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.	R. 12-03-014 (Filed March 22, 2012)

REPLY COMMENTS OF CALPINE CORPORATION IN RESPONSE TO ALJ RULING ON WORKSHOP TOPICS

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Pursuant to the September 14, 2012 California Public Utilities Commission ("Commission") *Administrative Law Judge's Ruling Seeking Comment on Workshop Topics* ("*ALJ Ruling*"), Calpine Corporation ("Calpine") provides the following reply to the comments submitted by Megawatt Storage Farms, Inc. ("Megawatt Farms") and the Distributed Energy Consumer Advocates ("DECA") on the questions identified in the *ALJ Ruling*.

I. INTRODUCTION

As discussed in Calpine's September 7, 2012 workshop presentation and its initial comments on the questions in the *ALJ Ruling*, Calpine supports non-discriminatory procurement practices that foster competition between new and existing resources of all types, including conventional and renewable generation, demand response, energy efficiency, and storage. As Calpine described, such non-discriminatory procurement practices will better identify the least-cost/best fit resource option for meeting reliability needs at both the system and local level.

In stark contrast to such non-discriminatory procurement practices, Megawatt Farms and DECA recommend changes to current procurement practices that, if adopted, would undermine the competitive procurement process. For example, Megawatt Farms seeks set-asides for specific classes of resources that would completely frustrate least-cost/best fit procurement goals. DECA asks the Commission to, in effect, adopt discriminatory procurement practices that would adversely impact cost-effective projects to upgrade existing resources to increase capacity and/or flexibility. In support of their respective proposals, both Megawatt Farms and DECA

mischaracterize the operating characteristics of conventional generation and make unsubstantiated assertions of fact.

II. MEGAWATT FARMS MISCHARACTERIZES THE OPERATING CHARACTERISTICS OF STORAGE RELATIVE TO FLEXIBLE CONVENTIONAL GENERATION RESOURCES

In addressing its recommended changes to procurement rules, Megawatt Farms asserts that separate procurement processes should be used for different resource types, such as energy storage.[1] According to Megawatt Farms, "storage is especially unique" such that it should not be compared to other resource types but procured outside of an all-source resource solicitation.[2] In support of its proposed procurement "set aside" for storage, Megawatt Farms purports to identify several advantages that storage has over conventional generation resources:

> As a further example, consider ramping. Storage generally provides 200 MW of dispatchable MW per 100 MW of nameplate rating, because storage can swing from a 100 MW charge to a 100 MW discharge (or any setting in between.) Storage can dispatch instantly. When set to the midpoint, it can swing 100 MW either way, yet while at that midpoint, it neither consumes nor delivers energy. In contrast, even a flexible fossil plant will have a minimum operating point of about 50%. Each 100 MW of nameplate fossil generation provides just 50 MW of dispatchability. Hence 100 MW of storage has four times the dispatchable MW of this 100 MW fossil plant. A fair comparison is cost per dispatchable MW, not cost per nameplate MW. Yet even that doesn't provide true equality, because the storage can ramp much faster - more on this in a moment. Also, the fossil plant, when positioned at the midpoint of 75 MW, so it can swing up or down by 25 MW, is actually delivering 75 MW to the grid. It will be typically be running at a higher heat rate than its optimum. It is emitting GHG and the energy may not even be needed, if renewables outputs are high and baseload plants are operating. So the opex profiles of storage and fossil are also very different.[3]

[1] Megawatt Farms Comments, at 4.
[2] Megawatt Farms Comments, at 4.
[3] Megawatt Farms Comments, at 4-5.

There are at least four significant errors in Megawatt Farms' characterization of storage relative to flexible conventional generation resources. First, Megawatt Farms suggests that storage has dispatchable capacity that is equivalent to twice its nameplate rating. This characterization ignores the fact that in order for storage to be dispatchable at twice its nameplate rating it must transition from consuming energy to providing energy (or vice versa). Megawatt Farms, however, fails to explain how a resource that must *consume* energy to provide its full dispatchability can actually addresses future reliability requirements. For instance, the renewable integration analysis performed by the California Independent System Operator ("CAISO") in the last long-term procurement planning ("LTPP") proceeding showed that needs for flexible capacity can arise in peak periods in which flexible resources are unable to meet load following and regulation requirements because they are needed to provide energy.[4] Adding storage resources that must consume energy to provide upward flexibility may not address the needs identified by the CAISO.

Second, Megawatt Farms suggests that only half of the capacity of a typical conventional generation resource can be considered dispatchable. This claim ignores the diversity of minimum operating points among different types of conventional generation resources. Many conventional generation resources have minimum operating points significantly less than 50% of their nameplate capacity. For example, in some of its renewable integration modeling, the generic Combined Cycle Units and Combustion Turbine Units that the CAISO assumes are used

[4] *See* http://www.cpuc.ca.gov/NR/rdonlyres/32D2572E-7B0B-4DAD-8D99-AB13CBA1470F/0/201206OpFlexMeetingpresentationPDF.pdf at slide 144 and slide 147.

to replace once-through cooling units in Southern California Edison's service territory have minimum operating points that are 40 percent of their total capacities.[5]

Moreover, Megawatt Farms ignores that a resource's ability to start and get to a minimum operating point is a significant element of dispatchability in and of itself. In the Commission's ongoing resource adequacy ("RA") proceeding, the CAISO has identified three different types of flexibility requirements – (1) regulation; (2) load following; and (3) maximum continuous ramping.[6] At least with respect to maximum continuous ramping, the CAISO counts conventional generation towards the requirement at its full capacity to the extent that it can start and increase its output in the time frame over which the requirement is determined (generally multiple hours).[7]

Third, Megawatt Farms asserts that conventional generation resources might produce at higher heat rates to the extent that some portion of its capacity is held back to provide upward flexibility. The extent to which the efficiency of a conventional generation resource is reduced due to partial loading varies from resource to resource, and is not necessarily large or significant for all resources.

Fourth, Megawatt Farms suggests that conventional generation might produce energy that is not "needed." Megawatt Farms, however, ignores that it is the CAISO's role to commit and dispatch units economically. To the extent that CAISO clearing prices do not support the operation of conventional generation resources, such resources will generally not operate.

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[5] *See* http://www.cpuc.ca.gov/NR/rdonlyres/E4C8D751-01D2-4EF2-9F33-F9AF4A84434/0/2012LTPPOpFlexWorkshop2.ppt at slide 51.

[6] *See e.g.,* http://www.cpuc.ca.gov/NR/rdonlyres/36AF21E5-5608-48EF-A4D5-5D2221BD0E00/0/CAISOFlexibleCapacityRequirement.ppt.

[7] *See* http://www.cpuc.ca.gov/NR/rdonlyres/36AF21E5-5608-48EF-A4D5-5D2221BD0E00/0/CAISOFlexibleCapacityRequirement.ppt at slide 5.

Furthermore, to the extent over-generation conditions occur and power is genuinely not "needed" (*i.e.*, short-term prices are negative and the CAISO must pay load and/or exporters to take power), then opportunities for storage to arbitrage inter-temporal price differences should be enhanced. The attractiveness of such arbitrages, however, should be determined through competitive markets, not assumed.

III. A SPECIFIC NEED FOR STORAGE APART FROM OTHER RESOURCES HAS NOT BEEN DEMONSTRATED

Megawatt Farms asserts that "[t]here is no way" for storage and conventional generation resources to "compete fairly within a single" resource solicitation because of differences in their respective ramping speeds.[8] Implicit in Megawatt Farms' position is the notion that there is a need for relatively fast ramping resources to meet future renewable integration and reliability requirements. While it may be the case that storage can ramp more quickly than some conventional generation resources, the need for relatively fast ramping resources has not been established by the CAISO. As discussed above, the CAISO has identified three different types of flexibility requirements to address capacity needs across different time intervals from second-to-second (regulation), to within the hour (load following), to over multiple hours (maximum continuous ramping). Given that (1) current regulation requirements are relatively modest;[9] (2) the CAISO expects regulation requirements to increase only modestly with increased penetration of renewable resources;[10] and (3) significant amounts of capacity with very fast ramp rates

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[8] Megawatt Farms Comments, at 5.

[9] The CAISO currently buys approximately 300 MW of regulation, both up and down, on average in every hour. *See* http://www.caiso.com/Documents/2011AnnualReport-MarketIssues-Performance.pdf at Figure 5.4.

[10] *See e.g, Track 1 Direct Testimony of Mark Rothleder on Behalf of the California Independent System Operator,* R.10-05-006 at Exhibit 1, slide 4 (suggesting that regulation requirements will be up to approximately 1 GW per hour both up and down under a 33 percent RPS). Note that values in slide 4 are not directly comparable to the averages referenced in footnote 9 because the values in Table 4 reflect "the single highest hourly seasonal requirement," *(i.e.*, they are upper bounds).

already exists (*e.g.*, substantial amounts of hydroelectric generation and the Helms' pump storage facility), it is not at all evident that, as Megawatt Farms suggests, additional amounts of relatively fast capacity will be needed during the current planning horizon.[11]

IV. THE COST-EFFECTIVENESS OF STORAGE IS BEST ADDRESSED THROUGH A NON-DISCRIMINATORY AND COMPETITIVE PROCUREMENT PROCESS – NOT RESOURCE SPECIFIC SET-ASIDES

Megawatt Farms asserts that "[d]eployment of storage on the [California] grid, in successive steps leading to 4 GW by 2020, is the most cost-effective way to support renewables integration and achievement of the 33% RPS."[12] However, in making this assertion, Megawatt Farms fails to demonstrate that storage is actually cost effective, much less that 4 GW of storage constitutes an appropriate procurement target. Least-cost/best fit procurement in general and cost-effectiveness in particular is best determined through a non-discriminatory and competitive procurement process. Once flexibility requirements are defined (something that has not yet occurred), it may be the case that some amount of storage is a least cost source of incremental flexible capacity. Until such requirements are identified *and* a competitive non-discriminatory procurement process takes place, the amount of cost-effective storage, if any, simply cannot be determined.

V. MARKETS SHOULD NOT DIFFERENTIATE FUNCTIONALLY EQUIVALENT CAPACITY AND OPERATING CHARACTERISTICS BASED ON THE VINTAGE OR SPECIFIC IDENTITY OF THE RESOURCE

DECA argues that upgrades to existing resources to increase capacity and/or flexibility should not be "commingled" with the resource's existing capacity and flexibility attributes for evaluation purposes in a resource solicitation.[13] According to DECA, "[b]y assigning

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[11] Beacon Power, LLC ("Beacon") Comments, at 7-8.
[12] Megawatt Farms Comments, at 13.
[13] DECA Comments, at 20.

incremental value only to new amounts of a desired attribute, the Commission can avoid paying a second time for something it already owns and can better judge the value of the attribute in the market."[14]

As an initial matter, it does not appear that DECA understands how existing market structures work - the Commission does not "own" generation nor does it pay for it. DECA also appears to confuse cost-of-service regulation associated with resources owned by the investor-owned utilities ("IOUs") with resources developed, owned and operated by independent power producers and which are procured through competitive markets. Under cost-of-service regulation, an IOU is generally allowed to recover the cost of a rate-based investment only once and according to a prescribed schedule. In contrast, in a competitive market, the value of specific products and services is determined by the market, regardless of past compensation. Well-structured markets should not differentiate functionally equivalent capacity and operating characteristics based on the vintage or specific identity of the resource.

VI. STORAGE IS NOT THE EQUIVALENT OF ENERGY EFFICIENCY

Megawatt Farms recommends that storage be treated analogously to energy efficiency for purpose of the loading order in the Energy Action Plan ("EAP").[15] Megawatt Farms' position seems to be based on the notion that adding storage to the bulk power system will reduce gas use by conventional generation resources. By this same logic, any upgrade to an existing generation resource that increases its efficiency should also be considered energy efficiency in that it would result in a reduction in gas use.

As defined in the EAP, "energy efficiency" was not meant to include either of the above scenarios. Specifically, the initial EAP adopted by the Commission in 2003 ("EAP I") defines

[14] DECA Comments, at 20.
[15] Megawatt Farms Comments, at 14; *see also* Beacon Comments, at 6.

energy efficiency in terms of the reduction in *consumption* as opposed to more efficient *production*: "California should decrease its per capita electricity use through increased energy conservation and efficiency measures."[16] Thus, the attempt of Megawatt Farms to equate storage with energy efficiency is inconsistent with the clear intent of the loading order.

VII. CONCLUSION

Megawatt Farms seeks unnecessary and expensive changes to the procurement process for the purpose of ensuring a set-aside for storage. Calpine urges the Commission to reject such changes, particularly given that the need for, and cost-effectiveness of, storage technology has not been demonstrated. California already has separate and uncoordinated procurement of demand response, energy efficiency, utility-scale renewables, wholesale distributed generation ("DG"), behind-the-meter DG, combined heat and power, new conventional generation, and existing conventional generation. California does not need another carve-out for yet another class of resources. On the contrary, least-cost/best fit procurement demands non-discriminatory procurement practices that foster competition between new and existing resources of all types.

By: /s/

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[16] EAP I, at 5. EAP I can be found at: http://docs.cpuc.ca.gov/word_pdf/REPORT/28715.pdf.