BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Integrate and Refine Procurement Policies and Consider Long-Term Procurement Plans.	)	**Rulemaking 12-03-014 (Filed March 22, 2012)**

COMMENTS OF BEACON POWER, LLC ON THE ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENT ON WORKSHOP TOPICS

Andrew O. Kaplan
BROWN RUDNICK LLP
One Financial Center
Boston, MA 02111
Telephone: 617.856.8369
Facsimile: 617.289.0724
Email: akaplan@brownrudnick.com

Dated: October 5, 2012

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Integrate and Refine Procurement Policies and Consider Long-Term Procurement Plans.	)	**Rulemaking 12-03-014 (Filed March 22, 2012)**

COMMENTS OF BEACON POWER, LLC

Pursuant to Rule 14.3 of the Rules of Practice and Procedure of the California Public Utilities Commission (the "CPUC" or the "Commission"), Beacon Power, LLC ("Beacon Power" or the "Company"), a manufacturer and merchant developer of an innovative advanced energy storage technology that uses flywheels to provide fast accurate Regulation service to the grid is pleased to file its Comments in response to the September 14, 2012 Administrative Law Judge's ("ALJ") Ruling Seeking Comment on Workshop Topics that was issued in the above-captioned matter.

As detailed below, Beacon Power's flywheel technology has demonstrated success at providing fast, accurate regulation service on the grid. For California utilities and ultimately their ratepayers to experience the benefits that these resources provide to the grid, the CPUC must modify several existing policies and laws so that fast, environmentally friendly, cost effective storage resources can operate competitively in the state.

I. COMMUNICATIONS

Beacon Power respectfully requests that Communications and correspondence related to this filing should be directed to the Company's representatives:

Andrew O. Kaplan, Esquire
Brown Rudnick LLP
One Financial Center
Boston, MA 02111
Tel: 617.856.8369
Fax: 617.289.0724
Email: akaplan@brownrudnick.com

and

Mike Berlinski
Beacon Power, LLC
65 Middlesex Road
Tyngsboro, MA 08179
Telephone: 978.661.2075
Facsimile: 978.649.7186
Email: Berlinski@beaconpower.com

II. ABOUT BEACON POWER

Beacon Power's innovative flywheel-based energy storage technology operates by using flywheels to rapidly inject and withdraw power from the grid in order to quickly and accurately follow fast-changing dispatch control signals. When generated power exceeds load, Beacon Power's flywheels store this excess energy. When load increases, Beacon's flywheels return the energy to the grid. Using a 25 kWh/100 kW flywheel system, Beacon Power's technology can respond nearly instantaneously to a system operator's control signal, or up to one hundred times faster than many traditional generation resources. The ability of Beacon Power's flywheels to quickly and precisely respond to moment-by-moment system changes make this technology ideally suited to provide frequency regulation.

Beacon Power operates a 20-megawatt ("MW") flywheel energy storage plant in Stephentown, New York, and is developing a second 20 MW flywheel plant in Hazle Township, Pennsylvania to sell frequency regulation services in the PJM region.

With the expected implementation of CAISO's Regulation Energy Management Tariff and compliance with FERC's Order No. 755 by CAISO, which will result in compensating frequency regulation providers based on the fast response and accuracy by which these resources respond to the grid's dispatch signal, and the Commission's undertaking of this Rulemaking, Beacon Power submitted a request to interconnect a 20-MW flywheel-based regulation plant to be located in Tehachapi, California. However, the timing of the development of the plant heavily depends on the outcome of both the market rule changes and this and related Commission proceedings.

III. COMMENTS

Below are Beacon Power's responses to Questions 1-4E, as outlined in the ALJ's Ruling Seeking Comments.

1. What changes should be made to the rules governing the Investor-owned Utilities (IOUs') procurement process that would allow all resources (natural gas combined cycle, combustion turbine, storage, demand response, combined heat and power, renewable, etc.) to compete fairly in meeting identified needs? Please provide specific proposals for structuring an all-source procurement process.

The Federal Energy Regulatory Commission ("FERC") and the Independent System Operators ("ISOs") have acknowledged that fast-acting and accurate energy storage resources, such as Beacon Power's flywheels, provide an environmentally friendly, cost effective means to regulate the nation's grids.[1] For California ratepayers to experience the well-documented benefits of energy storage, the CPUC must ensure that these new advanced technologies that are designed specifically to provide ancillary service are included in the rules governing the Investor-owned Utilities (IOUs') procurement process. Specifically, the rules must: (1) enable investor-owned utilities to

[1] *Frequency Regulation Compensation in the Organized Wholesale Power Markets*, Order No. 755, 137 FERC ¶ 61,064 (2011) ("Order" or "Order No. 755").

utilize a "portfolio approach" that allows them to procure resources that provide one specific service to the grid, such as frequency regulation, if utilization of that resource in the utility's portfolio provides a benefit (*i.e.* lower cost set of resources) to ratepayers; (2) establish procurement targets for energy storage resources; (3) make energy storage a Preferred Resource; and (4) ensure that laws are in place for utilities and energy storage resources to execute long-term contracts.

In the last several years, new advanced energy storage technologies have become commercially available to provide fast, accurate frequency regulation service to the California grid. As found by FERC, utilization of these resources can reduce the total amount of regulation service that needs to be procured to reliably manage the grid, provide the grid operator increased flexibility to deal with system imbalances and variability, and reduce overall emissions, thus providing cost, reliability and environmental benefits for ratepayers. It is essential that these new technologies be included in the investor-owned utilities procurement plans if there is to be wide-adoption of these technologies in California.

As the Commission is aware, since the time that the Commission opened this Rulemaking, the CAISO has made great progress on opening its Regulation market to storage. On August 22, 2011, CAISO filed its Regulation Energy Management tariff ("REM") [Docket No. ER11-4353-000] which enables advanced storage resources to provide service in CAISO's frequency regulation market. REM was approved by FERC on November, 30, 2011 and is scheduled to be implemented on December 1, 2012. One important feature of the CAISO REM tariff is that REM resources are prohibited from providing offers for Energy and therefore selling Energy (except Energy associated with

providing Regulation service).[2] This results in REM resources (which may include flywheels and batteries and other storage resources) being Regulation-only resources. In addition, on April 27, 2012, CAISO filed its pay-for-performance tariff [Docket No. ER12-1630-000], pursuant to FERC Order No. 755, which will pay frequency regulation resources based on their speed and accuracy of response to an ISO dispatch signal. FERC approved CAISO's pay-for-performance tariff on September 20, 2012 and required the CAISO to implement its tariff on January 1, 2013.

However, even with the new federal rules, it will be difficult to finance the construction of new advanced storage projects designed to provide Ancillary Services-only in California without a regulatory change in how utilities procure energy and ancillary services. Currently, there is no method for utilities to procure frequency regulation from advanced storage technologies designed to provide regulation-only (*i.e.* not designed to provide energy). This means storage projects must be financed based on their expected revenue in the Regulation spot market, which makes it virtually impossible to obtain traditional private-capital project financing. Consequently, even though Beacon Power's flywheels are successfully providing frequency regulation on the grid today in other parts of the country (Beacon Power's other projects were financed through government funding), it will remain difficult for the Company to obtain project financing for energy storage regulation projects in California because the private capital markets will not provide debt financing without some level of revenue certainty.

In contrast, traditional generators in California are able to obtain traditional private-market project financing on the basis of long-term power procurement contracts

[2] CAISO REM Tariff Section 8.4.1.2. "A resource using Regulation Energy Management may not provide Energy other than Energy associated with Regulation."

("LTPP contracts") for their energy, capacity and ancillary services. With LTPP contracts in place, generators can receive traditional project financing for their projects. Including regulation-only energy storage systems in utilities LTPP plans, along with establishing specific procurement targets for storage, would help overcome the project financing barrier thus removing a significant barrier to fast, accurate, cost-effective environmentally-friendly storage providing ancillary services in CAISO.

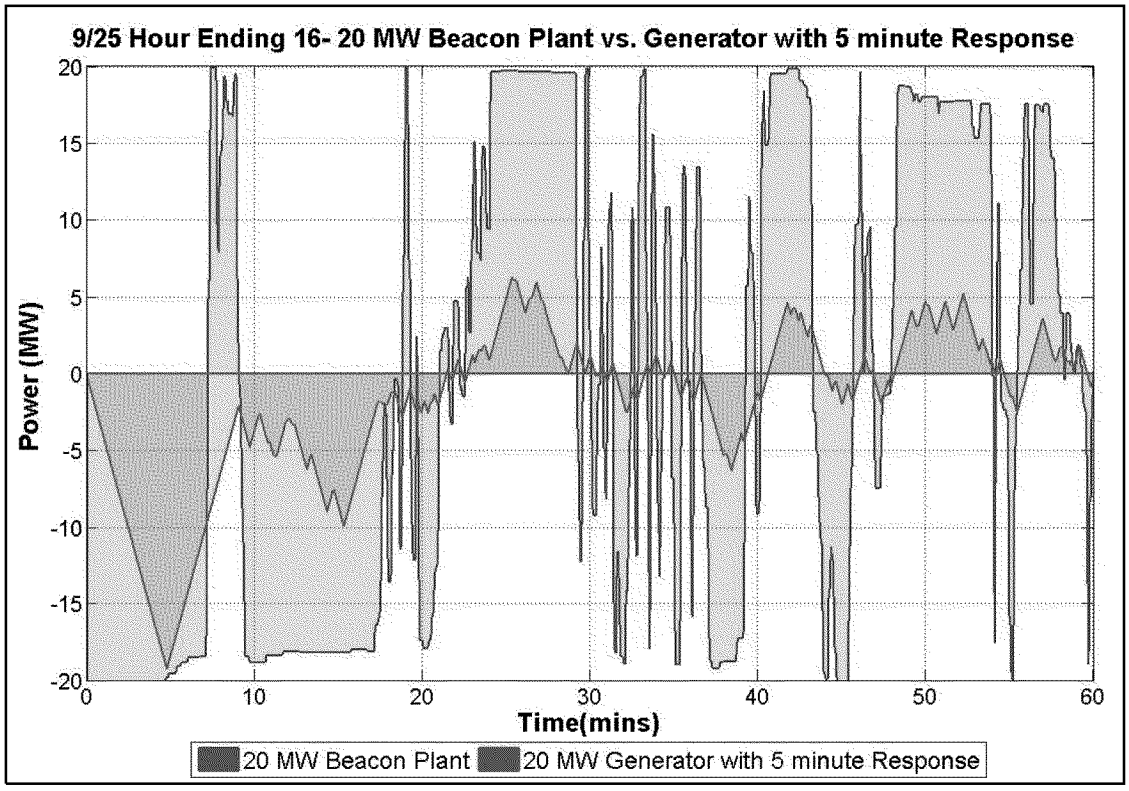
Preferred Loading Order

Given the number of benefits provided by innovative energy storage technologies, such as flywheels and batteries. The CPUC should ensure that these resources are deemed to be Preferred Resources. According to the CEC, the intent of the loading order is to develop and operate California's electricity system in the best, long-term interest of consumers, ratepayers, and taxpayers. As discussed below, Beacon Power's flywheel technology offers many key advantages over the conventional generation resources now used to provide Regulation Service and thus its procurement as part of a utility's overall portfolio is in the best long-term interest of consumers, ratepayers and taxpayers.

a. **Fast Response**

Beacon Power's flywheel frequency regulation systems have demonstrated to be a more effective and environmentally friendly alternative to conventional fossil-fuel-powered frequency regulation methods. Our 20 MW Frequency Regulation Plant operating on the NYISO power grid has demonstrated the value of flywheels providing fast response frequency regulation in the NYISO. To take advantage of our nearly instantaneous response rate, NYISO dispatches our facility as the first responder to frequency deviations. The chart below shows actual performance data of our 20 MW

flywheel facility (in blue) as compared to 20 MW of regulation from a traditional generator with a 5 minute response rate (in red). The areas under each curve show the amount of energy provided by each resource to correct frequency imbalance, or Area Control Error (ACE) Correction. In this hour, flywheels, with their 4 second ramp rate, provided 4 times more energy than the slower responding resource. On average we have seen that Beacon Power's 20MW flywheel plant is 10% of the frequency regulation market capacity, yet provides 25% - 35% of NYISO's ACE Correction. Due to the speed of response, flywheels are far more effective per MW of capacity than traditional regulation providers and thus the grid operators can reduce the overall amount of regulation that needs to be procured to reliably operate the power system by utilizing these resources.



Furthermore, deploying Beacon Power's flywheel energy storage for Regulation Service will reduce costs to California's ratepayers by introducing new competition to the market and by displacing relatively high cost regulation deployments by traditional generators. Existing fossil fuel-powered plants displaced by Beacon Power's flywheel-based frequency regulation can be shifted to provide a corresponding amount of added peak generation capacity. In doing so, these plants can run at full capacity, improving their energy efficiency and reducing emissions.

Specifically, with the addition of more intermittent wind generation to the California Control Area, the grid will benefit from flywheel's fast response capability to address the control issues created by the frequent and unpredictable changes in wind output. As the amount of power generated by wind and other intermittent resources increases in order to meet California's Renewable Portfolio Standards, the need for fast regulation will also increase. Fast regulation resources, such as Beacon's flywheels, will assist CAISO in maintaining grid reliability as wind penetration increases.

b. **Cost Effective**

Because fast regulation resources are significantly more effective at responding to system imbalances than slower-ramping generation resources, their use on the grid can lower the overall amount of Regulation that needs to be purchased by California's ratepayers to maintain system reliability. A study requested by the California Energy Commission found that a 30-50 MW fast-response storage device could provide as much or more Regulation capability than a 100 MW combustion turbine.[3]

[3] "Research Evaluation of Wind Generation, Solar Generation, and Storage Impact on the California Grid," Study by KEMA, Inc., done for California Energy Commission funded via Public Interest Energy Research Program (PIER) page 6, June, 2010.

c. **Environmentally Friendly**

Unlike generators that consume fossil fuel, Beacon Power's flywheel technology recycles existing power, thereby lowering its operating costs to provide regulation and benefiting the environment by producing zero direct CO_2 greenhouse gas, particulates or other air emissions. A study by KEMA concluded that a 20MW Flywheel Energy Storage System emits 56% less CO2 than a natural gas power plant providing regulation and 26% less emissions than a pumped hydro power plant.[4] KEMA notes that continued reliance on thermal generating units to meet increased regulation requirements could actually increase emissions of CO2, NOX and other pollutants, thereby defeating one of the main benefits of wind generation.

Public Utilities Code Section 454.5(b)(9)(C) specifically requires that utilities meet their unmet resource needs through all available energy efficiency and demand reduction resources that are cost effective, reliable and feasible. The demonstrated success of Beacon Power's energy storage flywheels will be experienced by California utilities and ratepayers if these resources are incorporated into California's procurement process. As discussed above, storage resources like Beacon Power's flywheel systems are cost effective and reliable and a feasible solution to procurement needs. Accordingly, Beacon Power respectfully requests that the CPUC deem energy storage resources as Preferred Resources.

Long-term Contracts

Energy Storage Resources should be eligible to execute long-term contracts with utilities to procure energy storage. There is a long-term need for energy storage,

[4] KEMA, Emissions Comparison for a 20MW Flywheel-based Frequency Regulation Power Plant, May 18, 2007.

especially given the increased penetration of renewable resources to the utilities' procurement process. It should be noted that California now allows utilities to sign contracts with Renewable Resources using terms great than 10-years. Given that energy storage will assist with the integration of large amounts of renewable resources, it only makes sense that the duration of their contracts match.

Energy storage provides unique advantages for integrating renewable resources, including those storage technologies designed to specifically provide fast response frequency regulation. For example, when the wind blows during off-peak hours, few generators will be on-line to provide Regulation Service. Those generators that are operating are likely to be running at or near their minimum loads, meaning that they would be unavailable to provide Regulation Down service. This situation is further exacerbated by ramping these units above minimum load or bringing additional units on-line for Regulation service if those operating are not Regulation-capable. Advanced energy storage on the other hand, can provide Regulation a la carte. With Beacon Power's flywheel energy storage on the system, operators will not need to ramp up operating units in off-peak hours, or bring on additional generation to provide Regulation Service. As the amount of power generated by wind and other intermittent resources increases in order to meet the state Renewable Portfolio Standard, the need for fast regulation will also increase. Beacon Power's fast regulation technology can assist in meeting and improving grid reliability as wind penetration increases. Unlike generators that consume fossil fuel, Beacon Power's flywheel technology recycles existing power, thereby lowering its operating costs to provide regulation and benefiting the environment by producing zero direct CO2 greenhouse gas, particulates or other air emissions.

Accordingly, the CPUC should consider allowing contracts of greater than 10 years for storage resources.

2. ***What amendments, if any, would be necessary to the most recent long-term Request for Offers issued by the Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric (SDG&E, and Southern California Edison (SCE) to ensure that all resources are eligible to compete in meeting future Request for Offers (RFO)? Are there any changes specific to meeting Local Capacity Requirements (LCR)?***

To ensure that all energy storage resources, such as Beacon Power's flywheels are eligible to compete in future IOU Request for Offers (RFOs), changes to the most recent RFOs are needed. In its Comments submitted today, the California Energy Storage Alliance ("CESA") provided a detailed analysis of the recent IOU RFOs.[5] While Beacon Power concurs with CESA's analysis, the following items highlight some of the changes that will be required to enable more competitive RFOs:

a. When eligible technologies are listed, Energy Storage should be included as a category of resource from which a utility will consider offers.

b. Minimum offer size should be 1 MW.

c. The delivery term and expected commercial operating date ("COD") should take into account the benefit that Energy Storage resources can be developed and constructed in less time than conventional generation.

d. RFOs should recognize and fairly value responses that include a phased approach to commercial online dates ("CODs"), which can provide tremendous value to utilities by enabling capacity to be installed only when the system requires it.

[5] See Comments of CESA as submitted to the CPUC on October 5, 2012, the above-captioned filing.

e. The fact that Energy Storage resources can meet or greatly exceed the operational flexibility requested by the All Source RFOs should be recognized and valued.

f. RFOs need to appropriately value the products that storage resources offer. Simply calculating an offer's benefits as the market value of the energy, capacity and ancillary services offered, including risks and uncertainties of the costs and benefits, does not appropriately capture the benefits, some of which are not yet monetized (*e.g.* speed and accuracy).

g. The greenhouse gas ("GHG") and other emissions benefits of storage resources should be valued appropriately.

h. The benefits of the storage resource to the utility's portfolio should be valued appropriately. Storage resources can improve the operational efficiency of a fleet, reduce fuel consumption, reduce emissions, and reduce system costs.

3. ***What specific characteristics or attributes must any resource – including demand-side, energy storage, or distributed – provide in order to meet future procurement needs? In the absence of a Net Qualifying Capacity, what methodology should be used to determine a proxy capacity value for resources lacing a Net Qualifying Capacity for use in LCR capacity accounting? How can these characteristics or criteria be turned into criteria to evaluate resources bid into a Request for Offers to meet LCR or other needs? How should those criteria be weighted?***

Beacon Power notes that future procurement needs, like current system needs, include a mix of characteristics or attributes. In addition to longer duration capability for provision of energy, shorter duration capability for providing fast and accurate response to dispatcher's control signal is needed. Energy storage resources provide this fast and

accurate response in the form of Ancillary Services and other products and services. As discussed above, the CPUC should enable investor-owned utilities to utilize a "portfolio approach" to procurement that allows them to procure resources that provide one specific service to the grid, such as frequency regulation, if that resource provides an overall benefit to the grid. Thus, RFOs should specify that at least some of the required capacity can be met by fast and accurate technologies that provide Ancillary Services only, such as Beacon Power's flywheels.

4. ***What the pros and cons of the following procurement methods with regard to: 1) local procurement considered in Track 1 of LTPP, and 2) operational flexibility and general system procurement considered in Track 2 of LTPP?***

A. Continuation of current practices for procurement with minor clarifications.

Response: There are barriers in the current LTPP process for storage resources, particularly those designed to provide specific ancillary services to the grid. For California ratepayers to experience the well-documented benefits of energy storage, the CPUC must ensure that these new advanced technologies that are designed specifically to provide ancillary service are included in the rules governing the Investor-owned Utilities (IOUs') procurement process.

B. A "portfolio approach that allocates, based on strategic/portfolio considerations, the total quality of new flexible resources among various eligible resources (for example, how could/should the allocations be adjusted periodically based on current or expected conditions?).

a. *SCE provided two proposed alternatives to filling any LCR need at the September 7, 2012 workshop, one with flexibility for SCE in procuring resources via two separate tracks, and another approach using an all-source RFO. Is there some way to blend these approaches? If so, how, and should the Commission attempt to do so?*

Response: A portfolio approach as described by the Commission is a good method to resource procurement. The important feature of any successful procurement method is whether the IOU can simultaneously consider multiple resources to achieve a least-cost best-fit portfolio outcome. As discussed above, the CPUC should enable investor-owned utilities to utilize a "portfolio approach" to procurement that allows them to procure resources that provide one specific service to the grid, such as frequency regulation, if utilization of that resource in the utility's portfolio provides a benefit (*i.e.* lower cost set of resources) for ratepayers.

C. Establishing a set of minimum criteria for operational flexibility characteristics for all acquired resources.

Response: Establishing a set of minimum criteria for operational flexibility characteristics for all resources will not be sufficient to appropriately value the characteristics of superior technologies, such as Beacon Power's flywheels, with faster and more flexible characteristics. As discussed in the Comments that CESA submitted in this docket, storage resources have characteristics that exceed the minimum operation flexibility characteristics specified by the all-source RFOs. This fact must be valued accordingly in order for storage resources to receive appropriate treatment in procurement processes.

D. A "strong showing" requirement that the utility must demonstrate that is procurement process was substantially open to all resource types and appropriately considered all of the values discussed above and that the resulting portfolio of resources is an optimal solution.

Response: A "strong showing" requirement, while it sounds attractive in theory, would likely be too subjective to enable fair and transparent discussion and decision-making.

E. Adjusting existing procurement mechanisms, such as the Renewal Auction Mechanism, to focus on the physical locations with needs that can be met by that programmatic resource.

Response: Adjusting existing procurement mechanisms, such as Renewable Auction Mechanism ("RAM") or alternatively, creating new mechanisms, may be able to ensure that energy storage is appropriately included in both the local and system procurement processes.

IV. CONCLUSION

Beacon Power appreciates the opportunity to participate in this docket, and looks forward to working with the Commission and other interested parties in ensuring that energy storage resources assist utilities to provide reliable electric service at just and reasonable rates.

Respectfully submitted,

BEACON POWER, LLC
By its attorney,

Andrew O. Kaplan
BROWN RUDNICK LLP
One Financial Place
Boston, MA 02111
Telephone: 617.856.8369
Fax: 617.856.8201
Email: akaplan@brownrudnick.com

Dated: October 5, 2012