has both a capacity and an energy benefit to the system as a whole, and should be incentivized as such. (CESA recommendations for incentive structure are discussed further below, under "Performance Based Incentive Payments Structure")

Round trip efficiency is an input to a project pro forma, a driver of project economics – not the end-goal of the program! Further, actual round trip efficiency will vary tremendously based on the use case and project specific parameters and cannot be divorced from duty cycle. Because of the dearth of actual deployed grid customer sited grid energy storage projects today, it is very hard to characterize in advance anticipated duty cycle on a per project basis. Duty cycle, and hence, actual RTE, will vary tremendously by customer load shape and specific use of the storage system. Because these factors are not possible to precisely forecast in advance of project implementation, it would be difficult if not impossible to forecast round trip efficiency with an accuracy of +/- 2% for any given project. Further, requiring annual calculations of actual round trip efficiency at the project level would be onerous if not impossible for SGIP-Program

Administrators to implement, as this would require very large volumes of data and analysis for each project; adding unnecessary administrative cost to the program; particularly when a far superior method of incentivizing true performance is possible.

Performance Based Incentive Payments Structure

A better approach would be to create a hybrid incentive that provides incentives for meeting demand reduction on a kW basis, as well as an energy-based incentive for delivering kWh during the six hour peak window throughout the state during summer months. CESA recommends that the SGIP storage incentive be split accordingly. The capacity-based incentive can be paid up front and the energy incentive can be paid over time based on actual kWh delivered during qualified peak times over a five year period, consistent with the incentive pay-out duration recommended in the Proposal.

Because the capacity incentive is separate from the energy incentive, the minimum duration requirement for the capacity component can be significantly reduced from the current level of four hours. CESA recommends maintaining a shortened duration requirement for eligibility of the capacity based incentive to avoid incentivizing very short duration uninterruptible power supply, or 'UPS' solutions. To ensure that the peak energy is delivered during peak periods throughout the year, CESA recommends basing the maximum kWh energy incentive on the total peak hours during any given year as follows:

> 129 days per year (total number of weekdays during 6 months average peak period) x 6 hours per day (noon to 6 pm – peak period used in all utility TOU tariffs) x 90% availability of the energy storage system, or a maximum of 697 hours per year.

By splitting the capacity and energy incentive for storage, the CPUC will be encouraging the widest possible set of energy storage technologies and applications. For example, energy storage technologies that are primarily demand or capacity focused can still participate and provide valuable demand reduction benefits, even if they are not discharged for hundreds of hours each year. Similarly, storage technologies that can provide significant peak load shifting in terms of kWh will be rewarded for their ability to move energy from peak to off-peak periods, commensurate with their actual ability to do so.

Performance Based Incentive Levels

The specific incentive levels for the capacity and energy incentive components can be easily calculated based on existing incentive levels and CESA-proposed renewable incentives for energy storage.[22]For example, the capacity-based portion of the incentive could be paid upon project commissioning based on a percentage of the current incentive (either $2/Watt for standalone, or $2.50/Watt coupled with renewables), similar to how storage SGIP incentives are paid today. The remaining incentive would then be applied toward the energy-based incentive and would be paid over time according to the number of actual kWh delivered on peak, up to a maximum of six hours per qualifying peak day (excludes weekends and holidays during peak summer months). The resulting $/kWh incentive would need to factor in a reasonable estimate for the risk-adjusted time value of money to achieve comparable project economics to what is available today. By linking the energy-based incentive purely to actual kWh delivered on peak, the applicant is not only taking on financing costs and inflation but also 100% of the performance risk associated with the energy value of the energy storage. CESA supports the staff recommendation of 15% internal rate of return to be used as the risk-adjusted time value of money for the purposes of this calculation.

By structuring the new SGIP energy storage incentive in this way, the incentive amounts would be aligned with current and requested incentive levels[23], while providing the accountability benefits of a long-term payment plan, a payment plan that would be in effect if and only if the asset delivered kWh on peak. CESA would like to add that its comments in this regard pertain ONLY to energy storage, as current incentives may not be appropriately set for other technologies in the SGIP, in particular renewable fuel incentives.

Under this hybrid performance-based incentive approach, SGIP participants would receive incentives for clipping their respective peak demand on a capacity basis, as well as receive incentives to shift peak energy consumption to off-peak periods…commensurate with the actual volume of peak consumption shifted. By paying only for performance in this regard, program accountability will be increased. Finally, measuring actual kWh's on peak is easily

[22] CESA recommended $2.50/W incentive for energy storage applications coupled with renewables (wind, solar or renewable DG) in its 12/09 filing

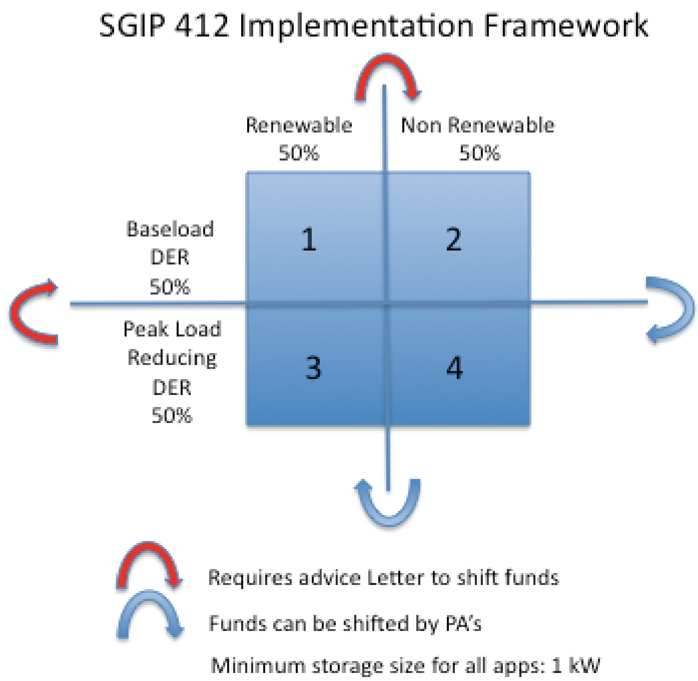
[23] in its 12/09 filing, CESA requested $2.00/W for standalone storage, and $2.50/W for storage coupled with renewable energy systems

monitored and tracked, thus this incentive mechanism should reduce overall administrative costs. Further, a performance-based incentive mechanism based on actual kWh delivered could easily be extended to other eligible SGIP technologies such as fuel cells, microturbines or distributed wind, further simplifying and standardizing program administration across technologies.

VI. THE SGIP FUNDING FRAMEWORK SHOULD PRESERVE RELATIVE FUNDING LEVELS FOR ALL SGIP-ELIGIBLE TECHNOLOGY CATEGORIES.

The Proposal recommends, "The designations "Level 2" and "Level 3" should be eliminated. CESA agrees with the recommendation in the Proposal because they were only useful when the SGIP employed three separate budget categories. Today, with no "Level 1" the original designations are out of date and confusing for customers. Instead, CESA recommends that the SGIP budget should be divided equally between "renewable" and "non-renewable" categories."

The Commission created the SGIP as a peak load reduction program to implement the intent of AB 970. To be consistent with this state goal (and with the discussion in the Proposal) CESA recommends that the current funding framework be modified so that, in addition to renewable and non renewable allocations, there are also program budget allocations for peak load reducing and base load distributed energy resources, essentially creating four funding categories as follows:



Under this proposed framework, new eligible technologies applying for SGIP incentives would apply for one of these four funding categories. Energy storage would only be able apply for peak load reducing funding and should be eligible for Category 3 and Category 4 incentives as follows:

Category 3: Energy storage coupled with any form of renewable distributed energy resource (e. g. wind, solar, ocean, fuel cells operating on renewable fuel).

Category 4: Energy storage operating 'standalone' or in conjunction with any form of renewable energy resource, as well as energy storage technologies coupled with any form of distributed energy resource using non-renewable fuels (e. g. fuel cells operating on natural gas).

In both of the above categories, energy storage should be permitted to charge from the grid at night, and to be discharged during peak times. This would serve to improve California's load factor substantially and help reduce the amount of peak demand. Energy storage should also be permitted to charge directly from the renewable resource itself (wind/solar) or use regenerative power (e.g. otherwise wasted mechanical or heat energy that can be converted for use later). Energy storage should also be allowed apply for funds from the non-renewable category when coupled with wind, solar and any other SGIP-eligible generating technologies.

As noted in the Introduction to the Background Section of the Proposal (p. 10) energy storage technologies offer multiple benefits. CESA therefore proposes that energy storage systems that receive SGIP funding also be allowed to provide emergency backup power to end use customers, and/or provide ancillary services to load serving entities and/or the California Independent System Operator. These additional services for SGIP-funded energy storage systems should only be allowed if they are technically able to provide them reliably, and still meet onsite customers' peak demand reduction performance requirements.

VII. METERING REQUIREMENTS SHOULD BE TECHNOLOGY-SPECIFIC.

To create a successful grid energy storage program and market in California, the ability to measure and monitor actual field performance is critical. In general a metering requirement similar to the CSI's "Section 5" Solar Metering requirements is envisioned with additional data appropriate to energy storage. The following comments assume the same requirements, details and resources as listed in Section 5 of the current CSI Handbook unless otherwise detailed below.

1. Existing approved Performance Monitoring and Reporting Services ("PMRS") should be allowed to expand their services to report on storage as well as solar so long as the data requirements are clearly identified. Upgrades to current PMRS services should be encouraged.

2. As most energy storage systems will require a unique or dedicated service for data reporting and collection the Commissions should enable a special communication tariff specifically for the purpose of energy performance data collection and control that cellular providers would have to offer. All cellular providers today offer significant capability in data only but can charge upwards of $1000/year for the necessary bandwidth to monitor an installed energy storage system. CESA recommends a 2 gigabyte per month data plan for no more than $10 per month plus cost of equipment specific to Energy Performance Monitoring.

3. Data specific to energy storage should include:
    a) Location identifier
    b) Meter(s) being monitored. If multiple meters, a unique identifier for each meter should be included
    c) Interval of data (1 min, 3 min, 5 min or 15 minute) by Meter and Device (15 minutes for residential systems)
    d) Renewable Generator(s) present with identifier and type of generator (Fuel Cell, Solar PV, Thermal, CHP, gas, hydro, other) by Meter
    e) Storage unit(s) identifier with association to each meter
    f) For each interval for each meter for each device for each phase of power:
        (i) Time stamp of reading based on GMT
        (ii) kWh in interval

(iii) Average kW in interval
(iv) Power factor in interval (except for residential)
(v) Direction of net flow in interval (To Grid (+) or from Grid (-))

g) For each interval for each storage system present indicate the current state of capability in kWh and kW

4. This data should be able to be stored for not less than 2 reporting intervals in the local metering unit (For example: 6 months if reported quarterly).

5. Meter display via web (internet) or local display device should be acceptable.

6. Accuracy should be required to be at least +/- 2%.

7. The metering should allow the system owner to see real time performance for the readings (based on interval length) and notify the owner if the system is not functioning.

VIII. A FIVE-YEAR WARRANTY REQUIREMENT FOR ENERGY STORAGE SYSTEMS IS REASONABLE.

The Staff Proposal states that, "a five-year warranty on an asset that is expected to last 10 or 20 years is insufficient." However, every technology that has started out with the SGIP program since 2001 has been allowed to start with a five-year warranty. Energy storage, as a relatively new technology class, should receive consideration no different from all preceding technologies. The Commission addressed this point in D.11-08-044:

> "We adopt the technical parameters proposed by VRB, but lower the proposed 20-year minimum warranty requirement. We find it unreasonable to require a 20-year warranty term for AES, while under the SGIP, wind and fuel cell technologies are required to have only a five-year warranty. Furthermore, the PAs recommend that we "select a minimum warranty term that encourages the greatest success in roll-out of the AES technology." A 20-year warranty term seems unnecessarily excessive. Therefore, we require a five-year warranty for AES systems, consistent with the warranty requirements for wind and fuel cell technologies. We believe that the adopted definition is generic enough to allow all qualified AES systems to participate in SGIP." (p. 11).

The Commission's reasoning for maintaining a five-year warranty requirement is just as correct today as it was the last time it was addressed. CESA recommends maintaining the five-year warranty level for energy storage systems.

IX. THE COMMISSION SHOULD CONSIDER ADOPTING APPLICATION FEES IN ORDER TO ENCOURAGE ONLY HIGH-QUALITY APPLICATIONS.

The Proposal states that application fees "support program administration, screen out applicants who did not fully intend to complete projects, and create a disincentive for perpetual re-application." CESA agrees with this assessment and strongly supports adopting an application fee structure, provided it is scaled for project size. For example, a small residential or small commercial project should pay proportionately less in application fees than a multi-megawatt commercial or industrial project. CESA recommends that the maximum residential fee not exceed $100. Anything beyond this level would be cost prohibitive for residential applications. Application fees for larger projects could be scaled proportionately according to project size, but should be kept to less than 2% of the total incentive award being applied for and be fully refunded at time of claim filing

X. CONCLUSION.

CESA appreciates this opportunity to comment on the Ruling, and looks forward to working with the Commission and the parties as this proceeding progresses.

Respectfully submitted,

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Counsel for the
CALIFORNIA ENERGY STORAGE ALLIANCE

Date: November 15, 2010

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of ***Opening Comments of the California Energy Storage Alliance on Administrative Law Judge's Ruling Requesting Comments on Staff Proposal Regarding Modifications to the Self-Generation Incentive Program*** on all parties of record in proceeding ***R.10-05-004*** by serving an electronic copy on their email addresses of record and by mailing a properly addressed copy by first-class mail with postage prepaid to each party for whom an email address is not available.

Executed on November 15, 2010, at Woodland Hills, California.

Michelle Dangott

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