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

OPENING COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON PROPOSED DECISION ADOPTING PROPOSED FRAMEWORK FOR ANALYZING ENERGY STORAGE NEEDS

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Pursuant Rule 14.3 of the California Public Utilities Commission's ("Commission's") Rules of Practice and Procedure, the California Energy Storage Alliance ("CESA")[1] hereby submits these comments on the *Proposed Decision Adopting Proposed Framework for Analyzing Energy Storage Needs*, issued July 2, 2012 ("Proposed Decision").

I. INTRODUCTION.

CESA greatly appreciates the proposed decision and the thoughtful and helpful work conducted by staff to date as embodied in the Final Energy Storage Framework Staff Proposal ("Staff Proposal"). The Staff Proposal in particular encompasses a broad and rigorous overview of issues facing grid storage in California. Going forward, CESA recommends that the Commission proceed expeditiously and aggressively despite substantive issues that may still need to be addressed, and closely coordinate efforts with related proceedings, namely, the Energy Storage Rulemaking, Long Term Procurement Planning ("LTPP"), Resource Adequacy ("RA") and Renenewables Portfolio Standard ("RPS").

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[1] The California Energy Storage Alliance consists of A123 Systems, Bright Energy Storage Technologies, CALMAC, Chevron Energy Solutions, Deeya Energy, East Penn Manufacturing Co., EnerVault, Fluidic Energy, GE Energy Storage, Green Charge Networks, Greensmith Energy Management Systems, Growing Energy Labs, HDR Engineering, Ice Energy, Kelvin Storage Technologies, LG Chem, LightSail Energy, Primus Power, Prudent Energy, RedFlow Technologies, RES Americas, Saft America, Samsung SDI, SANYO Energy, Seeo, Sharp Labs of America, Silent Power, Stem, Sumitomo Electric, Sumitomo Corporation of America, SunEdison, SunVerge, TAS Energy, 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

II. THE COMMISSION SHOULD EXPEDITIOUSLY IMPLEMENT A SCOPING MEMO AND PREHEARING CONFERENCE FOR PHASE 2 INCLUDING EXPLICIT COORDINATION WITH THE RPS, LTPP AND RA PROCEEDINGS.

CESA recommends that the Commission expeditiously take the following near term procedural steps:

a. Issue a Scoping Memo for Phase 2 within 15 days of a Phase 1 Final Decision
b. Schedule a Phase 2 Prehearing Conference and a Workshop within 30 days of a Phase 1 Final Decision to finalize priority applications

Additionally, CESA recommends that the Commission consider issuing an Assigned Commissioner's Ruling providing guidance to parties and Energy Division Staff regarding coordinated near term steps to be undertaken in the RPS, LTPP, RA, and Energy Storage Rulemaking proceedings by dates certain.

III. CESA SUPPORTS THE APPLICATION SPECIFIC APPROACH – FURTHER CLARITY IN TERMS OF DEFINITIONS AND PRIORITY APPLICATIONS WILL SIGNIFICANTLY ACCELERATE PROGRESS IN PHASE 2.

CESA recommends further clarifying and standardizing stakeholders' usage of a few key concepts and terms. Consistent and standardized terminology use will facilitate application prioritization and stakeholder collaboration efforts going forward and will help improve the efficiency of this rulemaking substantially by minimizing the chance of misunderstanding and miscommunication. As such, CESA proposes the following definitions:

c. Benefit = a single value which may be captured by an energy storage system. Benefits may entail 1) market-based revenue (direct market participation) 2) a reduced or deferred cost relative to the status quo or 3) an environmental benefit. Benefits may also have value that can be challenging to quantify, such as "risk mitigation" or "portfolio diversification".

d. End Use = specific targeted operational use for a resource in the field, may result in capture of one or more benefits. This definition is consistent with how 'end use' is applied in the Final Staff Proposal e.g. frequency regulation or ramping or black start. End Use has also been used synonymously with "application". Both CESA and SCE have previously defined "application" as: the combination of benefits that an energy storage system may capture when sited at a specific place and managed in a particular way. "End use" also represents a collection of use-cases, defined below.

e. Use Case – specified and detailed use of energy storage with a specific location, technology, ownership model and operating regime. There can be many different use cases within a given "end use" or "application". The use case describes a problem being solved by a particular storage system in a particular location, under a specific ownership model, technology solution, and operating regime. For example, under the "demand side management" end use for energy storage, there are at least three different use cases delineated by ownership: customer owned, third party owned and utility-owned. Each use case will have different technology requirements and will have different regulatory implications.

CESA appreciates very much the framework that was introduced in the Staff Proposal, however, CESA remains concerned that the four scenarios identified in the Staff proposal are too broad as many end uses and use cases are possible within each of the scenarios. With so many possibilities, meaningful cost benefit analysis and procurement targets maybe difficult to quantify. Cost benefit analysis methodology will be most meaningful at the end use level, given the great diversity across the potential use cases for grid storage.

CESA recommends further refinement of the specific end uses to evaluate for procurement targets and cost benefit analysis methodology development. To meet the goals and deadlines set forth in AB 2514, specific end uses should be identified and prioritized as quickly as possible. CESA recommends that the following six end use/application priorities be targeted going forward; each briefly described by their primary objective. These end uses could perhaps be used as a starting point for a near term workshop (these end uses are further detailed in Appendix A):

1. Distribution Energy Storage – to defer distribution upgrades.
2. Community Energy Storage – to improve local system reliability, integrate distributed renewable generation and provide voltage control.
3. Distributed Peaker – to provide energy cycling to address peaking needs.
4. Generation Sited – to increase the output of generation (fossil fuel plants), or provide firming, smoothing, or shaping of intermittent renewable generation
5. Bulk Generation – to provide electric supply capacity, resource adequacy, ancillary services and energy. Note that these products can be provided by a single storage facility or multiple aggregated distributed systems.
6. Demand Side Management – to actively manage customer's electricity and demand costs, provide system load modification and improve service reliability and quality.

It is important to note that multiple business models and revenue sources be considered within each end use, such as alternative ownership models: for example, the Demand Side Management end use has three key use cases delineated by ownership: customer owned, third party owned and utility owned; the Distributed Peaker end use could readily see such an asset operated part of the year by the utility for peaking purposes and operated by the California Independent System Operator ("CAISO") the other part of the year. Such dimensions of each end use results in multiple use cases, each of which may have different technology implications as well as different regulatory implications. Similarly, use cases can be driven by energy storage siting. For example, a bulk generation application can be provided from a single storage facility or many aggregated smaller facilities.

IV. THE COST-BENEFIT FRAMEWORK SHOULD BE DEVELOPED IN PHASE 2; IT NEEDS TO CONSIDER FULLY THE FLEXIBILITY OF ENERGY STORAGE – A BENEFIT THAT CAN SIGNIFICANTLY REDUCE COSTS AND RISKS.

CESA strongly agrees with the comments summarized in the Proposed Decision that the absence of cost benefit methodology for energy storage is a major barrier – as such, CESA recommends that a robust cost benefit methodology be developed as soon as possible in Phase 2. It is likely that there will be a consistent underlying "framework" to consider as the basis for discrete cost benefit methodologies in the priority end uses – and any such framework for energy storage needs to take into consideration the fact that storage provides significant value – this value needs to be fairly valued and counted; including cumulatively counting multiple benefits for a particular end use when possible. Storage can provide many unique benefits, such as its significant operational flexibility and its potential to reduce risk in overall system planning (i.e. to avoid overbuilding by using "just-in-time" capacity alternatives. Each of these unique benefits are outlined below.

a. Lower Cost of Delivered Flexibility -- In some or perhaps many circumstances energy storage's net cost (benefits minus cost) is likely to be less than traditional combustion turbines when compared on a delivered service basis, and simultaneously improve overall system efficiency.

    i. Regarding Flexible Capacity -- Fairly comparing cost of delivered service:

        1. Example: 100MW gas turbine – if this capacity to be flexible, then it can only be running at 40 MW to obtain +/- 40 MW of flexibility (80 MW of total flexible capacity). This has implications in that

running this turbine at 60MW is not its most efficient operational capacity, resulting in greater emissions and lower overall heat rate efficiency

2. The same up/down 40MW frequency regulation and ramping service (80 MW of total flexible capacity) can be provided by 40 MW of storage. 40MW of procured energy storage will be far more cost effective than 100 MW of combustion turbines even at today's commercially available energy storage prices. Another way to look at the same example is to compare apples to apples flexible capacity: 100MW of energy storage can provide 200MW of flexibility as compared to a 100MW gas turbine which can only provide 80 MW of total flexible capacity. Energy storage thus provides 2.5x more flexible capacity for each MW of rated capacity.

3. While charging energy storage can provide 2x its capacity as reserves and when charged energy storage can provide spinning reserves while on standby

ii. Regarding Service hours and ramp speed. Energy storage's value is even greater when service hours and ramp speed are factored in.

1. Gas turbines must always be running at some minimum output level (or their efficiency is too low). Such minimum "must-run" required runtimes may displace lower-cost alternative sources of energy for California

2. Conversely; storage, has a minimum utilization of 0. As a result, it can be constantly synchronized to the grid, ready to provide fast-ramping flexibility in response to dispatch instructions, allowing lower cost supply sources to be used.

3. Storage's ability to respond instantaneously to control signals (as compared to the slow response of combustion turbines) means that less overall balancing services need to be procured. In other words, storage provides superior performance. This is the main reason why FERC recently issued Order No. 755 requiring ISOs and RTOs around the country to implement a new "pay for performance" tariff that rewards fast-responding resources.

a. Significant locational flexibility – energy storage can be sited in small, modular increments anywhere in the electric power system resulting in a number of unique benefits:

i. Far fewer siting and permitting requirements as compared to a large fossil plant, particularly because many storage technologies have no local emissions impacts.

ii. Energy storage can accurately target areas of greatest local constraint

iii. Siting and permitting requirements for energy storage are significantly less than that of a fossil plant – thus, energy storage can be more quickly and easily sited

b. Significant timing flexibility – again, energy storage's ability to be sited in small, modular increments enables unique benefits related to system planning/timing of new capacity. Namely, by installing smaller increments of capacity over time, the risk of adding too little or too much capacity is reduced.

c. Enhancing overall system efficiency; improving system asset utilization to deliver more kWh per kW of system capacity. There are a number of ways that energy storage can improve overall system efficiency:

i. Energy storage helps existing fossil fuel plants operate at their most efficient levels (let storage be load-following, not the fossil plants) (i.e. due to reduced start-ups, commitment, part load operation and ramping to reduce fuel use, air emissions and generation wear per kWh delivered).

ii. Energy storage helps flatten peak, thus better utilizing fixed investment in transmission and distribution and improving California's overall load factor.

iii. Distributed energy storage can also help reduce line losses which reduces affects fuel use and capacity needs

d. Accelerating renewable deployment – collectively, the operational flexibility benefits of storage as described above not only results in lower overall system operational cost, but also can enable greater renewable deployment and reduced system-wide emissions

V. STORAGE SHOULD BE ALLOWED TO PARTICIPATE IN EXISTING ENERGY AND CAPACITY PROCUREMENT EFFORTS, AND BE AFFORDED FULL RECOGNITION OF ITS UNIQUE BENEFITS

California's energy and capacity procurement methodologies (for renewables and other energy/capacity) need to explicitly enable storage to participate, and indeed credit storage for its unique benefits/attributes. To signal an openness to storage project development any procurement needs signal to the market place that is "open to storage" as an alternate solution by:

i. Explicitly indicating that energy storage can participate (and being technology neutral among energy storage technologies)

ii. Compare the energy storage's cost and capabilities on a delivered service basis factoring in storage's flexible capacity, service hours and ramp speed benefits

iii. Explicitly indicating that a four hour duration product (or shorter duration) can qualify for capacity product procurement

iv. Recognizing energy storage's fast ramp rate capabilities

v. Recognizing energy storage's ability to start/stop immediately

vi. Recognizing energy storage's ability to be sited close to load, where needed

vii. Recognizing energy storage's minimal siting and permitting risk

viii. Recognizing energy storage's ability to deliver modular installations over time as a valuable deployment and planning option

ix. Recognize energy storage's ability to increase existing generation, transmission and distribution asset utilization (more kWh delivered per kW of system capacity)

x. Recognized energy storage's ability to reduce T&D I^2R energy losses (affects fuel use and capacity needs)

It is equally important that the LTPP, RA and RPS proceedings similarly consider these benefits of energy storage. Finally, any evaluation of storage procurement, whether that is through this proceeding or LTPP, RA or RPS, should create procurement solutions that result in long term, financeable contracts for energy storage; another key enabler for storage deployment and healthy market development going forward.

VI. CONCLUSION.

CESA appreciates this opportunity to respond to submit comments to the Proposed Decision, and looks forward to working with the Commission and parties throughout the remainder of this proceeding, in particular, in helping to shape the Roadmap for energy storage in California going forward.

Respectfully submitted,

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Appendix A: Proposed Application Priorities

#	End Use (Application)	Description/ Problem Solving	Potential Compensation or Ownership	Likely Siting & Scale	Primary Benefits	*Conventional Solutions or Alternatives*	Energy Storage Case Study Example
1	Distribution Storage	Defers distribution upgrades. (For Example: overloaded wire, transformers, capacitor – not a load modifier) Use energy storage in lieu of sub transmission capacity (for 1-4 years)	• Utility Ratebased • Third party • End User	• At or down-stream from overloaded equipment • Substation • Circuit • Likely scale: MW x 4 hours	• Upgrade Deferral* • Replacement Deferral* • Equipment life extension • Service reliability • T&D congestion • Transportability	• Upgrade wires or transformers.	• SDG&E primary distribution storage (batteries)

*Operational considerations: Will operate on a scheduled basis (load modifier) **OR** maintains a prescribed level of charge and responds automatically to improve operational reliability (voltage support, etc.).

#	**End Use (Application)**	**Description/ Problem Solving**	**Potential Compensation or Ownership**	**Likely Siting**	**Primary Benefits**	***Conventional Solutions or Alternatives***	**Energy Storage Case Study Example**
2	Community Energy Storage	Improve local service reliability. Integration of distributed VREs Voltage control	• Utility Ratebased • Third Party under contract	• Adjacent to loads, on utility 'easement' >25 kW x 2 hr	• Service Reliability* • D Deferral* • T Congestion* • Electric Supply* • Ancillary Services* • Transportability	• Capacitor • Transformer	• AEP CES • Detroit Edison CES • SMUD Solar Smart RES/CES Project • SDG&E secondary storage projects

Operational considerations: Will operate on a scheduled basis (load shift) **OR** on an automated basis (power quality / operational reliability) depending on the nature of the problem to be solved [**OR** Bid into ISO markets; operate according to awards and ISO dispatch signal]

#	End Use (Application)	Description/ Problem Solving	Likely Compensation or Ownership	Likely Siting	Primary Benefits	*Conventional Solutions or Alternatives*	Energy Storage Case Study Example
3	Distributed Peaker (Load Modifier -- primarily in lieu of added electric supply capacity)	Energy cycling to address peaking needs (part year operated by utility, part year operated by CAISO)	• Utility Ratebased • Third Party ownership, PPA	• Subtransmission • Substation >25 MW x 4 hr or aggregated MW sized units	• Electric Supply* • Ancillary Services* • T Congestion* • Service Reliability* • D Deferral* • Transportability	• *Conventional Generation (CT, CC)* • *PPA* • *DR* • *Critical Peak Pricing (CPP)* • *EE* TES	• Modesto Irrigation District • Raleigh, NC (TAS Energy)

Operational considerations: Bid into ISO markets; operate according to awards and ISO dispatch signal **OR** Operate on a scheduled basis (load shift) **OR** on an automated basis (power quality / operational reliability).

The unit is operated as a traditional generation resource bidding into the market; thus the unit is *not* operated to meet local reliability needs. The “potential additional” benefits are the cost savings resulting from proximity to load, thus avoided some congestion charges and line losses.

	End Use (Application)	Description/ Problem Solving	Potential Compensation or Ownership	Likely Siting	Primary Benefits	*Conventional Solutions or Alternatives*	Energy Storage Case Study Example
4	Generation-sited (co located with fossil fuel plant or renewables)	On-site firming or shaping of intermittent generation Improving efficiency of existing fossil generation	• Expensed by LSE (if third party owns and sells higher value power to LSE) • Third Party PPA • Ratebased (If IOU owns and pairs with generation) • Market	• At or near RE Generation ✓ Subtransmission ✓ Substation ✓ Distribution 5 MW – 250 MW (variable, depending on size of co-located generation)	• Variable RE Generation Integration ✓ energy time-shift ✓ capacity-firming ✓ ramping ✓ Volt/VAR support • Resource adequacy • Ancillary services	• *Additional Sub-T or D Infrastructure* • *Static VAR Compensator* • *Switched Capacitor Banks*	• Xtreme Power - various • Solar Thermal with molten salt or other • TAS Generation Storage™ • Laurel Mtn AES

Operational Considerations: Dispatch coordinated to smooth VER output to avoid future integration charges. **OR** Bid into ISO markets; operate according to awards and ISO dispatch signal.

This application is distinct from the [Bulk] Generation application only when the storage device is integrated in to the VER itself, such as solar thermal coupled with thermal storage. Otherwise, there is no need for the storage device to be co-located with the VER as opposed to at a transmission substation. There could *potentially* be additional value if the storage device was able to reduce or avoid an investment to increase the transmission capacity necessary to accommodate the VER, but this would be a FERC-jurisdictional benefit.

#	End Use (Application)	Description/ Problem Solving	Potential Compensation or Ownership	Likely Siting	Primary Benefits	*Conventional Solutions*	Energy Storage Case Study Example
5	Bulk Generation/ Storage	Electric Supply Capacity/ provides resource adequacy, ancillary services, and energy	• Market • Utility Ratebasing • Third Party PPA	• Transmission • Generator co-located >100 MW x 6 hr (or aggregated units of smaller size)	• Resource adequacy • Ancillary services • Energy	• *Conventional Generation (CT, CC)* • *PPA* • *DR*	• Utility-owned Pumped Hydro-electric • Alabama CAES • TAS Energy Generation Storage™ Case Study

Operational considerations: While this application is conceived as large scale storage, the C/E template would be the same for a much smaller (or aggregated) device so long as that device is interconnected at the transmission level and intended to earn revenues through markets exclusively.

#	End Use (Application)	Description/ Problem Solving	Likely Compensation or Ownership	Likely Siting	Primary End Uses	*Conventional Solutions or Alternatives*	Energy Storage Case Study Example
6	Demand Side Management	End-use Customer Bill Management System load modification Service Reliability/ Quality Integration with BTM renewables	• Customer • Market (for ancillary services) • End-user • Third-party • Utility	• Customer-side of Meter	• TOU Energy Cost Management • Demand Charge Management • Reliability (back-up power) • Power Quality • Ancillary Services	• *Energy Efficiency* • *Combined Heat and Power (CHP)* • *Combined Cooling Heat and Power (CCHP)*	• Alameda County Santa Rita Jail • Various recently funded SGIP funded projects • TES

Operational considerations: Operated to minimize customer energy and demand charges, potentially responding to price signals sent by utility; potentially providing backup power in an outage if outage occurs when battery happens to be charged