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 BEACON POWER, LLC ON THE ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENT ON INTERIM STAFF REPORT AND WORKSHOP TOPICS

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COMMENTS OF BEACON POWER, LLC

Pursuant to the Rules of Practice and Procedure of the California Public Utilities Commission (the "CPUC" or the "Commission") and the January 18, 2013 Administrative Law Judge's ("ALJ") Ruling, Beacon Power, LLC ("Beacon Power" or the "Company"), a manufacturer and developer of an innovative advanced energy storage technology that uses flywheels to provide fast accurate balancing services to the grid is pleased to file its Comments in response to the Interim Staff Report 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. The Company is appreciative that the CPUC has recognized that for California utilities and their ratepayers to experience the benefits that flywheels and other environmentally friendly, cost effective storage resources provide to the grid, there needs to be modifications to California's existing market rules. Accordingly, for the reasons stated herein, Beacon Power respectfully requests that the Commission mandate specific actions that will help storage resources overcome existing barriers. These actions include (1) establishing procurement targets for energy storage resources that provide ancillary services-only; (2)

establishing procurement set-asides and enable utilities to utilize a "portfolio approach" for resources that provide specifics service to the grid, such as frequency regulation; and (3) designating energy storage as a preferred resource.

I. COMMUNICATIONS

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II. ABOUT BEACON POWER AND FLYHWEEL ENERGY STORAGE

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. Beacon Power's flywheel technology can respond nearly instantaneously to a system operator's control signal, or up to one hundred times faster than many traditional generation resources, but with no direct emissions. Beacon's flywheel energy storage systems are designed for a 20 year life and 100,000 cycles at full depth of discharge. 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 has successfully deployed its flywheel energy storage technology in multiple locations over seven years, and has accumulated over 3 million flywheel operating hours. In 2006, Beacon demonstrated a 100-kilowatt ("kW") flywheel plant at a Pacific Gas & Electric Substation in San Ramon, California, which won approval from CAISO. Between 2008 and 2010 Beacon operated up to 3-megawatts ("MW") of flywheel energy storage at its headquarters in Tyngsboro, MA that provided frequency regulation in the ISO-NE region. Since January 2011, Beacon Power has operated a 20 MW flywheel energy storage plant in Stephentown, New York that provides frequency regulation services in the NYISO market. Beacon is currently constructing a second 20 MW flywheel plant in Hazle Township, Pennsylvania to provide frequency regulation services in the PJM region.

Based on the expected implementation of CAISO's Regulation Energy Management ("REM") tariff and compliance with FERC's Order No. 755 (Pay-for-

Performance Regulation) by CAISO, and the Commission's undertaking of this Storage Rulemaking, in the spring of 2012 Beacon Power submitted a request to interconnect a 20-MW flywheel-based plant in Tehachapi, California. However, the timing of the development of the plant depends heavily on the outcome of both the market rule changes and this and related Commission proceedings, as barriers to market entry remain.

III. COMMENTS

A. Overview

In AB 2514, the California State Assembly found that energy storage systems have many benefits.[1] Additionally, the Federal Energy Regulatory Commission ("FERC") and the Independent System Operators ("ISOs") have acknowledged that fast-acting energy storage resources, such as Beacon Power's flywheels, provide an environmentally friendly and cost effective means to regulate the nation's grids.[2] However, many of these benefits cannot be captured by California's existing market and procurement rules. Beacon Power commends the CPUC for recognizing that for the marketplace to experience the benefits of fast, accurate Regulation, such as the Company provides, there needs to be policy action by the CPUC.

Since the time that the Commission initiated this proceeding, the CAISO has made great progress on opening its Regulation market to storage. On December 1, 2012, CAISO implemented its REM tariff, which enables advanced storage resources (including Beacon Power's flywheels) to provide service in CAISO's frequency regulation market.[3] In addition, on December 3, 2012, FERC approved CAISO's Order

[1] See Assembly Bill (AB) 2514 (Stats. 2010, ch. 469).
[2] See, for example, *Frequency Regulation Compensation in the Organized Wholesale Power Markets*, Order No. 755, 137 FERC ¶ 61,064 (2011) ("Order" or "Order No. 755").
[3] 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). This results in

755 "Pay-For-Performance Regulation" tariff to begin on May 1, 2013, which will enable just and reasonable compensation for fast, accurate regulation resources, including flywheels. However, even with the new CAISO market rules, barriers remain in California for Beacon Power's flywheels and other energy storage resources as many of the operational, economic, and environmental benefits of storage are not recognized and cannot be monetized in existing market and procurement structures. For example, as outlined below, without regulatory changes in how utilities procure capacity, energy, and ancillary services, it will be difficult to get energy storage resources built in California. It will be especially difficult to finance the construction of advanced storage projects designed to provide ancillary services only. Specifically, there is no established method for utilities to procure frequency regulation from energy storage resources designed to provide regulation only (*i.e.* not designed to provide energy). This means new regulation-only storage projects must be financed based on their expected revenue in the regulation spot market, which makes it extremely difficult to obtain traditional private-capital project financing.

In contrast, new traditional generators in California are able to obtain traditional private-market project financing on the basis of Long-Term Procurement Plan ("LTPP") contracts for their energy, capacity and ancillary services. By permitting regulation-only energy storage resources in utilities' LTPP processes, along with the other recommended policy actions described below, CPUC would send the correct market signals to investors and encourage the development of fast, cost-effective and environmentally-friendly storage providing ancillary services in California.

REM resources (which may include flywheels and other storage resources) being Regulation-only resources. CAISO REM Tariff Section 8.4.1.2.

B. Benefits of Utilizing Flywheel Energy Storage

Energy storage provides numerous operational, economic, and environmental benefits. In particular, flywheel energy storage resources, with their fast response, zero direct emissions, and low operating costs, can displace fossil-fuel fired generation and enable other resources to operate more stably and efficiently, helping reduce fuel consumption, associated emissions, and cost.

1. Fast Response

Beacon Power's flywheel frequency regulation systems have been demonstrated to be a more effective and environmentally friendly alternative to conventional fossil-fuel-powered frequency regulation methods. Beacon Power's 20 MW Stephentown plant operating on the NY power grid has demonstrated the value of flywheels providing fast response frequency regulation in the NYISO market. On average, Beacon Power has seen that the Stephentown flywheel plant is 10% of the NYISO frequency regulation market capacity, yet provides 25% - 35% of NYISO's Area Control Error ("ACE") correction. Due to their speed of response, flywheels are far more effective per MW of capacity than traditional regulation resources, and thus, can reduce the overall amount of regulation that needs to be procured to reliably operate the power system.

As the amount of energy generated by wind and other intermittent resources increases in order to meet California's Renewable Portfolio Standard, the need for fast regulation will also increase. Beacon's flywheels, with their fast response capability, will assist CAISO in maintaining grid reliability as regulation requirements increase and will enable greater amounts of intermittent renewable development.

2. **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 estimated a natural gas plant providing regulation in California emits about 500 tons of CO_2 per MW per year, while a 20MW flywheel energy storage plant would account for 56% less CO_2 than a natural gas power plant, and 26% less than a pumped hydro power plant.[4]

There should no longer be any "debate about whether supply-side energy storage in and of itself reduces GHG emissions."[5] After earlier studies on the topic, in 2010 in AB 2514, the Legislature found

> (d) Expanded use of energy storage systems will reduce the use of electricity generated from fossil fuels to meet peak load requirements on days with high electricity demand and can avoid or reduce the use of electricity generated by high carbon-emitting electrical generating facilities during those high electricity demand periods. This will have substantial cobenefits from reduced emissions of criteria pollutants.
>
> (e) Use of energy storage systems to provide the ancillary services otherwise provided by fossil-fueled generating facilities will reduce emissions of carbon dioxide and criteria pollutants.

3. **Cost Effective**

Because fast regulation resources like Beacon's flywheels are significantly more effective at responding to system imbalances than slower-ramping generation resources, their use on the California grid can lower the overall amount of Regulation that needs to be purchased to maintain system reliability, thereby lowering ratepayer costs. A study

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[4] KEMA, Emissions Comparison for a 20MW Flywheel-based Frequency Regulation Power Plant, May 18, 2007.
[5] CPUC "Energy Storage Phase 2 Interim Staff Report" - January 4, 2013, p 17.

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.[6]

Furthermore, deploying Beacon Power's flywheels for regulation service will reduce costs to California's ratepayers by introducing new competition to the market with very low operating costs 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.

In addition, flywheel energy storage resources typically require less land than conventional resources and shorter times to site, permit, and construct, yielding cost benefits. Flywheel plants are modular, with many units operating at once, which improves system availability and reliability. Beacon's flywheel energy storage systems are designed for a 20 year life and 100,000 cycles at full depth of discharge.

Given the multiple benefits of flywheel energy storage, and given that all of these benefits cannot be fully monetized, thus creating a barrier to entry, Beacon Power recommends that the Commission take the following policy actions: (1) establish procurement targets for energy storage resources that provide ancillary services-only; (2) establish procurement set-asides and enable utilities to utilize a "portfolio approach" for resources that provide specific services to the grid, such as frequency regulation; and (3) designate energy storage a preferred resource.

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[6] "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. Beacon Power's responses to the questions 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?***

Beacon Power has been an active participant and contributor to the Transmission Connected Energy Storage Use Case Document and looks forward to continuing to work on the Use Case. The Transmission Connected Energy Storage Use Case Document represents a collaborative effort of storage developers and utilities and provides excellent analysis on some issues, such as the Barrier Analysis that demonstrated the complexities of the identified barriers and the Real World Examples. However, the Use Case fails to adequately address other issues, especially describing the Other Beneficial Attributes and whether they are captured by current or planned market mechanisms. The list of benefits of energy storage and the extent to which the benefits are monetized must be accurately described in the Use Cases, because that list is an input to the Cost Effectiveness analysis, which is an integral part of this proceeding.

Beacon Power recommends that to accurately set up the Cost Effectiveness Analysis, the Transmission Connected Energy Storage Use Case Document in Section 3.3 Other Beneficial Attributes be revised. The language in this section reflects compromised point-of-views from different parties during the group discussions, and therefore might not be informative enough for CPUC to understand what each benefit is and decide whether the benefit is currently captured by storage resources under existing market mechanisms. Thus, language should be included that addresses how each Benefit

Stream is not currently captured. This can be done either in Section 3.3 Other Beneficial Attributes or in Section 4 Barrier Analysis & Policy Options.

For example, in Section 3.3 Other Beneficial Attributes for the Benefit Stream of Reduced Emissions, while it is true that in 2013 the cost of GHG emissions is included in the CAISO energy price, this is a direct cost to energy storage resources (that have some efficiency losses) and not a benefit as the Use Case suggests. The emissions benefit of energy storage resources comes from their operation displacing some generators and allowing generators to operate more efficiently, reducing fossil fuel use. Ratepayers benefit from the lower fuel consumption and emissions from the operation of the storage resources, but there is no way for storage resources to be compensated for providing these benefits.

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

Besides the issues with the benefit sub-sections in the Cost Effectiveness Analysis section described above, there are no critical elements missing from the Transmission Connected Energy Storage Use Case.

2. Preferred Resources

– ***Why should Energy Storage be considered a "preferred resource"?***

In AB 2514, the California State Assembly found and declared that energy storage systems have many benefits, including, but not limited to: reducing emissions of greenhouse gases, increasing and optimizing the use of renewable energy, and reducing costs to ratepayers.[7] Given the number of benefits provided by energy storage, and the similarities of these benefits with those of the preferred resources in California's Loading

[7] See Assembly Bill (AB) 2514 (Stats. 2010, ch. 469).

Order – energy efficiency, demand response, renewable energy and distributed generation, such as combined heat & power ("CHP") – it would be consistent for the CPUC to confirm that energy storage resources are "preferred resources."

Further, use of energy storage expands the opportunities for the preferred resources in California's Loading Order. For example, demand response programs could increase the number of commercial and industrial customers when assured that they could meet their critical loads due to energy storage. Intermittent renewable resources could be integrated without the use of fossil fuel for balancing and ramping needs, and solar projects could extend the power availability beyond the sunset by using energy storage. Similarly, CHP units could provide more energy with the use of energy storage if production of electricity did need to coincide with the use of thermal energy. In many instances, energy storage delivers the very benefits contemplated under the elements of the Loading Order – namely energy with less dependence on fossil fuels, fewer greenhouse gas emissions, and reduced need to add large conventional generating capacity and transmission infrastructure. Therefore, treating energy storage as a preferred resource is in the best long-term interest of California's consumers, ratepayers, and taxpayers.

– ***What are the implications of designating Energy Storage as a "preferred resource" in this Proceeding for other procurement proceedings?***

It is important to set the precedent for the treatment of energy storage as a preferred resource in this proceeding to ensure that the CPUC is conveying accurate market signals to potential investors that utilities are mandated to procure energy storage as a preferred resource.

3. Cost-Effectiveness Methodologies

Clearly, before the Commission undertakes additional efforts to remove barriers to the energy storage industry by changing procurement policies, there must be evidence that energy storage resources are cost-effective. Beacon Power recognizes Staff's efforts to investigate available cost-effectiveness models and cautions that no matter the model and method used, the model and method must account for all of the benefits of energy storage for the analysis to be valid.

During the discussions held by the CPUC about the potential models and methodologies, parties have recognized and identified that there are limitations to the models. In particular, several benefits identified in the use case discussions are not represented in the identified models. For example, using the identified models, there can be no calculation of the unique benefits of energy storage such as reducing grid emissions and increasing grid fleet efficiency. Without inclusion of these important factors, the cost-effectiveness analysis will under value the benefits of energy storage.

Moreover, the cost-effectiveness models under consideration by the Commission do not adequately capture other benefits despite claims to the contrary. For example, the model cannot conduct intra-hour dispatch or make use of different ramp rates of technologies. This limits frequency regulation and pay for performance calculations, such as FERC Order 755 implementation. The fast response characteristic of storage enables it to respond quicker to the ISOs dispatch signals on a second-to-second basis than conventional resources, which determines dispatch performance and regulation compensation. The models have been said not to take into account second-to-second dispatch signals from CAISO, but instead use hourly data to calculate the revenues of

CAISO markets, which may overlook storage's unique characteristic of fast response. FERC Order 755 requires ISOs to compensate for the performance of resources providing frequency regulation, and is expected to significantly increase the market-based revenue of fast-responding regulation resources. The models, however, have been described as not taking into consideration the potential revenue of fast-responding regulation resources, including storage, under Order 755 implementation, because CAISO has not yet implemented the changes for Order 755 (which changes are expected to be implemented in May 2013).

- ***What models should be pursued for running the cost-effectiveness test?***

In general, models that accurately capture the benefits of energy storage, in representing their operational characteristics, should be pursued. As described above, if the models used have limitations, or if time constraints prevent more detailed analysis, then estimates of all the benefits of energy storage must be included to accurately represent cost-effectiveness.

- ***Is there a simplified approach to cost-effectiveness that would meet the Commission needs?***

As described above, while there may be simplified approaches to running models, accurate estimates of all the benefits of energy storage must be included to accurately represent cost-effectiveness.

- ***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?***

Beacon Power recommends that priority be given to Use Cases where there is an existing body of experience that attests to energy storage technology's performance and

ability to compete in the market, including in the provision of services such as frequency regulation.

4. Policy Options

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

The Commission has developed a set of near-term Policy Options for this proceeding that includes preferred resource status and procurement targets. Beacon Power agrees with these Policy Options, but would like to expand the discussion on procurement targets and add long-term contracts to this proceeding.

a. Identifying Energy Storage as a Preferred Resource

As detailed in Section III.C.2 above, because of the recognized benefits to utilities, the grid, and ratepayers, Energy Storage should be a preferred resource.

b. Procurement Targets

The Staff Report lists three procurement options on page 19: (1) Procurement Targets as a percentage of load, (2) Procurement set asides, and (3) Pilots or Market Tests. Both Procurement Targets and Procurement set asides (the "portfolio approach"), are needed for storage to overcome barriers and provide its benefits to society. While Pilots or "Market Tests" may be helpful for some storage technologies, flywheels would not benefit from pilot project scale deployments as they have already been demonstrated in California and elsewhere and have been operating commercially for many years.

The Commission should utilize procurement set asides for energy storage and should enable investor-owned utilities to utilize a "portfolio approach" that allows them to procure resources that provide specific services 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. Just as it did to encourage the procurement of preferred resources for other markets, the CPUC will need to adopt rules that require utilities to use energy storage resources, rather than fossil-fired generators, to provide ancillary services such as frequency regulation.

Advanced energy storage provides significant economic, reliability enhancement and environmental benefits for providing ancillary services. FERC found in Order No. 755 that the use of fast-ramping storage technologies to provide frequency regulation had the potential to reduce the total amount of regulation that needs to be procured by the ISO to meet its reliability requirements, i.e. 1 MW of storage has the potential to offset 2 – 4 MWs of traditional fossil generation providing frequency regulation. Given that the CAISO is forecasting that it will need to more than double the amount of regulation procured[8] by the CAISO to support the 33% RPS, advanced energy storage is an ideal solution for meeting this increased need. Furthermore, unlike generators that experience higher rates of fuel consumption and air pollutant emissions when they provide regulation service, storage resources recycle existing power without burning fossil fuel or producing any direct air emissions, thereby lowering total system operating costs and air pollutant emissions. A study by Carnegie Mellon in October 2008 estimated that 20% of the CO_2 emission reduction and up 100% of the NO_X emission reduction expected from introducing wind and solar power will be lost because of the extra ramping requirements they impose on traditional generation.[9] Continued reliance on thermal generating units to meet increased regulation requirements could actually increase emissions of CO_2, NO_X

[8] In CAISO's 33% RPS study, the CAISO found that it needs 754 MW of Regulation Up and 767 MW of Regulation Down on average per hour in 2020 as compared to the 333 MW of Regulation Up and 350 MW of Regulation Down procured on average each hour in 2012. http://www.caiso.com/planning/Pages/ReportsBulletins/Default.aspx

[9] Katzenstein, W., and Jay Apt. Air Emissions Due To Wind And Solar Power. *Environmental Science & Technology*. 2009, 43, 253-258. http://pubs.acs.org/doi/pdf/10.1021/es801437t

and other pollutants, thereby defeating one of the main benefits of the 33% RPS. Therefore, procurement of energy storage for frequency regulation brings benefits to California's ratepayers.

In addition to procurement set asides and other "portfolio approaches," CPUC should set procurement targets for energy storage resources that provide ancillary services-only. The details of whether the structure of such a procurement target is a fixed percentage of load-serving entity load (in MWh), a capacity value for a specific application (in MW), or based in some other unit (such as MW-h), as well as eligibility requirements, are important and should be discussed once it is determined that procurement targets are appropriate.

Because of the inadequate market mechanisms to capture the unique benefits of energy storage, and the barriers this creates, procurement policies are necessary to incentivize storage deployment. From the available policy options, setting procurement targets is the most effective way to overcome these barriers, ensure that energy storage is adequately procured, and provides its benefits to the system.

As the California Energy Storage Alliance ("CESA") described in its January 14, 2013 Workshop presentation, procurement goals for a technology class make sense when:

- All benefits are not monetized through existing rules and policies, but un-captured benefits demonstrate the technology's cost-effectiveness.
- Widespread deployment creates net benefits for society and ratepayers.
- Increasing scale improves cost-effectiveness compared to business-as-usual alternatives.
- The inertia of business-as-usual procurement must be overcome.
- Near-term inaction will risk incurring substantial lost opportunity costs.

All of these criteria exist today in California. Procurement targets, including procurement set asides, can help storage overcome barriers and bring benefits to customers.

Under the existing market structure, only some of the benefits of storage are monetized and able to be captured by the storage resource. For example, energy storage can participate in the CAISO frequency regulation market and once the Pay-for-Performance tariff is implemented should be compensated in a just and reasonable manner. However, by displacing higher cost regulation resources, and improving response time to system deviations and thus potentially reducing regulation requirements for the system and consumer costs, fast-response energy storage will likely lower market prices. Such lower market prices would hurt the energy storage resource's market revenue, creating pricing uncertainty and a "chicken and egg" problem that procurement contracts with utilities would solve. The benefits that the system could capture by having energy storage resources in the market are therefore not going to be realized by the storage resource through existing market mechanisms.

In addition, parties have recognized that there are additional benefits such as reduced emissions if energy storage is deployed on the grid. While market costs for GHG and other emissions might address the value of the benefit of reducing emissions, there is no mechanism for the energy storage resource to be compensated for its emissions reduction benefit on the system. Further, higher energy prices resulting from emissions standards negatively impact the energy storage resource with a higher operating cost for any energy lost in conversion.

Existing markets and policies do not adequately compensate and incent energy storage resources. Because a business case for storage cannot be built around uncertain revenue streams, this proceeding should explore how such market uncertainty can be mitigated to encourage storage development. The creation of procurement targets for energy storage providing certain end uses (such as frequency regulation) that have already been proven to be viable for storage will advance the adoption and deployment of storage in California. The cost of doing otherwise would be delaying or even missing the benefits of energy storage for California's ratepayers.

c. Long-term Contracts

Energy storage resources should be eligible to execute contracts with utilities with terms greater than ten years as is allowed for other resources in California. There is a long-term need for energy storage, especially given the expected increased need for flexible resources and increased need for frequency regulation and other ancillary services. Energy storage, including those storage technologies designed to specifically provide fast response frequency regulation, provides unique advantages for integrating renewable resources and can enable greater development of renewable resources.

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

Beacon Power commends the Commission for developing a substantial list of actions needed to remove barriers for the storage industry. Beacon suggests adding several policy actions to the list in Table 1: Barrier Resolution Recommendations, which the Commission will need to take for the storage industry to thrive. Beacon suggests the Commission add the policy actions of procurement targets for energy storage that provides ancillary services only, identifying energy storage as a preferred resource, and

enabling contracts of greater than ten years for energy storage, as discussed in the section above.

5. Related Proceedings

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

Yes, there is more that the Commission should do in the identified proceedings to advance energy storage deployment, in addition to establishing procurement targets. Beacon discusses below recommended actions in the Long-Term Procurement Plan ("LTPP") and Resource Adequacy ("RA") proceedings that will help overcome remaining barriers to storage.

LTPP

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 specific services to the grid, such as frequency regulation, if that resource provides an overall benefit to the grid. Thus, utility Request for Offers ("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. Beacon Power notes that future procurement needs, like current system needs, will 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 will be needed. Flywheels energy storage resources provide this fast and accurate response in the form of frequency regulation and other ancillary services and can improve the value of a procured portfolio.

Beacon Power comments below on the three specific recommendations listed by the CPUC from the September 7, 2012 Joint Workshop on LTPP and Energy Storage.

1. SCE NQC Method

Beacon Power disagrees with the Net Qualifying Capacity ("NQC") method that SCE proposes for energy storage, as it contains several flaws. First, SCE's assertion that "energy storage devices with less than one hour of capacity should not have an NQC" is misguided.[10] As stated by the CAISO in its comments, there is a clear need for flexible capacity "which the ISO has defined as the ability of the fleet to provide regulation, load following, and maximum continuous ramping."[11] Therefore, a more appropriate NQC value for storage with less than one hour capacity is to use the capacity formula that the CAISO applies under their REM tariff for frequency regulation, where storage resources with less than one hour of capacity are allocated MWs of capacity corresponding to their sustained output over 15 minutes.[12] In addition, existing fossil fuel-powered plants displaced by storage resources providing frequency regulation can be shifted to provide a corresponding amount of added peak generation capacity and energy. A MW of regulation (or other ancillary service) capacity from storage frees up two MWs of traditional capacity to respond to load requirements, so MWs from shorter duration, ancillary service-only storage resources should be allocated a NQC.

Second, SCE's statement that "in order to count for local capacity requirements ("LCR") purposes, an energy storage device should have a minimum of three to eight hours of capacity" is ill-advised. Due to its benefits, any storage capacity that counts as NQC should also count towards LCR. The same "displacement" argument applies to

[10] SCE comments on the September 7, 2012 Joint Workshop at 16.
[11] CAISO comments on the September 7, 2012 Joint Workshop at 8.
[12] CAISO Tariff Section 8.4.1.2 Regulation Energy Management

LCR where the operational flexibility of storage means that it frees up less flexible, traditional plant who can dedicate their longer duration capability to meeting LCR needs. In the absence of storage as a local resource, the amount of capacity available from the traditional resource to meet LCR is compromised. Failure to recognize the locational benefit of storage with any duration also fails to recognize the greater modularity and ease of siting associated with these resources, as alternatives to conventional plant. The proposed three hour cut-off for LCR is entirely arbitrary – if storage was to be treated as a direct equivalent of a peaking plant, then this would make sense. But a storage facility is not a direct equivalent of a peaking plant and applying a peaking plant LCR value methodology is flawed.

Third, SCE's screening criterion of "highest and best use" is flawed because, while a storage resource may be limited to providing a certain set of products and services at a certain point in time, the same resource may provide additional products and services at other times, depending on market signals and grid needs. Thus, limiting the valuation of a storage resource to a single use based on a single expected mode of operating severely undervalues the flexibility and optionality of storage.

2. CESA Model All-Source Procurement Structure

To ensure that all energy storage resources, including Beacon Power's flywheels, are eligible to compete in future RFOs and are evaluated appropriately, changes to the most recent RFOs are needed. Beacon Power agrees with the CESA "Model All-Source" Procurement Structure submitted with its comments on the September 7, 2012 Joint Workshop.

3. Storage retrofit / incremental offers to RFOs

Beacon Power agrees with CESA's comments on the September 7, 2012 Joint Workshop that RFOs should not prohibit additional capacity provided by the addition of an energy storage device at an existing facility and should also allow for a separate contract for such capacity.

RA

In regards to topics that the Commission has indicated will be addressed in the RA proceeding, the issues of determining an NQC / RA value for energy storage resources and defining Flexible Capacity are the most important to advancing energy storage deployment. The Commission should determine an NQC / RA value for energy storage resources, including for shorter duration storage (see section above for discussion on SCE's proposed NQC method). Once NQC / RA value for energy storage resources are defined, then multi-year contracting for RA resources would be beneficial for energy storage resources. In parallel with determining an NQC / RA value for Storage resources, the Commission should explore the use of storage to improve the deliverability status of renewable resources, and enable those renewable resources that utilize storage to increase the amount of energy considered "deliverable" for purposes of RA.

Flexible Capacity should be defined, and should not rely on a three-hour continuous duration as mentioned in the Joint Parties' Proposal. For similar reasons in the NQC/RA value discussion, storage resources with duration shorter than 3 hours have flexibility and reliability value for the grid.

IV. CONCLUSION

Beacon Power appreciates the opportunity to comment on the Interim Staff Report and January 14, 2013 Workshop, and looks forward to continuing its involvement with the Commission and other interested parties in this proceeding. Storage resources in general and Beacon's flywheels in particular have many operational, environmental, and economic benefits, but barriers exist that prevent storage and their benefits from reaching the grid and its customers. To alleviate these barriers for storage, Beacon Power respectfully requests that the CPUC: (1) establish procurement targets for energy storage resources that provide ancillary services-only; (2) establish procurement set-asides and enable utilities to utilize a "portfolio approach" for resources that provide specific services to the grid, such as frequency regulation; and (3) designate energy storage as a preferred resource.

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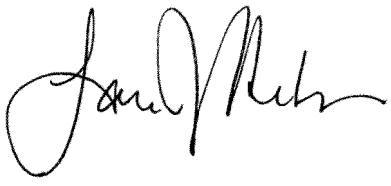
Dated: February 4, 2013

CERTIFICATE OF SERVICE

I hereby certify that I have on this day served via email, a true copy of the foregoing "Comments of Beacon Power, LLC on the Administrative Law Judge's Ruling Seeking Comment on Interim Staff Report and Workshop Topics" to all known parties to R1012007 listed on the most recently updated service list available on the California Public Utilities Commission website.
Executed this 4th day of February 2013 in Boston, Massachusetts.



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