

**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 PRIMUS POWER CORPORATION ON ASSIGNED COMMISSIONER'S  
RULING PROPOSING STORAGE PROCUREMENT TARGETS AND MECAHNISMS**

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In accordance with the provisions of Rule 4.3 of the Rules of Practice and Procedure of the California Public Utilities Commission ("Commission"), Primus Power Corporation ("Primus Power", or "Primus") hereby submits these comments on the Assigned Commissioner's Ruling *Proposing storage procurement targets and mechanisms*, issued by Commissioner, Carla J. Peterman on June 10, 2013.

**I. DESCRIPTION OF PRIMUS POWER**

Primus Power designs, manufactures, and sells megawatt-scale energy storage systems that are low-cost, reliable, and deploy rapidly. Primus' containerized, EnergyPod™ battery systems can be integrated at both the transmission and distribution level in the electric grid and provide multiple hours of energy storage. Primus Power's systems can also be used for microgrid applications. EnergyPods™ enable optimization of the grid (e.g., reduction of peak loads, increased reliability, and deferral of investment), integration of renewable energy, and reduction of greenhouse gas emissions. While Primus Power has focused on grid-scale applications to date, its battery technologies are also applicable for behind-the-meter installations, and Primus may develop products for specific consumer and industrial applications in the future. Primus believes that the outcome of this proceeding will help the company, and similar companies, to focus development efforts on the use-cases where its technology fits best and can create the most impact.

Primus Power is a four-year old California company with a versatile zinc bromine flow battery that improves upon existing zinc-halogen designs. The Company has brought its patented technology from lab to demonstration scale with the support of venture investors and public grants from DOE-ARRA, APRA-E, and the CEC. Primus has three early adopting demonstration partners: a California municipal utility (Modesto Irrigation District), an investor-owned utility (Puget Sound Energy) and a military base (MCAS Miramar) with whom it will demonstrate its EnergyPod™ systems. These deployments are intended to prove out the value of the technology in "Distributed Storage" type use-cases detailed earlier in this proceeding and also in microgrid applications. Primus will ship first systems in 2014 with larger scale commercial readiness in 2015.

## **II. INTRODUCTION.**

Deployment of advanced energy storage can have a significant and measureable impact on California's goal to reduce greenhouse gas emissions by relying more on clean, renewable energy. Energy storage can enable the efficient, reliable, resilient and affordable electric power system that benefits California ratepayers and meets the aforementioned goals. The ability of storage to "decouple" energy generation and use, and to respond quickly and accurately to changing conditions on the grid, make it a versatile resource that may help meet the growing need of California's electrical grid for flexible generating resources. Realizing this opportunity, energy storage device manufacturers, service providers, and utilities have invested in early energy storage pilots and demonstrations in California.

However, as with the introduction of many new technology classes, there are a number of barriers to widespread adoption of energy storage technologies. The Energy Storage OIR proceeding has identified eight barriers to market entry for energy storage in California. These barriers are widespread, and are based on technical, regulatory, and economic issues. Removing these barriers is essential to achieving the widespread adoption of energy storage that is needed to benefit California's electric power system.

Procurement targets that are right-sized, timed correctly, and implementable serve as a mechanism that can lead to the elimination of the barriers to energy storage adoption. The Assigned Commissioner's Ruling (ACR) on June 10<sup>th</sup>, 2013 proposing energy storage procurement targets and a reverse auction mechanism (RAM) to implement the propose targets is an important step in the right direction. Subsequent actions by the Commission need to focus the market towards the most efficient and needed applications.

In the comments on the ACR that follow, Primus Power offers suggestions on how to strengthen and focus this initial proposal. Primus advocates for the following related to procurement target setting and implementation:

- Flexibility in procurement targets that is created by an iterative, "learn-by-doing" approach, not off-ramps
- Linkage of cost competitiveness to procurement target setting
- LTPP and RPS proceedings that formally incorporate energy storage

These suggestions are detailed below.

## **III. STORAGE PROCUREMENT DESIGN AND IMPLEMENTATION NEEDS TO BLEND FLEXIBILITY AND THE NEED TO SEND A CLEAR MARKET SIGNAL.**

The ACR puts forth clear targets for the procurement of developing energy storage technologies and also proposes "off-ramps" for the investor owned utilities (IOUs) that offer flexibility in the procurement process. Energy storage procurement targets are defined as:

"... a target represents the number of MW of storage capacity that each utility would solicit. Thus, the targets should not be considered requirements or mandates, and will be subject to certain flexibility off-ramps as further described below."

The off-ramps are further defined in sub-section 5 of section iv:

“Each IOU would have the burden to make such a showing and have the Commission approve a lower procurement target in that instance. As an example, an IOU may be permitted relief from up to 40 percent of its 2014 procurement target with such a showing, from up to 30 percent of its 2016 procurement target with such a showing, and from up to 20 percent of its 2018 and 2020 procurement targets with such a showing.”

Primus Power advocates for flexibility that supports all players in the energy storage value chain, and accounts for uncertainty in

- commodity pricing (e.g., natural gas),
- energy storage technology development,
- energy storage cost improvements,
- capacity needs in the coming decade as a result of closure of SONGS and OTC plants, and
- application needs for utilities (e.g., addressing the increasing penetration of distributed generation).

Primus Power believes that a solution, which includes the following elements, offers both flexibility and a clear market signal:

- **An iterative, “learn-by-doing” approach:** AB2514 requires and the Commissioner has proposed a framework for performing ongoing evaluation of progress toward the goals of AB 2514. We applaud the proposal, and suggest extending it in two concrete ways:
  1. use the lessons from previous procurement rounds to shape the process in subsequent rounds,
  2. reassess cost-effectiveness, energy storage demand across use-cases, and technology supply readiness, and use this information to inform the size of targets across *each* storage deployment category (e.g., transmission, distribution, and behind-the-meter) following *each* procurement round for the IOUs.
- **Commission oversight and 3<sup>rd</sup> party analytical support to guide target setting and program evaluation:** We recommend that a 3<sup>rd</sup> party with specific expertise in determining the economic value of energy storage in the broader context of the California grid be included in procurement target setting, and the subsequent target assessment and refinement . The 3<sup>rd</sup> party would engage in and bring value through deeper study of cost-effectiveness economics, market size, and product readiness to ensure that markets of the right size and composition are being created to match demand for and supply of storage technology applications. This proceeding has highlighted that calculating the value of energy storage is not trivial. The array of storage applications, diversity of siting options, and operational flexibility make valuing energy storage in stand-alone scenarios challenging. Determining the value of energy storage placed and operated within a portfolio of assets is even more complicated, and can cause the value of storage to vary greatly. Modeling techniques that do not account for all of these variables may be both inaccurate and imprecise. To ensure

that the value of and demand for energy storage are fairly and rigorously assessed, we recommend that 3<sup>rd</sup> party analytical support be an integral part of near and long-term procurement target setting. To facilitate the confidential sharing of information between storage developers, utilities, and third party analysts, we propose development of a standard Non-disclosure agreement (NDA) that can be executed between the parties..

- **Cumulative energy storage procurement targets that are only prescriptive with regard to energy storage deployment category for 2014:** The Commission should consider making targets cumulative by year (e.g., 2014, 2016, 2018, and 2020) for each IOU versus the current proposal. Additionally, utilities should be allowed to accelerate or delay procurement of a fixed percentage of the energy storage target based on need versus having the currently proposed off-ramps. We also suggest elimination of prescriptive targets for the transmission, distribution, and behind-the-meter connected storage classifications after the 2014 round of procurement. Instead, we propose that targets for the aforementioned storage classifications be set following evaluation of the preceding round of procurement and in conjunction with need and technology readiness assessments. In practice, IOU targets for transmission, distribution, behind-the-meter storage for the 2016 round of procurement may be formally set in early or mid-2015 following completion and evaluation of the 2014 procurement round. Primus believes that this could mitigate the challenge in accurately predicting demand and technology readiness to serve that demand in developing markets. For instance, few accurately predicted the decrease in price in solar PV modules and subsequent demand for roof-top solar fueled by companies like SolarCity seven years ago. As a result, we believe that being overly prescriptive limits flexibility and potentially sends the wrong signals to the energy storage value chain. In addition, and importantly, such predetermined prescriptions do not leave room for the iterative, “learn-by-doing” approach proposed above.

The elements of flexibility described above should also be balanced with clear market signals. Primus Power advocates for Commission involvement in the development of standardized, long term (20 year) financeable contracts as an appropriate market signal for energy storage. Energy storage, like other developing, capital-intensive technologies in commodity/near commodity markets, faces the challenge of reducing technical and market risk to become financeable or “bankable”. Storage providers have the full responsibility and ability to control meeting the technical requirements for bankability. However, they have less control in assuring access to consistent, predictable revenue streams. Monetization of energy storage through efficient markets alone is likely not enough to make energy storage bankable, and as a result energy storage will likely need to be PPA or rate based. As such, contracts need to enable cost recovery, and also account for the potential development of additional value streams where storage can provide value.

#### **IV. COST CONTAINMENT AND TARGET SETTING SHOULD BE CLOSELY LINKED**

As described in the previous section, evaluation of the cost effectiveness of energy storage is challenging and in its early stages. The diversity of system siting and application options for energy

storage, and necessity to address energy storage in the context of a portfolio of assets, make accurately valuing energy storage a non-trivial endeavor. Commissioner Peterman directly addresses this valuation challenge in the ruling saying that, “The cost-effectiveness evaluation of energy storage conducted within this proceeding to date is groundbreaking, but preliminary,” and that “As more information is gained through deployment of storage projects and applications, more refinements and better analysis of cost-effectiveness will become possible...” Building a clear picture of the capacity needs, value, costs and technical readiness of storage, and then applying them to the procurement target setting, is critical to creating a market of the right size and composition. Starting with targets that are too high, or too low, and ramping those targets too aggressively, or not aggressively enough, will have unintended consequences to California ratepayers and companies across the energy storage value chain.

Primus Power offers the following suggestions to address the need for cost containment and target setting, building on the ideas set forth above:

- **Leverage 3<sup>rd</sup> party analytic support to guide target setting:** We agree that multiple viewpoints on cost effectiveness are need to ensure the most cost-effective solution for the California ratepayer (see ACR section iv. sub-section 5). As discussed above, Primus Power suggests taking the ruling as written a step further and formalizing ongoing, 3<sup>rd</sup> party analytical support in cost-effectiveness modeling and target setting. We believe to get this right, the 3<sup>rd</sup> party should have specific expertise in determining the value of energy storage in the context of a portfolio of assets, and be able to integrate need assessments and technology readiness to ensure that procurement targets in subsequent rounds are of the right size and composition.
- **Avoid a reverse auction mechanism (RAM); instead consider a feed-in tariff to implement the procurement of storage:** Energy storage can serve the grid in a variety of ways and, depending on the details of the deployment, with differing levels of cost-effectiveness. This can make evaluating the results of a RAM difficult. RAMs are more appropriate in procurement of commodity type assets with defined deployment characteristics. A RAM could limit the procurement of the best-fit energy storage assets that provide the most system-wide benefits. Primus Power recommends that the Commission consider a, feed-in tariff, or standard contract offer, that encourages system-wide optimization, participation by numerous technology types, and cost reduction over time to help support overall cost containment. A feed-in tariff, like an SGIP, can also ensure that various factors such as off-peak and on-peak markets are adequately served and valued, and can help to ensure that multiple technologies have market access.
- **Provide enough time between procurement cycles to enable evaluation and learning:** As part of the iterative, “learn-by-doing” approach, Primus Power suggests that adequate time between procurement rounds be allotted for learning and technology development. As is, the proposed two year gap between procurement rounds may not be enough time to
  - deploy the storage procured in the previous round,

- determine its impact on the grid, and
- re-evaluate system needs, cost-effectiveness, and technology readiness needed for the next round of procurement target setting.

Adequate time for learning between procurement rounds is important, and may be solved by lengthening the time between rounds and/or by placing requirements on the time to deploy storage following each procurement round, which is not explicitly stated in the current proposal.

- **Create cumulative targets:** As described above, cumulative targets with the utility option to accelerate or delay procurement with justification, provide flexibility and enable a portfolio approach to near and long term system needs. We favor cumulative targets over cost caps and the off-ramps proposed in the initial proposal.

#### **V. ADVANCE INITIAL STORAGE PROCUREMENT IN PARALLEL WITH LTPP AND RA PROCEEDINGS AND MERGE IN THE LONG TERM**

Commissioner Peterman provides clear guidance in the ruling for the interplay of on-going planning and procurement proceedings with the implementation and execution of energy storage procurement. The preliminary ruling states the following:

“The procurement targets and the schedule for solicitations proposed here are not presently tied to need determinations within the LTPP proceeding. Instead, in the near term, I view this proposal as moving in parallel to the ongoing LTPP evaluations of need – system and local, and with the new consideration of the outage at SONGS. In the longer term, I propose that procurement of energy storage be increasingly tied to need determinations within the LTPP proceeding.”

LTPP and RA, which are specifically addressing flexible capacity, have to this point run in parallel with the energy storage proceeding, and, given the advanced state of each proceeding, the Commissioner believes that they should remain separate in the near term. However, because of the ability of energy storage to serve as an element of the solution set for RA and LCR requirements, future storage procurement should be an integral part of these planning proceedings.

Primus Power agrees with the urgency to move forward with the initial round of procurement in parallel with the current LTPP and RA proceedings and to eventually merge storage procurement analysis with the LTPP proceeding. That said, the Company suggests the following in addition to the position laid out by the Commissioner:

- the rapid trial and adoption of modeling tools in LTPP proceedings that enable the assessment of operational and flexibility requirement for storage,

- a deeper analysis of cost effectiveness, capacity needs, market demand, and technology readiness to set energy storage procurement targets,
- the application of the results from the 2014 procurement round, and the operating data from subsequent deployments of energy storage into the next LTPP proceeding to enable learning.

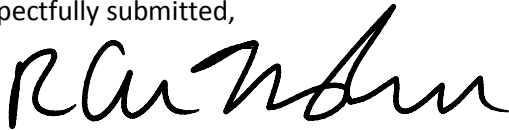
We believe that these suggestions help to strengthen the initial procurement and set up the transition of the energy storage proceeding into future LTPP proceedings for success.

**VI. CONCLUSION.**

Primus Power appreciates this opportunity to help shape and provide these comments to the record. We will continue to work with the Commission and all parties to meet the goals set forth in AB2514 and this proceeding.

July 3<sup>rd</sup>, 2013 in Hayward, CA

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Andrew Marshall". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Andrew Marshall  
Director of Product Management  
Primus Power Corporation