BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Pursuant to Assembly Bill 2514 to Consider the Adoption of Procurement Targets for Viable and Cost-Effective Energy Storage Systems.	R.10-12-007 Filed December 16, 2010

REPLY COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE RESPONDING TO ADMINISTRATIVE LAW JUDGE'S RULING ENTERING INTERIM STAFF REPORT INTO RECORD AND SEEKING COMMENTS

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In accordance with the California Public Utilities Commission's ("Commission's") Rules of Practice and Procedure, the California Energy Storage Alliance ("CESA")[1] hereby submits these reply comments on the *Administrative Law Judge's Ruling entering Staff Report Into Record and Seeking Comments*, issued by Administrative Law Judge Amy C. Yip-Kikugawa on January 18, 2013 ("ALJ's Ruling").

I. INTRODUCTION.

CESA submits these reply comments for three reasons. First, CESA corrects a number of misinterpretations and resulting mischaracterizations in Opening Comments filed by several parties concerning CESA's presentation at the workshop held in this proceeding on January 14, 2013 ("Workshop"). CESA's second purpose in submitting these reply comments is to register its strong agreement with Opening Comments filed by numerous parties that the Commission must promptly complete the current work in progress on cost-effectiveness that is very near

[1] The California Energy Storage Alliance consists of A123 Systems, Alton Energy, AU Optronics, Beacon Power, CALMAC, Chevron Energy Solutions, Christenson Electric Inc., Clean Energy Systems Inc., CODA Energy, Deeya Energy, DN Tanks, Energy Cache, EnerVault, FAFCO Thermal Storage Systems, Flextronics, Foresight Renewable Systems, Greensmith Energy Management Systems, Growing Energy Labs, Gridtential Energy, Halotechnics, Ice Energy, Innovation Core SEI, LG Chem, LightSail Energy, NextEra Energy Resources, Panasonic, Powertree, Primus Power, RedFlow Technologies, RES Americas, Saft America, Samsung SDI, Sharp Labs of America, Silent Power, SolarCity, Stem, Sovereign Energy Storage LLC, Sumitomo Corporation of America, TAS Energy, UniEnergy Technologies, 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://storagealliance.org

drawing to successful closure.[2] CESA agrees with Calpine,[3] among others, that the substantial body of soon-to-be complete collaborative work on cost-effectiveness will provide a critical element of the evidentiary foundation required by the Commission for evaluation of procurement policy options. CESA notes that the Interim Staff Report[4] states:

> "The purpose of this Interim Staff Report is not to make specific recommendations on any of the barriers or policy options at this point in time, but rather to seek comment from stakeholders based on the work prepared in the proceeding up until this point. Staff expects stakeholder comments, future workshops, and subsequent staff proposals to all be part of the record of this proceeding." (p. 3).

CESA also notes that informed speculation and sincere expressions of opinion by commenting parties, while appropriate at this stage of the proceeding, pale in significance when compared to the substantial evidence already in the record that can reasonably support any of the wide range of policy decisions that the Commission may make once the record is closed. Furthermore, the Commission can and should inform its policy determinations and decisions regarding procurement planning and goal setting in this proceeding with references to other related Commission decisions and proceedings. In addition to the substantial evidentiary record produced to date in this proceeding, the Commission should take official notice of (as one example) the Track 1 decision it arrived at very recently in the Long-Term Procurement Planning proceeding,[5] and others as appropriate.

CESA supports the timeline that was introduced by the Energy Division Staff at the Workshop, and looks forward to commenting on the final staff proposal that is expected to be produced for public comment in the coming few months. In pertinent part, the timeline proposed by the Energy Division staff specifically provides as follows :

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[2] The current *Draft Workplan for Cost-Effectiveness Study*, dated February 8, 2013, is subject to revision.
[3] *Comments of Calpine*, filed February 4, 2013.
[4] *Energy Storage Phase 2 Interim Staff Report*, January 4, 2013.
[5] (D).13-02-015, issued January 13, 2013.

"1st Quarter 2013

- Glossary of Commonly Used Terms - Some parties have expressed a desire for a common set of definitions to terminology that is frequently used in this proceeding.

- Energy Storage Cost-Effectiveness Analysis – a document that outlines how cost-effectiveness for storage will be approached, complete with (1) categories of benefits to be considered (2) categories of costs to be considered and (3) a set of underlying assumptions to be used in the analysis including a 'baseline' of status quo solutions to compare against storage solutions

- Summary of preliminary cost-effectiveness analysis from exercising the modeling tools.

- Finalized Use Cases to incorporate cost-effectiveness analysis (recognizing that these documents may continue to evolve to fit future process needs).

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- Staff proposal presenting cost-effectiveness analysis, recommended procurement policies, and guidance on cost-effectiveness methodology for future procurement application."

Third, the Commission should establish as a general policy guideline to Load Serving Entities ("LSEs") that cost-effective and viable energy storage resources should be the *most favored* energy resource available to meet California's system needs. This approach would be entirely consistent with the concept proposed in the comments of Pacific Gas and Electric Company ("PG&E):[6]

> "To the extent that any particular resource or class of resources provides the highest value, there would be a clear market signal though procurement. PG&E suggests, consistent with CESA's recommendations, that:
>
> - Utilities will be required to consider storage; and
>
> - If storage projects are not found to be cost-effective, utilities will have to demonstrate to the Commission and the Procurement Review Group

[6] *Pacific Gas and Electric Company Comments on the Interim Staff Report in Phase 2*, filed February 4, 2013.

(PRG) that any proposed storage projects are not cost-effective compared to other bidders. (p. 9)."

CESA asks the Commission to support PG&E's approach in principle and the distinction CESA draws between "preferred resources" listed in the Loading Order and a "most favored resource" policy preference for the flexible operating characteristics of energy storage resources.

II. MISCHARACTERIZATIONS OP CESA'S WORKSHOP PRESENTATION IN OPENING COMMENTS FILED BY PARTIES SHOULD BE DISREGARDED BY THE COMMISSION.

A. Southern California Edison.

1. ***SCE's Comment***: Percentage-Based Procurement "Target" Lacks Any Clear Methodology or Principles.

CESA's Response: The goals included in the presentation at the Workshop were clearly labeled: "Examples." As explained in its Opening Comments, CESA has recommended an approach to goals based upon system need.

2. ***SCE's Comment:*** Contrary to CESA's presentation, most energy storage benefits may be monetized today, or will be monetized when ongoing regulatory reforms are complete.

CESA's Response: CESA disagrees with the assertion that many of these services are monetized, per our comments below. However, there is a larger issue: it is *unclear* if utility procurement processes value, or correctly evaluate, the benefits listed, due to lack of transparency on utility procurement processes to outside stakeholders. In these cases, it does not matter if an energy storage system would be able to capture the benefits if the procurement process does not recognize the benefits. If the benefits are not recognized during procurement, then energy storage systems will appear as though they are not cost-effective. They will not be procured at appropriate levels for utilities and ratepayers, and energy storage systems will have insufficient opportunity to demonstrate that they can capture those value streams. CESA expects

the cost-effectiveness work in this proceeding to show that certain applications of energy storage will, in fact, be cost-effective when all benefits are correctly accounted for.

3. ***SCE's Comment:*** "Grid Benefits," including "Reduced Fossil Fuel Use" and "Increased efficiency of installed generators," generally refers to the emissions reductions gained when energy storage displaces or abates conventional generation or enhances generation efficiency. CESA displayed a fundamental misunderstanding of the benefits captured in the daily energy markets.

CESA's Response: CESA agrees that emissions reductions are gained when energy storage displaces or abates conventional generation or enhances generation efficiency. However, these benefits are not fully monetized at this time. For example, the following factors must be accounted for:

a. Historic ancillary service market prices commonly used to evaluate generation projects do not include the price of greenhouse gasses ("GHGs"), nor do they accurately reflect the long term increases in the price of GHG offsets required to fulfill AB32 requirements.

b. Capacity values do not currently account for expected future prices of GHG offsets. SCE assumes carbon offset prices of $10 per ton based upon 2012 auction prices. However, evidence in the long term procurement planning proceeding shows that carbon offset prices are projected to be $36.65 per ton by 2020.[7] When resources with greater than 20-year lifetimes are being considered, it is critical that long term carbon prices are taken into account when evaluating cost-effectiveness.

The developers of many generating resources are compensated through long-term power purchase agreements ("PPAs"), not through market participation. For example, generation-sited energy storage systems collocated with fossil generators can greatly increase the output of those traditional fossil generators, but established PPA rates do not change if an on-site energy storage system is able to provide more power output. Thus, the developers of generation-sited energy storage systems are unable to capture the value of the increased capacity. The result is that

[7] *See*, D.12-12-010, p. 36-37.

utility customers are deprived of resources which provide energy at lower cost than traditional assets. A proposed solution, offered at the Workshop, and in comments filed in this proceeding is to ensure these generators are able to receive a separate contract for the power produced by the generation-sited energy storage systems.

4. ***SCE's Comment:*** "Distribution Peak Capacity Support (Deferral)" and "Distribution Operation (Voltage/VAR Support)" refer to a storage device's ability to reduce peak load and the ability to provide voltage and volt-ampere reactive ("VAR") support. These benefits may allow system planners to defer system capacity upgrades or the installation of power quality equipment such as capacitors. Because a utility owns its distribution assets, the utility fully monetizes its distribution benefits by evaluating the project's impact on the distribution system to establish and estimate the abated costs.

CESA's Response: CESA agrees with SCE that energy storage may "reduce peak load" and "provide volt-ampere reactive ("VAR") support. CESA also agrees that, "the utility fully monetizes its distribution benefits." However, this statement does not apply to a customer installing an energy storage system behind the meter. The customer is not able to monetize either the distribution peak capacity support or distribution operation benefits provided to the utility by the energy storage resource. Because the customer cannot monetize these benefits, it is less likely that customers will install behind the meter energy storage resources than if they were able to monetize these benefits.

5. ***SCE's Comment*:** "Locational Flexibility" and "Modularity" will be monetizable through a least-cost best-fit procurement process. Locational flexibility could reduce siting costs, resulting in a lower bid price that increases the likelihood of selection. Alternatively, locational flexibility could be incorporated on the "best fit" side: a resource that can be sited in a preferable location will be valued incrementally higher. Similarly, modularity could also be monetized through the least-cost best fit process. A modular resource could allow the developer to build precisely according to the defined need, so as to maximize needed benefits while minimizing costs.

CESA's Response: There are additional benefits of locational flexibility and modularity which are not accounted for in SCE's comment. Locational flexibility and modularity are both characteristics of many energy storage systems, which can also allow them to be moved to a

different location during the course of their project life. This means that an energy storage system might be placed at one high value location, and then moved to another high value location during its lifespan. Taking advantage of the mobility of energy storage is a key benefit for certain applications such as distribution deferral. The reduced risk of achieving energy storage benefits due to their ability to be readily moved and/or modularized is not addressed by SCE's comment.

6. ***SCE's Comment:*** CESA cited benefits that are too vague to be meaningful, or are common to both conventional and storage resources. For example, it is unclear to what "Increased Integration of Renewable Resources" specifically refers; "integration" of renewable energy can mean any number of activities, including some benefits provided by conventional generation. Similarly, any resource provides some degree of "Grid Reliability," which encompasses some of the functions noted above. SCE agrees that storage provides benefits that are related to these concepts, it makes no sense to broadly claim that storage is uncompensated for them.

CESA's Response: Contrary to SCE's comment, energy storage resources may provide clear benefits which are not currently compensated. The benefit of increased integration of renewable resources refers to three unique capabilities of energy storage which are critical to renewable integration. The first is the capability of energy storage systems to store renewable energy that might otherwise be wasted. The second is the capability of energy storage to balance, firm, and shape renewable energy output without producing additional emissions. Finally, by shaping and scheduling renewable energy production, energy storage has the potential to better utilize existing transmission and distribution capacity. The critical issue is that California is procuring renewables to achieve AB 32 and Renewables Portfolio Standard ("RPS") goals. If those renewables are balanced by fossil resources, then achieving high RPS goals becomes a losing battle, where increased renewables requires adding more fossil fuel generation, which requires adding additional renewables. In assisting with renewable grid integration, energy storage allows for greater penetration of renewable energy on the grid, and

increased utilization of both renewable energy assets and existing transmission and distribution assets paid for by ratepayers.

The grid reliability benefit provided by energy storage is the ability for an energy storage resource to continue to provide power to customers in a grid outage. In addition, many fast response energy storage systems may be rapidly deployed to prevent large grid outages in the first place. Compensation rules for these unique benefits of energy storage are unclear, at best.

7. ***SCE's Comment:*** CESA asserted large-scale procurement funded by ratepayers can help improve economies of scale and reduce costs. While this is true, spending enormous sums of utility customer money for the sole purpose of making something less costly in the future is a bad proposition, especially when the net benefits of storage are yet to be demonstrated. While better economies of scale is a helpful secondary benefit once a resource is found to be cost-effective, it is ultimately not the utility customers' obligation to improve the cost structure of competitive developers and manufacturers.

CESA's Response: This comment implies that CESA has advocated for procurement goals for the sole purpose of improving economies of scale and reduce cost. Quite the contrary! CESA advocates for procurement goals because it is a proven way of achieving focused results by a broad set of stakeholders. The results CESA seeks are consistent with that of SCE and many other stakeholders - -a cleaner, more reliable, affordable, efficient and secure electric power system for California. Appropriate procurement goals will provide the necessary market signal to stimulate even greater investment into energy storage solutions, financing and manufacturing capacity … which will result in greater economies of scale and even lower costs in the future, creating a virtuous cycle of enabling even more applications of energy storage to become cost effective and viable. It is important to note that procuring large amounts of conventional fossil fuel generation capacity over the next decade will have a rate payer impact as well … and in particular, will increase the 'switching cost' of moving to a cleaner alternative. CESA is suggesting that the Commission instead support the procurement of lower-emissions,

more flexible energy storage assets that are being shown to be more cost-effective than traditional assets.

8. ***SCE's Comment*:** CESA's Presentation Distorts the Results of the CAISO's 33% RPS Studies CESA selectively quoted a slide taken out of context from a CAISO presentation to support the false claims that "Under business as usual, the 33% RPS will not reduce GHGs" and "GHG/Fuel use increases when 33% RPS happens without grid-connected storage available. CESA misrepresented the environmental benefits of moving to 33% renewables prior to inclusion of storage on the grid. SCE further states, while energy storage has some potential to decrease emissions in certain applications, CESA's implication that emissions reductions will not occur without storage is entirely false.

CESA's Response: Unfortunately SCE seems to have misunderstood or taken the CESA presentation out of context by ignoring CESA's reference to "business as usual" in the slide. CESA agrees with SCE that the RPS has significant emissions benefits, and agree that energy storage does have potential to decrease emissions if effectively utilized. The recent slowdown in RPS procurement and implementation is a strong indication that under business as usual, the full and best benefits from the RPS are not being captured as best they could, and, utilizing fossil generation to balance renewable energy is a 'lost emissions reduction opportunity.' The CAISO slide in CESA's presentation identified a scenario where achieving California's 33% RPS goal did not result in reduced fuel burn in California. CESA did not mean to imply that that was the only scenario possible.

CESA is not saying that energy storage is required to get reductions, but that energy storage is essential to achieving reduction effectively. As the volatility of the grid increases (either due to increased intermittent generation or increased high demand intermittent loads such as electric vehicles), non-GHG-generating buffering is needed to reduce GHGs. Running fossil generators at minimum loads in standby mode or at high ramp rates generates a tremendous amount of GHGs. This is simply not necessary. In contrast, most energy storage resources do not require minimum load levels or wasteful minimum idling levels. Their energy output comes

from energy taken from the grid, which becomes increasingly clean as renewable penetration increases. CESA believes that a careful study of alternative emissions scenarios under AB 32 will clearly demonstrate that with use of cost-effective energy storage, the amount of emissions will likely be significantly reduced by 2020, compared to the cases without energy storage. Procurement of too much unnecessary gas now will have negative emissions consequences for many years. Cost-effective energy storage is an essential tool to lower overall cost risk, and further add value to the 33% RPS goal, and beyond.

9. ***SCE Comments*:** SCE strongly objects to implications that investor-owned utilities ("IOUs") lack either the will or the ability to properly consider new technologies such as storage. CESA's claim that the "inertia of business-as-usual procurement must be overcome"5 ignores these ongoing efforts by utilities to transform and advance utility procurement processes as the market landscape continues to develop. SCE and other utilities are continually adapting to the changing energy landscape, changing requirements of the grid, and evolving public policy objectives. (page 6)

***CESA Response*:** CESA would like to clarify its statement from the workshop. CESA did not mean to imply that 'IOUs" lack the will or the ability to properly consider new resources such as energy storage. Clearly this is not the case, as SCE and other utilities have successfully implemented a broad range of pilot projects to date, and, in the case of SCE, proactively initiated in-depth study of the role of energy storage in the electric power system. What CESA intended to convey was the idea that new energy storage resources have a different risk profile, from an investor standpoint, as compared to traditional fossil based resources. In the business world, higher risk investments typically enjoy a higher return. CESA wanted to point out that under existing utility compensation mechanisms there is currently no way for utilities to be fairly compensated for the higher risk profile – both real and perceived – of future energy storage procurement. CESA recommends that this be factored in when considering energy storage policy development.

B. Jack Ellis.

> ***Jack Ellis' Comments:*** CESA has also made no attempt to quantify any of the capacity and ancillary benefits that storage built for peak capacity could provide, so there's no way to compare the cost of achieving CESA's quantitative justification for the 1,500 MW of storage it suggests be targeted toward customer bill management.

CESA's Response: As an interested party with relatively little experience with grid-connected energy storage, Jack Ellis' comments are apparently made with insufficient context as to all of what is actually happening in this proceeding and should be regarded as such by the Commission. CESA has been working collaboratively with Energy Division staff and other stakeholders, including the utilities, on a comprehensive energy storage cost effectiveness workplan that will be used to evaluate the cost-effectiveness of each of the energy storage use cases developed in Phase 1of this proceeding. Obviously, since this work is underway and has not been completed CESA was not able to quantify the capacity and ancillary services benefits described in its Opening Comments. This is also the primary reason why CESA has not introduced any specific procurement targets to date, as it would be premature to do so before this cost-effectiveness work has been completed.

C. Calpine.

1. *Calpine's Comment:* Energy storage can increase GHG emissions depending on: (1) the extent to which it requires significantly more energy to charge than it can subsequently discharge; and (2) the mix of resources that are generating when it is charging and the resources that are displaced when it discharges. For example, if energy storage is charged using electricity that is produced from coal (or coal-based imports as the case may be in California) and displaces electricity that is produced from comparatively efficient and clean gas- fired plants when it is discharged, then energy storage has the potential to increase GHG emissions. It is important that resources, such as energy storage, are not added to the Loading Order on the basis of assumed GHG reductions until it is demonstrated that material GHG reductions will, in fact, be realized. (p. 5)

CESA's Response: Calpine's comments are correct in that the GHG emissions profile of energy storage is dependent on the source of the energy used to charge the energy storage

system. However, in the case of California it is highly unlikely that energy storage will increase GHG emissions for several reasons:

a. In its comments emphasizing the importance of including carbon in the cost effectiveness calculation for energy storage,[8] Calpine calculated that an energy storage system needs to be at least 50% efficient to be on par with the costs and emissions reduction potential of a combined cycle gas turbine ("CCGT"), in a scenario where it displaces a high heat rate gas plant that would otherwise be needed if the energy storage was not dispatched.

b. Fortunately, round-trip efficiencies of most energy storage resources are much more efficient than that example. Many common hydro resources, battery chemistries, and mechanical energy storage systems achieve are over 80% AC to AC round trip efficiency. In its Opening Comments, Alton Energy demonstrated a very simple methodology for quantifying the avoided CO2 emissions from higher heat rate generators. Alton points out that there are thousands of megawatts of gas combustion turbines with over a 11,000 heat rate ranging up over 15,000 heat rate generators still operating in California. Alton demonstrates that even in a scenario where the charging energy was sourced by 100% gas (for a bulk energy storage with a round-trip efficiency of 80%), specifically sourced from CCGTs at a heat rate of 7,000, that there would be substantial CO2 emissions avoided when displacing gas plants with a heat rate of 9,000 or higher.[9] It is clear, both through Calpine's example and references by SCE that energy

[8] *Comments of Calpine*, p. 6-7.
[9] *Alton Energy Comments,* filed February 4[t], 2013, pp. 5-7.

storage can reduce emissions and help California reach its AB 32 goals in a timely and cost-effective manner.

c. California is in the process of reducing its reliance on coal generation. Rather, the generation used at the margin is very efficient CCGT generation and gas peakers – not coal.

d. California's electricity mix is getting cleaner over time, not dirtier – especially its nighttime mix, as more and more wind generation comes on line. Energy storage can provide a useful 'load' for any excess wind or solar generation and so has the ability to be even cleaner than California's baseline average electric mix.

III. COST-EFFECTIVE AND VIABLE ENERGY STORAGE RESOURCES SHOULD BE CONSIDERED THE MOST FAVORED RESOURCE AVAILABLE TO MEET SYSTEM NEEDS.

CESA reaffirms its consistent position that the Loading Order cannot be unilaterally altered by the Commission.[10] However, given energy storage's potential to reduce GHGs and its highly flexible and modular capabilities it should be considered a "most favored resource." This proceeding is an excellent platform to demonstrate the benefits of energy storage, to show the need and urgency for it to be included in the Loading Order, and demonstrate that energy storage does offer many of the same attributes of a preferred resources – including GHG reduction. Energy storage has not been included in Loading Order to date for the simple reason that its importance was not considered or understood when the Loading Order was originally established. In addition to its emissions reduction potential, energy storage is essential to realize and maximize the utilization and value of Preferred Resources.

[10] *See, e.g. Reply Comments of the California Energy Storage Alliance on Administrative Law Judge's Ruling Seeking Comment on Workshop Topics*, filed October 23, 2012, in R.12-03-014.

CESA agrees with the CAISO's comments in the LTPP to the effect that dispatchable resources, like demand response and energy storage, must help balance supply and demand; and non-dispatchable resources, like energy efficiency or behind the meter generation, must eliminate demand that would otherwise have to be balanced with supply. In the end, all resources, regardless of size, configuration, or type must fundamentally deliver the operating characteristics that can measurably support grid reliability by helping to balance supply and demand or by eliminating the need to do so.[11] CESA also agrees with the CAISO that at a minimum, dispatchable resources must provide energy when and where needed, and for how much is needed to balance the grid and maintain system stability based on ISO instructions and or submitted schedules.

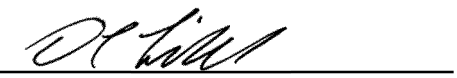
The *sine qua non* of energy storage that should be considered when procuring all new dispatchable resources is its defining operating characteristic: that many energy storage technologies can be available to the grid at an operationally ideal zero PMin (minimum load).[12] Finally, CESA agrees with the CAISO that: "The ability to minimize PMin is highly beneficial for reliability and minimizing cost as the ISO anticipates periods of significant over-generation with increasing amounts of energy served by intermittent resources. Lower PMins will help minimize over generation and the potential for high negative prices where market participants (and ultimately consumers) pay to have excess energy consumed or exported. Minimizing minimum load as an operating characteristic is an important consideration in future procurement solicitations for dispatchable generation resources. All other benefits of energy storage aside, no other resource can cost-effectively and reliably deliver a PMin of zero.

[11] *See, e.g. Comment s of the California Independent System Operator*, filed October 9, 2012.
[12] 7 PMin is the minimum normal energy producing capability of a resource, i.e. the lowest operating level a resource can sustain and still be dispatchable.

IV. CONCLUSION.

CESA appreciates this opportunity to provide these reply comments, and looks forward to continuing to work with the Commission and parties to achieve the goals of this proceeding.

Respectfully submitted,



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