CESA
CALIFORNIA ENERGY STORAGE ALLIANCE

October 29, 2009

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California Energy Commission
Docket Office, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

RE: Docket No. 09-IEP-1A

Dear Commissioners:

Thank you for giving CESA the opportunity to comment on the Draft September 2009 *Integrated Energy Policy Report*. CESA's comments and recommendations are provided below. CESA takes this opportunity to restate and update policy input previously provided at a number of forums during the 2009 IEPR development process. At this juncture, CESA respectfully strongly recommends that the views of it and its member companies should be explicitly recognized and endorsed in the text of the final version of the IEPR. CESA urges the Commission to champion the concept that energy storage should have its own asset class, embrace the idea that "utility-scale" is not simply about magnitude, fund a PIER study of the dimensions of California's need for energy storage, urge support for existing and proposed regulatory and legislative efforts to advance greater deployment of energy storage.

CESA also notes, and states its support for, recent formal comments by California Attorney General Edmund G. Brown to the CPUC: "The PUC report notes the possibility of solar thermal resources with storage (p. 31), but does not discuss the possibility of solar PV with storage. Such a combination could provide a short-term substitute for additional natural gas capacity needed to ensure necessary system reliability, and is worth exploring."[1]

1. **Energy Storage Should be Treated As Its Own Asset Class Category For All Purposes Because It Is Unique From Technical, Regulatory, and Policy Perspectives.**

Energy storage is very different than generation, demand, transmission and distribution of energy and therefore it is appropriate – and indeed crucial – that it has its own category for purposes of *inter alia* qualification for incentive programs - such as California's Self Generation Incentive Program ("SGIP"), tariffs, and utility rate base treatment. In an order approving wholesale rates for electricity sold by the Norton compressed air energy storage facility in 2001 the Federal Energy Regulatory Commission ("FERC") clearly articulated the basic reason that energy storage is a "thing" unto itself:

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[1] "Comments of California Attorney General Jerry Brown on California Public Utilities Commission 33% Renewable Portfolio Standard Implementation Analysis Preliminary Results, August 27, 2009" page 6.

> While common industry practice is to use "energy" and "electric energy" interchangeably, for the purposes of this order, the Commission distinguishes between the terms as follows. The term "energy" is used in the technical sense to mean the "capacity for doing work," while "electric energy" is used to mean electricity, one of the several forms energy may take. (Other forms of energy include nuclear, mechanical, radiant (or light), thermal (or heat), and chemical.) We make this distinction to ensure that the phrase "energy storage facility" is understood as not implying that electric energy is being stored, since, by definition, electricity cannot be stored.

California is moving in the right direction by creation of a regulatory category for energy storage at the retail level. One example is a specific subset of demand response, referred to as "permanent load shifting." However, California should much more explicitly align itself with the direction that FERC is taking to afford equal treatment to generation and load in terms of pricing and direct access to the wholesale market for ancillary services with its Orders No. 890 and No. 719, and its Smart Grid Policy. In a recent decision approving utility retail demand response programs, the California Public Utilities Commission ("CPUC") stated that:

> The phrase "permanent load shifting" refers to the shifting of energy usage by one or more customers from one time period to another on a recurring basis. Permanent load shifting often involves storing electricity produced during off peak hours and then using the stored energy to support load during periods when peak energy use is typically high. Examples of permanent load shifting technologies include battery storage and thermal energy storage. Thermal energy storage draws electricity during off-peak hours, which it stores in the form of thermal energy in ice, chilled water or a eutectic salt solution. That stored energy can be used during peak hours, generally to cool buildings without drawing additional electricity from the power grid during the day.

The CPUC's decision supporting permanent load shifting at the retail level dovetails with the FERC's wholesale Smart Grid Policy, which states that:

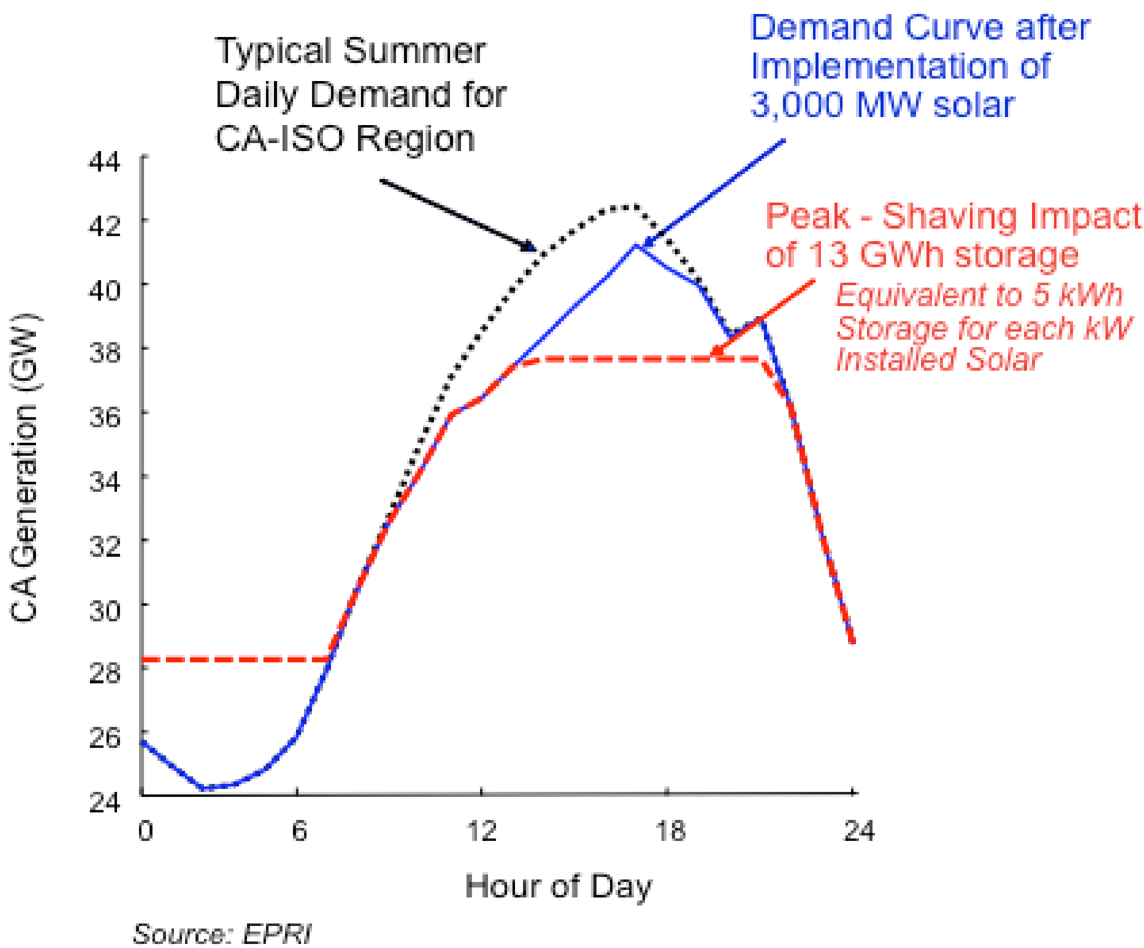
> For the purposes of this Policy Statement, electric storage refers to the storage of different forms of energy that may be beneficial to the bulk-power system. For example, while pumped hydroelectric storage refers to the potential energy stored in a reservoir of water, it is the conversion of that energy to electricity by a water turbine generator that makes it useful. Similarly, a flywheel stores kinetic energy to spin a generator, and batteries convert chemical energy directly into electricity. Moreover, there are useful applications for stored energy (for example, thermal energy) that is not converted into electricity, but can substitute for electrical power by providing an end use.

2. **"Utility-Scale" Energy Storage Should Explicitly Encompass Aggregated Small Distributed Energy Storage Applications**.

The commonplace term "utility-scale" itself isn't defined to our knowledge. Key in fact is that energy storage is "utility-friendly" and "utility-grade." That means, among many other positive attributes, it (i) performs reliably and cost-effectively, (ii) advances other utility and grid goals like reliability, peak reduction, CO_2 reduction, voltage regulation, and (iii) is "smart" and controllable (although not necessarily directly) by utilities. We note that at one time small distributed renewables (such as PV, wind, and biomass) and demand-side management were considered too small and distributed to be appropriate utility – scale/utility – grade resources, but now, quite appropriately, they are at the top of California's loading order. Similarly, today there are some who might believe that certain energy storage seems too small and distributed to be "utility-scale." But as long as a given energy storage technology can make a meaningful and cost-effective contribution to the above utility-grade attributes, it is an appropriate resource for the power grid – even if individual units are measured in kW not MW – and deserves support by utilities, the CAISO, and the State government.

A perhaps more meaningful term than "utility-scale" that is increasingly used is "grid-scale," which means "of value to or deriving value from connection to the grid." In California today, operating under a FERC-approved tariff, the CAISO is the *de facto* arbiter of what energy storage it will pay for. As a practical matter, what currently has value in current CAISO management of the grid is any kind of energy storage technology that is able to shift, in aggregate, 1 MW or more. Of course, this explicitly includes smaller distributed energy storage systems that in aggregate can total up to 1 MW. One MW is meaningful from a policy perspective because it is the size threshold that is technically and administratively cost-effective for the CAISO's purposes. Energy storage systems may or may not be centrally controlled – in other words, they are still "grid scale" even if an electric distribution utility doesn't have a direct role in controlling the energy storage (e.g. end-use customers could be responding to a retail or wholesale program or price signal).

For example, below is a chart that was created by EPRI that illustrates the impact of full implementation of the California Solar Initiative on a typical summer day. Notably, post-full CSI implementation California's peak remains quite high (41MW) at 5 PM (blue line). The resulting dashed red line indicates that impact to California peak demand if 5 kWh of storage were installed with each kW of solar. California's peak demand would effectively be reduced from 41MW to 37.5 MW. This peak load reduction is in fact possible with commercially available storage technologies today.



In a similar way CESA recommends that the IEPR more address the role of customer-based thermal energy storage. Thermal energy storage is a very efficient means to store energy and to reduce peak demand due to air conditioning. The National Renewable Energy Laboratory on behalf of the U.S. DOE's Building America program has identified thermal energy storage systems as a priority for zero net energy buildings[2] and CESA recommends that the IEPR recognize the importance of thermal energy storage in reducing peak demand and achieving zero net energy buildings. (Additionally, we request that thermal energy storage be included among the storage examples listed on page 185.)

3. **<u>The CEC's PIER Program Should Provide Funding To Determine How Much Energy Storage Is Needed To Attain California's Energy Policy Goals.</u>**

Storage, as a technology class, is a key asset to help California integrate its various energy policy goals. A focused planning effort that looks at the potential of storage as a cross-

[2] *Maximizing Residential Energy Savings: Net Zero Energy Home Technology Pathways*, R. Anderson and D. Roberts, National Renewable Energy Laboratory Technical Report NREL/TP-550-44547, November 2008

cutting enabling technology will facilitate the implementation of the State's existing energy policy goals. For example, storage can help address T&D cost shifting issues associated with wind and solar net metering, by minimizing the grid impacts of back-feeding too much renewable generation into the grid. Further, such an approach will help to identify and resolve barriers to achieving the various benefits from storage.

For reasons that are not readily apparent, the results of a 33% RPS Implementation Analysis conducted by the CPUC's Energy Division staff, made no attempt to quantify the need for energy storage. There are many guesses based on various degrees of rigor in the analyses of available data. For example, a recent Pew Center for Global Climate change states:

> Global electric energy storage capacity is 90 GW, which is only 3 percent of electric power production capacity due to the high capital cost of electric energy storage compared to natural gas power plants which can provide similar services, and regulatory barriers to entry in the electricity market. Of that global capacity, 22 GW of electric energy storage is in the United States (2.5 percent of U.S. power capacity).

Unfortunately there is no way to assess the method used to reach this conclusion. It is worth noting that the amount of energy storage that is necessary and cost-effective typically rises faster than does the level of renewables in a system for at least two reasons. One, small amounts of intermittency can be responded to by various operational means, but large amounts of intermittency need capital plant such as cost-effective energy storage. Two, ambitious renewables mandates such as the 33% RPS will be largely met by wind (and perhaps PV) rather than other renewables such as biomass or geothermal, and thus will highlight the significant intermittency and off-peak nature of PV and to greater extent wind.

As noted in the draft IEPR, PIER funding for wide-scale demonstrations of advanced energy storage in different cross-cutting applications in the marketplace is urgently needed to demonstrate capture of multiple value streams in various applications and business models.

- Energy storage with renewables (distributed and wholesale)
- Energy storage integrated with onsite renewables and demand response
- Energy storage integrated with all of above plus emergency backup applications – to help achieve highly reliable islanded loads with no onsite emissions

4. **Existing State and Federal legislative Initiatives Should be Highlighted and Supported.**

Including advanced energy storage technology that is integrated with qualifying renewable generation technology in California's SGIP is a significant step already taken by the CPUC. Recent state legislation, such as SB 412 (Kehoe) would further expand the role of energy storage incentives. Another two-year bill, AB 44 (Blakeslee), would allow utilities an incentive rate of return and require a prominent place for storage in utility long term procurement planning.

Federal legislative actions regarding energy storage of note are the significant financial support for energy storage in the American Recovery and Reinvestment Act of 2009 (the "Stimulus" legislation, P.L. 111-5); the introduction of the "Storage Technology of Renewable and Green Energy (STORAGE) Act" (S. 1091) by U. S. Senator Ron Wyden and others and the "Thermal Energy Cooling and Heating Act" (H.R. 3918) by U.S. Representatives Mike Thompson, Wally Herger and others; and the passage by the U.S. House of Representatives of the American Clean Energy and Security Act of 2009 (H.R. 2454), with provisions that explicitly and implicitly promote the deployment of energy storage. This legislative trend is likely to increase over the coming months due to the many actions currently underway at both the state and federal level on energy policy.

5. Specific Policy Recommendations to Optimize the Deployment of Energy Storage.

State Legislature, CEC, CPUC and CARB

1. Fully implement incentives for advanced energy storage technology in the SGIP.
2. Support creation of a California-based "Energy Storage Center of Excellence" to provide technical and policy leadership.
3. Accelerate deployment of "integrated" energy storage demonstration projects under various business models.
4. Include energy storage in DG, DR, EE cost benefit methodologies.
5. Require near-term utility procurement of distributed storage for peak load reduction (similar to how solar is being procured now).
6. Reflect the value of storage-integrated renewables in the Feed-in-Tariff, pursuant to recently enacted statutes, and net metering.
7. Explore retail tariff design that encourages peak load shifting.
8. Provide standard offers for energy storage and/or permanent load shifting, upon completion of CPUC-ordered proceeding.
9. Establish increased rate of return for qualifying utility-owned storage.
10. Require storage as part of current utility long-term procurement process.
11. Consider the following policies as part of California's RPS implementation:

A. Assign "bonus" RECs for renewables coupled with storage based upon a determination of the qualifying storage's value to the RPS and grid.

B. Establish a "storage-version" of the RPS – that includes peak a reduction standard for utilities and government agency power purchases.

C. Allow storage to receive REC assignment under an "alternative technologies" classification within the state's REC program. (For example, in Massachusetts', for every 1 MWh that flywheel storage injects to the grid, the flywheel storage gets credit for creating 0.65 "class I" RECs. Those RECs can then be sold in the NEPOOL's REC market.)

Federal and CAISO

1. Implement energy storage tariff for ancillary services to comply with FERC Order No. 890 and No. 719.

2. Adopt tax incentives (investment tax credits and accelerated depreciation) as is the case with solar, wind, efficiency and numerous other energy technologies.

3. Adopt peak demand reduction goals for utilities and federal agencies.

4. Recognize storage's role in mitigating CO_2 emissions (including through the allocation of allowance/revenues for energy storage) and in contributing to a federal RPS (per RPS discussion above).

In summary, CESA urges the Commission to champion the concept that energy storage should have its own asset class, embrace the idea that "utility-scale" is not simply about magnitude, fund a PIER study of the dimensions of California's need for energy storage, urge support for existing and proposed regulatory and legislative efforts to advance greater deployment of energy storage. Thank you for considering our views.

Sincerely,

Janice Lin
CESA Co Founder and Director