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

JOINT STEM, INC. AND SOLARCITY COMMENTS RESPONDING TO THE ASSIGNED COMMISSIONER'S RULING PROPOSING STORAGE PROCUREMENT TARGETS

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In accordance with the California Public Utilities Commission's ("Commission's") Rules of Practice and Procedure, Stem, Inc. and SolarCity Corporation (hereafter "Joint Parties") submit these opening comments on the *Assigned Commissioner's Ruling Proposing Storage Procurement Targets*, issued by Assigned Commissioner Carla Peterson on June 10, 2013 (hereafter the "ACR").[1]

I. DESCRIPTION OF STEM, INC.

Stem is a developer, owner, and operator of grid-connected advanced energy storage systems. Stem was founded in 2009 in California and has a portfolio of projects in operation and in various stages of development across the state. Stem systems install and interconnect at customer sites, on the customer side of the utility meter. The Company uses advanced analytics to send control signals to charge and discharge the storage devices thereby managing customer load for optimal economic benefit. Stem systems, when operated in aggregate, also provide a measurable, verifiable, and dispatchable grid resource. This distributed resource can be located in congested load centers and offers local capacity, flexible ramping, transmission congestion relief, and, if so desired by the host distribution utility, distributed voltage and reactive power management to assist in the delivery of high quality power to ratepayers.

[1] Note that SolarCity is submitting a motion, concurrent with these comments, to become a party to this proceeding.

II. DESCRIPTION OF SOLARCITY CORPORATION

SolarCity is California's leading full-service solar power provider for homeowners and businesses - a single source for engineering, design, financing, installation, monitoring, and support. Our company provides cost-effective financing that enables customers to eliminate the high upfront costs of deploying solar. SolarCity has more than 1,900 California employees based at 15 facilities around the state and has provided clean energy services to over 26,000 California customers as of March 31, 2013.

III. JOINT PARTIES' SUPPORT OF THE ACR

The Joint Parties are supportive of Commissioner Peterman's ruling and applaud the effort by the CPUC, utility staff, and Proceeding R.10-12-007 (the "Proceeding") participants to encourage the development of a market for energy storage in California. In particular, we believe the 50% cap on utility ownership is a critical driver for enabling a competitive market for energy storage services and we commend Commissioner Peterman for the forward-looking ruling. In response to the ACR, Joint Parties recognize that there is much room for learning, by industry and regulators alike, for storage to add full value to the California grid and support the ACR in its acceleration of that learning.

Joint Parties will focus comments on the following issues posed in the ACR:

a. Please comment on this proposal overall, with emphasis on the proposed procurement targets and design.

e. Comment on whether and to what extent utilities should be permitted flexibility in procuring among the use-case "buckets" (transmission, distribution, and customer-sited) of energy storage within one auction, and whether a minimum amount in each "bucket" must be targeted.

g. Comment on how this proposal may be coordinated with Renewable Portfolio Standard procurement plans, as set out in Public Utilities Code section 2837.

i. Comment on how the preliminary results of the cost-effectiveness models should be applied to the question of setting procurement targets.

IV. PLEASE COMMENT ON THIS PROPOSAL OVERALL, WITH EMPHASIS ON THE PROPOSED PROCUREMENT TARGETS AND DESIGN.

The Joint Parties are supportive of all the efforts on the regulatory, legislative, and industry sides of the energy storage community to develop a market for storage. During the Proceeding, participants coalesced around a "use-case" based approach to valuing energy storage, however the ACR seems to focus on location-based procurement targets. (By "location based" we mean transmission / distribution / customer-sited delineation of storage. By "use-case" based we mean specific value streams or services that storage, wherever situated, can provide, as detailed in the next paragraph). The Joint Parties support the Proceeding's use-case based approach, and seek further clarification from the Commission regarding the definitions of the ACR's targeted categories of procurement which, at least superficially, appear to base eligibility to contribute toward a given target on where a given storage solution interconnects to the grid.

Example use-cases include adding capacity value, demand-side management, providing ancillary services, deferring or eliminating upgrades to the transmission and/or distribution systems, providing energy arbitrage to reduce the price and carbon spread between peak and off peak power, relieving congestion in load centers, managing voltage on distribution circuits, integrating renewable energy resources, and providing flexible ramping to support system stability. The ACR delineation for procurement targets appear to be based on where the storage interconnects, whether it's at transmission, distribution, or secondary voltages. The Joint Parties are concerned that location-based procurement targets send inefficient signals to the markets and could result in limited competition for certain buckets. This could potentially lead to over-purchasing of sub-optimal storage assets, and lessen the total benefit of the procurement targets as a whole.

Based on the fundamental flow of current on the grid, from generation to transmission to distribution and ultimately to the customer, a storage asset can only participate in use-cases that are "upstream" of it. Yet the location-based procurement targets specified are disproportionately weighted to transmission and distribution sited storage despite limited available use-cases.

Joint Parties believes that the use-case and type of service delivered by an energy storage system is more critical in driving ratepayer value than the interconnection

location. For example, storage that interconnects at the transmission level is able to provide some benefit to the bulk power system in terms of energy arbitrage, frequency regulation, or, in certain cases, congestion relief. However, transmission connected storage is incapable of providing any downstream services, such as distribution voltage management or customer load management.

Moving downstream, storage interconnected at a substation or on the primary side of a distribution transformer can provide the same benefits (energy arbitrage, frequency regulation, relief of transmission congestion, and voltage management on the distribution circuit) - yet the transmission level benefits provided by the distribution-connected asset will not be counted under the location-based procurement targets. And looking further down the line, distribution-connected storage cannot manage customer load or relieve pressure on distribution assets located "down stream" of it. In short, the inherent geographic constraints of transmission and distribution assets limit the applicable use-cases and associated grid value.

Customer-sited energy storage, by contrast to the above, since it is located at the edge of the network where grid challenges originate, is able to support the grid in its entirety. It does so by managing customer load and thereby relieving pressure on both the distribution and transmission systems. The needs for peak capacity, congestion relief, frequency regulation, distribution circuit voltage management, and flexible ramping all can be met by changing customer loads. By managing grid challenges where they initiate, at the load, the challenges faced upstream at the distribution and transmission levels are reduced.

The Joint Parties assert that there are no cost advantages to siting storage on the transmission or distribution system. Each large-scale system is an engineering "work of art" requiring significant project-specific resources, whereas customer sited systems are products that install quickly and interconnect directly into the existing customer electrical infrastructure. Expected benefits of scale of large systems are offset by the cost of real estate, permitting and siting, plus additional infrastructure, such as concrete foundations and additional transformers.

For all of the forgoing reasons, the Joint Parties support a use-case based procurement approach over a location-based approach. Under this approach, the

Commission could establish procurement targets based on the need for services (e.g. congestion relief, frequency regulation, distribution voltage management, flexible ramping, etc.) and all relevant technologies would be able to compete to deliver these services.

If, in the immediate term, the Commission feels the location-based approach is the best way to initially set the procurement targets, the Joint Parties believe that the customer-side procurement target is unreasonably small, comprising only 15% of the total procurement targets. In our view, given the clear-cut value proposition of behind-the-meter storage and greater opportunities to transform this market, we urge the Commission to increase this procurement bucket to one-third of the overall procurement target. We believe this is justified given the inherent advantages of customer-sited systems and the ability of these systems to provide a larger suite of services as discussed above. As the storage market evolves it may make sense to revisit these allocations, but as an initial starting point, we believe a more equitable distribution across procurement buckets is reasonable.

The Joint Parties also have significant concerns regarding the procurement mechanism proposed in the ACR and the frequency with which procurement and contracting is envisioned to occur. The proposed reverse auction mechanism (RAM) seems ill-suited to procure the diverse set of services that storage can provide. Furthermore, given the relatively nascent state of storage technologies and business models, a RAM contracting mechanism would appear to lack the needed flexibility to accommodate the very different circumstances and contexts encompassed by the wide array of technologies that comprise the storage space.

Irrespective of the procurement mechanism used, we also question the proposed frequency of procurement/contracting, with auctions occurring once every two years. This approach appears oriented toward larger scale projects that, by their nature, are subject to prolonged timelines. However, in general this appears inappropriate for smaller scale projects, and customer side projects in particular. It seems unlikely that project developers will be able to reasonably factor the uncertain opportunity presented by an infrequent auction process into project economics and thus this approach appears unlikely to have a significant impact on the scale or pace of deployment. To address this, we

encourage the Commission to consider a more frequent or even ongoing procurement/contracting approach.

Lastly, Joint Parties note that while procurement targets are an important policy lever to drive scale and ultimately transform the market, such targets will be insufficient to achieve these goals unless the Commission reduces or eliminates regulatory barriers that impede the ability of storage technologies, particularly customer-side systems, to deliver their services to market. Non-discriminatory access to the wholesale market should be expressly recognized as a fundamental and necessary objective of this effort.

V. COMMENT ON WHETHER AND TO WHAT EXTENT UTILITIES SHOULD BE PERMITTED FLEXIBILITY IN PROCURING AMONG THE USE-CASE "BUCKETS" (TRANSMISSION, DISTRIBUTION, AND CUSTOMER-SITED) OF ENERGY STORAGE WITHIN ONE AUCTION, AND WHETHER A MINIMUM AMOUNT IN EACH "BUCKET" MUST BE TARGETED.

Energy storage providers, Joint Parties included, are adamant that the technology is capable of providing multiple services to the grid, including flexible capacity, ancillary services, and customer load management. That flexibility is part of the value that storage can bring to the California power system. However, establishing the regulatory framework to capture these multiple value streams is complex. In the near to medium-term, the Commission should establish minimum targets for each bucket so that these multiple value stream solutions are brought to market. The hallmark of an effective market transformation program is providing clear and stable incentives that give the investment community the confidence to invest the substantial resources required to effectively address a market. Too much flexibility could undermine that confidence.

The Joint Parties believe that the California power system is changing rapidly due to changing loads, increased penetration of distributed variable energy resources, and the proliferation of electric vehicles. While large storage systems might help adjust to these changes, the needs of the grid today may not be indicative of the needs of the future. Large systems require long lead times to site, permit, finance, and construct. During that time, the needs of the power system will evolve and change. If more bulk storage systems than are needed are procured far in advance to accommodate project lead times, this will

lead to underutilized assets and additional cost to ratepayers. Too much advance procurement could crowd out faster-to-deploy, incremental, more nimble new technologies.

Short project lead-times will avoid path dependency and allow utilities to contract for the services required at the time of contract. The Joint Parties' view is that if the use-cases provided by bulk systems can be procured through the aggregation of customer-sited systems with the same reliability, at the same or lower costs, and with shorter lead times, aggregated systems should not be precluded from the use-case procurement.

VI. COMMENT ON HOW THIS PROPOSAL MAY BE COORDINATED WITH RENEWABLE PORTFOLIO STANDARD PROCUREMENT PLANS, AS SET OUT IN PUBLIC UTILITIES CODE SECTION 2837.

Joint Parties believe that energy storage services will have an important role to play in the integration of renewables in California, but the storing of power does not constitute the generation of renewable energy. Rather, the Renewable Portfolio Standard and integration of such resources will drive the need for storage.

Joint Parties applaud the ACR's recognition that third parties can provide these energy storage services, and might be able to do so at lower cost to ratepayers. Since storage will have a role in California's low carbon future, Joint Parties encourage the Commission to consider storage interconnection fees, regulatory barriers, and lead times as impediments to meeting the state's targets. Joint Parties applaud the Commissions work in Proceeding R.11-09-011 and support prudent resolution to storage interconnection. Ultimately, we believe storage should be an integral part of a safe, reliable, and decarbonized grid.

VII. COMMENT ON HOW THE PRELIMINARY RESULTS OF THE COST-EFFECTIVENESS MODELS SHOULD BE APPLIED TO THE QUESTION OF SETTING PROCUREMENT TARGETS.

As detailed above, Joint Parties believe procurement targets should be based on use-case, knowing that there is still learning to be done. For storage to add full value to the grid, it must offer reliable operation, a process that will take time. Joint Parties

support the ACR in pushing this learning forward and suggests the "cost-effectiveness" be revisited regularly by the CPUC.

VIII. CONCLUSION.

The Joint Parties strongly support the goals and objectives of the ACR and are grateful for all the work that has gone into the Proceeding. We support a storage market in California based on use-case and non-discriminatory access assuming that grid safety and reliability concerns are met. Joint Parties believe that such non-discriminatory access will be better enabled by clear, transparent, and efficient interconnections processes. Joint Parties believe that customer sited storage, including 3rd party owned storage, can add flexibility to the California power grid both today and in the future not only through system operations, but also in contracting, procurement, and construction time.

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Respectfully submitted,

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