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 (Filed December 16, 2010)

COMMENTS OF BRIGHTSOURCE ENERGY, INC. ON THE ADMINISTRATIVE LAW JUDGE'S RULING ENTERING INTERIM STAFF REPORT INTO RECORD AND SEEKING COMMENTS

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BrightSource Energy, Inc. ("BrightSource") is pleased to submit these comments in response to the Administrative Law Judge's Ruling Entering Interim Staff Report Into Record and Seeking Comments issued on January 18, 2013, in this proceeding and the questions posed in the Interim Staff Report (the "Interim Staff Report"). Our comments are based on participation in the California Public Utilities Commission ("CPUC") proceeding, review of the CPUC Use Cases and the Interim Staff Report, and a recent research paper entitled "The Economic and Reliability Benefits of CSP with Thermal Energy Storage: Recent Studies and Research Needs" (the "Economic and Reliability Benefits of CSP with Thermal Energy Storage Report"), which was authored for the Concentrating Solar Power Alliance (the "CSP Alliance") and addresses several of the questions raised for comment. We will refer to the relevant sections of the Economic and Reliability Benefits of CSP with Thermal Energy Storage Report in the discussion below; the current version of the paper is available electronically at http://www.csp-alliance.org/CSP Alliance-report/. The following comments respond to the questions raised in the Interim Staff Report.

1. Use Cases

- ***Do the Use Cases provide an adequate representation of the range of valuable applications that energy storage currently provides to the electric grid?***

The Economic and Reliability Benefits of CSP with Thermal Energy Storage Report focuses on the applications of thermal energy storage when co-located with a concentrating solar thermal power ("CSP") plant. The report discusses the grid applications of this technology in significant detail, addressing the Use Cases on "Transmission Connected Energy Storage" and delving much further into related topics. Rather than reproduce that discussion here, we incorporate the report's discussion by reference.

- ***Besides the section on cost-benefit analysis, which is still a work-in-progress, is there some critical element missing from the Use Cases?***

CSP with thermal energy storage is in some ways like most of the storage technologies being evaluated in this proceeding: it is a complex technology that can be adapted and configured to address different types of operational needs emerging on the California power system. However, unlike most other storage technologies, rather than taking power from the grid, it can shift the time of production of Renewables Portfolio Standard ("RPS") – eligible energy. Further, it generally augments the quantity of RPS energy that can be produced from a given-sized plant (i.e., it increases the plant's capacity factor), while at the same time enabling flexible dispatch characteristics to support the integration of renewable resources. Given the inherent complexities, we recognize that the CPUC storage proceeding Use Cases cannot begin to consider and evaluate all the potential design configurations of any particular storage technology. However, they should prioritize the most salient characteristics relevant to the proceeding's purpose. Some additional insight into how economic valuation intersects with engineering

design is provided in Section 12 of the Economic and Reliability Benefits of CSP with Thermal Energy Storage Report.

2. Preferred Resources

- ***Why should Energy Storage be considered a "preferred resource"?***
- ***Does the Commission need to work with Joint Agencies to modify the Loading Order or will a Commission policy statement suffice?***
- ***What are the implications of designating Energy Storage as a "preferred resource" in this Proceeding for other procurement proceedings?***

Storage should be studied and considered for a designation as a "preferred resource." Like existing "preferred resources," certain storage applications can provide benefits to the California grid that conventional resources cannot provide, i.e., a low or non-emission solution to energy supply and reliability needs. BrightSource recommends that the Commission engage with the Joint Agencies to discuss potential modifications of the Loading Order to ensure that the appropriate storage applications are dispatched consistent with the policy objectives underlying the Loading Order. A focused workshop would be an effective forum to discuss the proper place of "storage" within the Loading Order, as well as the implications of such a change on this proceeding and other procurement proceedings.

3. Cost-Effectiveness Methodologies

- ***What models should be pursued for running the cost-effectiveness test?***
- ***Is there a simplified approach to cost-effectiveness that would meet the Commission needs?***
- ***To address Staff's concern that it may not be the best use of resources to run all of the Use Cases through cost-effectiveness models, is there a priority criteria or prioritized list of Use Cases that can be utilized?***
- ***If not, how can we ensure that the analysis gets done for all the Use Cases in a timely***

manner?

BrightSource supports utilizing several models for the cost-effectiveness test, but careful attention needs to be ensured so that inputs and assumptions into different models are standardized and outputs are properly characterized. As the CPUC is aware, different methods yield different insights, reflecting modeling decisions such as the:

- level of aggregation of the power system,
- whether the storage unit is a price-taker or affecting market prices,
- the time-steps used in dynamic modeling,
- the scenario being analyzed (including the portfolio of variable renewables), among others.

One approach to prioritization is for modelers to review existing literature to determine where models already used for similar purposes can add insight into the evaluation of a particular technology or scenario. For example, understanding of the economic benefits of CSP with thermal storage has been greatly enhanced by the growing research literature on valuation of this technology and the comparative valuation of different solar technologies. The Economic and Reliability Benefits of CSP with Thermal Energy Storage Report contains a preliminary literature review with some comparison of modeling methods. This survey of research indicates a potential convergence in results between different models. Nevertheless, certain modeling questions remain unresolved, such as the frequency and magnitude of negative pricing as renewable penetration increases, which may benefit forms of storage.

The modeling resources required to assess potential value aspects are significant and may exceed those available to Staff in this proceeding. BrightSource would be happy to collaborate with the CSP Alliance, other stakeholders, and the CPUC to support any modeling of CSP with thermal

energy storage conducted in the CPUC proceeding. BrightSource would also be happy to assist in the interpretation of existing modeling results of CSP with thermal energy storage and other storage technologies as appropriate.

4. *Policy Options*

- ***Does Staff's priority listing of Policy Options accurately represent the most important issues facing storage in the identified proceedings?***

- ***Are suggested actions for resolution of barriers the best approach to advancing energy storage deployment?***

BrightSource has no opening comments on this topic.

5. Related Proceedings

- ***Does the list of issues in related proceedings capture the work being done in the other proceedings described?***

- ***Is there more that should be done in the identified proceedings to advance energy storage deployment, aside from establishing procurement targets?***

BrightSource has no opening comments on this topic.

Respectfully Submitted,

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