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.	Rulemaking 10-12-007 (AYK) (Filed December 16, 2010)

REPLY COMMENTS OF SIERRA CLUB CALIFORNIA ON ADMINISTRATIVE LAW JUDGE'S JULY 21, 2011 RULING ENTERING DOCUMENTS INTO RECORD AND SEEKING COMMENTS.

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Sierra Club California ("Sierra Club") respectfully submits the following reply comments on the Administrative Law Judge's Ruling Entering Documents into Record and Seeking Comments, dated July 21, 2011.

The Legislature required the Public Utilities Commission ("Commission") to open a proceeding to develop policies that would facilitate the use of energy storage. Specifically, the Legislature required the Commission to evaluate whether procurement targets and/or other policies would promote the use of energy storage. Creating a methodology to value energy storage's multiple benefits is a necessary prerequisite for complying with AB 2514. As Sierra Club explained in its opening comments, the lack of a rate design for energy storage is also a major barrier to its implementation.[1] By developing a mechanism that values energy storage, the Commission can assess the cost-effectiveness of energy storage and satisfy its legislative mandate by using this valuation mechanism for the purpose of establishing procurement targets. Sierra Club believes procurement targets will be an important tool in creating a regulatory environment conducive to maximizing the multiple benefits of adding energy storage to the

[1] Comments of Sierra Club California on Administrative Law Judge's July 21, 2011 Ruling Entering Documents into Record and Seeking Comments, August 29, 2011, pp. 4-5 ("Sierra Club's Comments").

grid. The Commission cannot reject procurement targets at this stage of the proceeding, as some parties suggest, without first evaluating them pursuant to AB 2514.

I. This Proceeding Should Focus on Developing a Methodology to Value Storage.

A. The Parties Agree that Energy Storage's Lack of a Valuation Methodology is a Major Barrier to its Widespread Adoption.

Although the opening comments offer a range of views on the barriers to energy storage, most recognize that valuing it will eliminate a major barrier to the adoption of energy storage. For example, the Green Power Institute explains that energy "[s]torage systems can resemble generation in some respects, and load in some respects, but it is neither. It needs treatment that recognizes the unique characteristics of storage technologies of various kinds, and provides a clear incentive structure."[2] Similarly, San Diego Gas & Electric concludes that "[t]he future prospects for energy storage are tremendous due to its multifunctional characteristics. It is . . . important is [sic] to capture this value proposition in California within all levels of the supplier-user value chain."[3] Creating mechanisms for valuing energy storage and the associated payment structures for the various services that storage can provide are also necessary for determining cost effectiveness. Megawatt Storage Farms explains that "[t]he question of cost effectiveness actually consists of two elements: the cost of the actual storage and the revenue that can be achieved from that storage."[4] The comments further argue that "[t]he fundamental problem is one of monetizing storage, not one of storage cost."[5] The California Energy Storage

[2] Comments of the Green Power Institute in Response to the ALJ's Ruling On Barriers To Storage, August 29, 2011, p. 4 ("GPI's Comments").
[3] Response of San Diego Gas & Electric Company (U 902 E) on Administrative Law Judge's Ruling Entering Documents Into Record And Seeking Comments, August 29, 2011, p. 7 ("SDG&E's Comments").
[4] Comments Of Megawatt Storage Farms, Inc. on the June 28, 2011 Workshop And Related Questions, August 29, 2011, p. 7 ("Megawatt Storage's Comments").
[5] *Id.*

Alliance ("CESA") emphasizes that there is "the acute need for a methodology to determine cost-effectiveness of energy storage . . . ."[6]

Sierra Club agrees with CESA's recommendation that the Commission should address cost-effectiveness in the near term by compressing "both policy issues and development of a cost-benefit evaluation to take place concurrently . . . ."[7] The comments reveal that the parties have varying approaches on how to address cost-effectiveness (*see infra* Sec. II), but devising the valuation mechanism for energy storage from diverse perspectives -- including the full range of services that energy storage can provide -- should be a primary endeavor of this proceeding.

B. Energy Storage Has Benefits that Are Not Properly Valued.

The Order Instituting Rulemaking ("OIR") succinctly described the potential value of energy storage in the context of California's legislative and regulatory shift to a clean energy economy:

> California's energy policies require the development of new types of renewable and distributed generation resources, such as wind and solar. These resources by their nature are intermittent and may not be directly dispatched by system operators to meet customer load. Since operators of the electricity grid must constantly match electricity supply and demand, intermittent renewable resources are challenging to incorporate into the electricity grid. Additionally renewable generation can often occur at times when there is reduced demand for power. Energy storage technologies may provide an effective means for addressing the challenges of relying upon intermittent and off-peak renewable generation.
>
> Energy storage technology may also offer California economic and environmental benefits. By utilizing energy storage technologies to store intermittent and off-peak renewable power, the state may: reduce greenhouse gas emissions from carbon-based electricity production; avoid the need to build more transmission and generation facilities; increase system efficiencies and reliability; and, generate economic activity through the manufacturing and operation of new technologies.

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[6] Opening Comments of the California Energy Storage Alliance to Administrative Law Judge's Ruling Entering Document Into Record And Seeking Comments, August 29, 2011, p. 2 ("CESA's Comments") .
[7] *Id.*, p. 5.

> However, the full costs and benefits of energy storage technologies are not known. How those costs and benefits should be allocated throughout the electric system is also not established, in part because these technologies may provide multiple services such as generation, transmission and distribution.[8]

Valuing the economic and environmental benefits identified by the OIR in the near term will facilitate the effective deployment and use of Energy Storage into the California grid.

C. Information Related to the Operational Needs of the Grid Would Facilitate Informed Decision Making.

Sierra Club agrees with CESA that "[e]nergy storage's ability to improve the efficiency of the grid itself, therefore enabling the deployment of more renewable energy more cost-effectively for ratepayers should be one of this proceeding's highest priorities."[9] Understanding the grid's present and future needs for energy storage will inform this analysis and will create inputs for a valuation methodology. Sierra Club advocated in its opening comments that this proceeding should develop information about the locational and operational needs of the grid. Sierra Club suggested that mapping of the transmission and distribution system that identifies the locational benefits of certain energy storage placement would provide important information for assessing the value of specific energy storage assets.[10] Pacific Gas and Electric ("PG&E") recognizes that "[l]ack of information about future system needs . . . makes it difficult to value energy storage."[11] However, PG&E does not volunteer the relevant information in its own control that would start to fill this information gap. The IOUs should be required to provide the operational and distribution data in their territories that would contribute to assessing the value of the locational benefits of energy storage.[12]

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[8] Order Instituting Rulemaking , December 21, 2010, p. 4.
[9] CESA's Comments, p. 6.
[10] Sierra Club's Comments, p. 7-8.
[11] Comments of Pacific Gas And Electric Company (U 39 E) on Presentations Made at the June 28, 2011 Workshop in the Energy Storage OIR, August 29, 2011, p. 5 ("PG&E's Comments").
[12] *See* Sierra Club's Comments, pp. 7-8.

Sierra Club also shares Megawatt Storage Farm's concern about curtailment of renewable energy resources.[13] Development of energy storage policies that eliminate or substantially reduce curtailment of renewable resources should be a priority of this proceeding.[14] The priority is consistent with promoting the use of the new renewables that are required by the 33% RPS mandate of SBx 2.

As California continues to use increasing amounts of renewable energy, the multiple functions of energy storage will provide essential services to the grid. Sierra Club agrees with Brookfield Renewable Power's request that this proceeding's evaluation of energy storage include the information being developed by CAISO in its renewable integration modeling.[15] Specifically, Sierra Club agrees that the "analysis of ramping ancillary services and other grid needs and requirements under the 33% RPS based on study data provided by CAISO" should be considered in this proceeding.[16] This is consistent with AB 2514's requirement that the commission "[c]onsider available information from the California Independent System Operator derived from California Independent System Operator testing and evaluation procedures."[17] This information can contribute to developing a methodology for assessing cost-effectiveness. To the extent that the Division of Ratepayer Advocates ("DRA") is arguing that renewable integration modeling that can relate to energy storage should be considered exclusively in the Long-Term Procurement Proceeding ("LTTP") rather than in this proceeding, Sierra Club disagrees with that position.[18] The information should not be exclusive to either proceeding.

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[13] *Id.*, p. 5; Megawatt Storage's Comments, p. 2-3.
[14] Sierra Club's Comments, p. 5.
[15] Comments of Brookfield Renewable Power Inc. on July 21, 2011 Ruling Entering Documents Into Record And Seeking Comments, August 29, 2011, p. 3 ("Brookfield's Comments").
[16] *Id.*
[17] Cal. Pub. Util. Code § 2836.2(b).
[18] Comments of Division of Ratepayer Advocates on Administrative Law Judge's Ruling Entering Documents into the Record and Seeking Comments, August 29, 2011, pp. 1-3, 5 ("DRA's Comments").

This proceeding and LTPP serve different purposes. This proceeding should eliminate the barriers to the widespread adoption of energy storage such as the current inability to value the multiple benefits of energy storage and the lack of a basis for determining cost-effectiveness. In addition, this proceeding will promote energy storage by developing proactive regulatory policies such as assessing the need for procurement targets for energy storage in particular.[19] LTPP, on the other hand, examines resource needs for the whole energy system, and generally does not establish targets for specific resource types. Rather, LTPP normally incorporates specific resource procurement targets established either by legislation, such as the RPS target, or by commission decisions from other proceedings, such as for Energy Efficiency, Demand Response, Combined Heat and Power, and Resource Adequacy. The analyses in the two proceedings are distinct, and, where there is overlap, the results of this proceeding can better inform LTPP. If energy storage procurement targets are adopted in this proceeding, those targets would constitute an input for the LTPP planning assumptions. The analysis in a new round of LTPP should and could assess the resource need using a variety of assumptions including procurement targets set in this proceeding. Similarly, information developed in this proceeding can inform other proceedings such as Resource Adequacy. The Commission should take advantage of this proceeding's sole focus on energy storage and use this proceeding to facilitate the adoption of energy storage. The Commission should reject positions that advocate piecemealing the consideration of energy storage into multiple forums.[20]\

[19] Cal. Pub. Util. Code § 2836(a)(1); *see also infra* Section III.
[20] *See, e.g.*, DRA's Comments, pp. 1, 4; Comments of Southern California Edison Company (U 338-E) to the California Public Utilities Commission on Administrative Law Judge's Ruling Entering Documents into the Record and Seek Comments in R.10-12-007, August 29, 2011, p. 6 ("SCE's Comments").

II. The Commission Should Reject Approaches that Do Not Adequately Value the Multiple Benefits of Energy Storage.

The comments generally agree that valuation of energy storage is a major barrier. This agreement ends, however, with respect to the proper approach to overcome this barrier. The comments broadly fall on two sides of a spectrum. On one side, the approach generally advocated by CESA involves the development of proactive regulatory policies to encourage the development of energy storage systems. On the other side, comments supported an "application-specific approach" addressed by Southern California Edison ("SCE") during the workshop presentations. This approach would rely on little to no Commission involvement and would require energy storage to attempt to compete with the market on a case-by-case basis. Sierra Club disagrees with the "application-specific approach" because it would result in a perpetual undervaluing of the multiple benefits of energy storage, since IOUs would be limited to looking only at specific applications outside of the context of the Commission's power to establish a general value for purposes of rate recovery for energy storage. A general approach can create a stable market for energy storage, and such certainty can help reduce the cost of clean energy technologies that are in early stages of market adoption.

A. SCE's Application-Specific Proposal Undervalues Energy Storage.

Several parties cited SCE's workshop presentation to support the "four-step" methodology to evaluate specific applications involving energy storage.[21] This process, as presented by SCE, would result in pairing particular energy storage technologies with specific application needs. While this approach could add value to several specific types of applications - such as combining energy storage with an intermittent renewable plant to provide firm

[21] Opening Comments of the Consumer Federation of California on the Administrative Law Judge's Ruling Entering Documents into Record and Seeking Comments, August 29, 2011, p. 5; DRA's Comments, p. 3; Brookfield's Comments, p. 2; GPI's Comments, p. 2.

generation to the grid - the focus on pairing energy storage for such a specific task would overlook the additional functions and benefits that energy storage can provide. By matching energy storage to one specific application, the multifunctional role of energy storage is limited to a single or preferred task, and the additional functions may be overlooked or lack a market to monetize the value of the additional function.

For example, SCE noted that it would support allowing renewable energy developers to include energy storage in their product design.[22] While this type of integration has value, it does not realize the full potential of energy storage. The Green Power Institute noted that, "[s]torage can be used to produce a more valuable electricity product for a renewable energy producer to provide to the grid, but in doing so the total amount of energy supplied through the utility interconnection meter is reduced."[23] In other words, if a specific application for renewable energy generation included energy storage in the design, there is a risk that this could limit the evaluation of those energy storage benefits to the benefits they could provide to that specific plant. As noted by the Green Power Institute, this pairing could actually reduce some value to the renewable energy generator because it would reduce the total amount of energy supplied to the utility.

Relying exclusively on SCE's application-specific approach, the pairing would fail to realize the full potential of the energy storage system's ability to balance other intermittent resources, to provide fast responding balancing services, and to reduce the need to build long-term infrastructure. In the example above, when the paired plant's renewable energy generation is running at ideal generation (i.e. there is no excess generation requiring a load sink and no intermittent drop in plant generation), the energy storage system would sit idle and would not

[22] *See, e.g.* SCE's Comments, p. 22.
[23] GPI's Comments, p. 3.

produce any benefits at that moment. By narrowing the cost-effectiveness review to a pairing with a specific plant, the fast-ramping capabilities, load sink capabilities, and other services that the energy storage facility could provide would be limited to the specific renewable energy plant with which it pairs. Pursuant to SCE's methodology, when that renewable plant does not need those services, these additional services are not valued. Combining a specific renewable energy plant design with energy storage could create substantial benefits in terms of firm power and reliability, but the true cost-effectiveness of the energy storage system would remain hidden because that specific application would not realize the full potential of that energy storage asset and would therefore undervalue it as a resource. Moreover, as Vote Solar points, SCE's proposal is "overly cautious" and it appears "to be an extremely deliberative and time intensive process" that limits the ability to address near-term energy storage solutions.[24]

While Sierra Club is not opposed to having storage co-located at renewable generation sites, it is crucial that all storage be given the market opportunity to provide a full range of service benefits. SCE's application-specific approach may have the potential to identify several beneficial projects; however, at this time the Commission should focus on overall policies that broadly encourage the development of energy storage.

B. Simply Making Energy Storage Competitive in Individual Markets Will Not Sufficiently Remove Energy Storage's Regulatory Barriers.

The above scenario of pairing energy storage with a single renewable generation plant illustrates the flaws of conceptualizing energy storage as an "even playing field" competitor in the market. The example shows that there are market inefficiencies with respect to energy storage because several external benefits of energy storage go unrealized or undervalued when they are limited to being paired individually with a particular generation plant. Such

[24] Comments of the Vote Solar Initiative, August 29, 2011, p. 2

inefficiencies would exist in other individual applications as well. SDG&E broadly acknowledged this problem: "Energy storage could play different roles in the market place due to its multifunctional characteristics. However, not all of these roles operate in markets that have accurate or efficient price signals."[25] The problem with an application-specific approach is that the case-by-case evaluation of energy storage will evaluate energy storage in a manner that perpetually fails to realize the full potential of its benefits. Regulatory incentives, such as procurement targets, can compensate for this market inefficiency by incorporating more accurate price signals in an otherwise undervalued asset.

Most of the parties, including those advocating for an application-specific approach, appear to agree that the market does not properly value the several benefits of energy storage:

- "Market access barriers represent impediments that limit energy storage devices from participating in existing markets . . . . New product barriers exist where storage devices possess capabilities not currently valued in the marketplace."[26]
- "[T]he different functions storage may provide are not mutually exclusive, and may come under different regulatory structures . . . . The existing inadequate markets under these jurisdictions for these projects could impede realizing the value for all the services that cost-effective energy storage systems are capable of achieving."[27]
- "DRA believes the largest barriers to more widespread usage and development of storage include the lack of a methodology to value cost-effectiveness, including a lack of understanding of how to quantify costs and monetize different value streams for different applications."[28]
- "[T]he industry still lacks a proper methodology and models to value the potential benefits in a fair and accurate manner that reflects the true operational benefits to the electric system."[29]

In light of the recognized inefficiencies in the current marketplace for energy storage facilities, the Commission can and should provide important leadership to overcome these barriers to create a regulatory framework that fosters the development of energy storage. Doing

[25] SDG&E's Comments, p. 4.
[26] SCE's Comments, p. 9.
[27] SDG&E's Comments, pp. 4-5.
[28] DRA's Comments, p. 6.
[29] PG&E's Comments, p. 4.

nothing would force energy storage to compete in individual markets on a case-by-case basis in a manner that, as discussed above, would result in a perpetual undervaluing of the resource. A "level playing field" in an inefficient market is not desirable. The energy industry is a highly regulated field because of the intrinsic understanding that the market requires regulation to overcome potentially severe market failures. The parties in this docket, and indeed the Legislature, have all recognized that energy storage holds enormous potential to benefit the electric system in numerous ways. In order to foster this potential, the Commission should provide regulatory support to overcome both the natural market and the regulatory disincentives to develop energy storage.

III. The Commission Must Reject Positions that are Inconsistent with AB 2514.

The IOUs' uniform opposition to procurement targets before this proceeding has developed a record on which to evaluate them is inconsistent with AB 2514, which requires the Commission to assess in this proceeding whether procurement targets should be adopted.[30] AB 2514 requires that:

> On or before March 1, 2012, the commission shall open a proceeding to determine appropriate targets, if any, for each load-serving entity to procure viable and cost-effective energy storage systems to be achieved by December 31, 2015, and December 31, 2020. As part of this proceeding, the commission may consider a variety of possible policies to encourage the cost-effective deployment of energy storage systems, including refinement of existing procurement methods to properly value energy storage systems.[31]

Moreover, assessing procurement is not a one-time requirement; the Commission is required to reevaluate its procurement target decision every three years.[32] The Scoping Memo sets forth a process in which procurement targets will be assessed at the end of the proceeding after the

[30] *See* PG&E's Comments, pp. 1-2; SCE's Comments p. 2; SDG&E Comments p. 3.
[31] Cal. Pub. Util. Code § 2836(a)(1).
[32] *Id.* § 2836(a)(3).

Commission has analyzed the Phase 1 and Phase 2 issues including cost-effectiveness.[33] The Commission should disregard comments in opposition to procurement targets because these comments are premature. In addition, DRA's proposal that energy storage should be considered in other proceedings but not this one should also be rejected as inconsistent with the Commission's mandate to consider procurement targets in this proceeding.[34] The Commission must consider procurement targets in this proceeding, but that requirement does not exclude the Commission from evaluating energy storage needs in other proceedings such as LTPP or Resource Adequacy. Sierra Club notes that procurement targets do not necessarily need to be based on a certain quantity of energy storage. Other criteria may be more appropriate for setting targets. For example, a procurement target could be based on environmental values such as reducing peak load by a certain percentage to achieve reduction in criteria air pollutants and greenhouse gases.

PG&E's suggestion that this proceeding should promote more demonstration projects is inconsistent with AB 2514.[35] The statute requires the Commission to consider information from existing pilot programs; it does not require additional study. Section 2836.2 states: "In adopting and reevaluating appropriate energy storage system procurement targets and policies pursuant to subdivision (a) of Section 2836, the commission shall do all of the following: (a) Consider existing operational data and results of testing and trial pilot projects from *existing* energy storage facilities."[36]

[33] Scoping Memo and Ruling of Assigned Commissioner and Administrative Law Judge, May 31, 2011, p. 3.
[34] *Cf.* DRA's Comments, pp. 1, 4 with Cal. Pub. Util. Code § 2836(a)(1).
[35] PG&E's Comments, p. 2.
[36] *Id.* (emphasis added).

IV. This Proceeding Should Focus on Beneficial Energy Storage Technologies.

This proceeding should focus on promoting California's energy and environmental policies and goals, including meeting the Governor's goal of 20,000 megawatts of renewables, creating policies that support California's 33% RPS mandate, and creating a vehicle for adding even more renewables to the grid beyond 2020. Policies in this vein will facilitate the reduction of greenhouse gases, thereby contributing to the goals of AB 32, the Global Warming and Solutions Act of 2006. In its decision in the 2006 LTPP, the Commission explained that it expected the IOUs in their future "resource planning to meet and exceed the high standards Californians expect as pacesetters on energy and environmental issues."[37] The same standard should be applied to the analysis of energy storage.

Sierra Club disagrees with Brookfield Renewable Power's recommendation that the Commission should "consider adopting financial incentives to encourage the development of large-scale pumped storage resources in California."[38] While all new, large energy storage projects may raise particular environmental review issues, Brookfield's recommendation raises serious red flags if its recommendation involves large new dams. These type of projects have well-known drawbacks, including the inundation of large natural areas, substantial damage to fish and wildlife, interference with fish migration and reproduction, and displacement of human and natural communities. Any such proposal would require significant California Environmental Quality Act analysis that would divert the resources for this proceeding from policies that could be implemented in the near term and make greater contributions to California's energy and environmental goals.[39]

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[37] Decision 07-12-052, December 20, 2007, p. 6.
[38] Brookfield's Comments, p. 5.
[39] Sierra Club notes that its opposition to Brookfield's recommendation is distinct from Sierra Club's recommendation to evaluate "if *existing* pump storage could be cost-effectively retrofitted and operated to provide

Respectfully submitted,

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needed capacity for support and delivery of variable generation from intermittent renewables." Sierra Club's Comments, pp. 8-9 (emphasis added).