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.	R.10-12-007 Filed December 16, 2010

COMMENTS OF THE CALIFORNIA WIND ENERGY ASSOCIATION ON ASSIGNED COMMISSIONER'S RULING PROPOSING STORAGE PROCUREMENT TARGETS AND MECHANISMS

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Pursuant to Assigned Commissioner Peterman's June 10, 2013, Ruling Proposing Storage Targets and Mechanisms and Noticing All-Party Meeting ("ACR"), the California Wind Energy Association ("CalWEA") submits these comments on the ACR's straw proposal with potential procurement targets for emerging storage technologies.[1]

I. Introduction & Summary of Comments

CalWEA recognizes that energy storage technologies offer many valuable benefits to the electricity system and that storage will be essential to achieve very high penetrations of renewable energy on the grid under an increasingly stringent carbon cap. CalWEA strongly supports the fair consideration of energy storage resources as one of many means of addressing system needs and supporting the long-term policy goals of the state. However, CalWEA urges the Commission to take more time to more carefully consider the need for storage targets (particularly in the near-term), to ensure that any targets are set in the context of identified system needs, and to justify any targets under robust cost-effectiveness models and methodologies. If targets are set too hastily, and if the most cost-competitive storage technologies are excluded from consideration, the result could be inefficient procurement,

[1] These comments reflect the views of the trade association, not necessarily the views of any member company.

unwarranted ratepayer costs, and potentially even increased overall greenhouse gas emissions. Such an outcome could undermine public support for California's important clean energy goals.

Specifically, CalWEA urges the Commission to focus first on taking aggressive steps to ensure that any storage technologies that are potentially competitive are fully considered prior to any procurement of fossil-fuel resources in the holistic context of various short- and long-term system needs. These needs include those being contemplated in currently separate ("siloed") planning and procurement proceedings for resource adequacy, local capacity, flexible and renewable energy resources and any need evidenced under relevant CAISO markets. Such planning will enable the utilities to optimize overall procurement and enable storage providers to more effectively compete directly with fossil-fuel and other alternatives to simultaneously provide a spectrum of identified long-term needs.

Secondly, the Commission should continue the work of this storage-focused proceeding to address identified barriers to both established and emerging storage technologies, and to consider specific and strategic system needs that may warrant a more targeted procurement goal. For example, customer-side storage could facilitate an increasing penetration of renewables on the distribution grid, and storage co-located with renewable energy generators could reduce required local transmission capacity. Any targeted goals should be pursued only when they are shown to be cost-effective under a robust range of modeled assumptions, as compared to available alternatives.

In the various proceedings before the Commission, there is currently no identified need for services that storage could address in the 2020 timeframe (for which procurement has not already been authorized) that would justify the potentially significant cost of 1,300 MW of emerging storage technologies, for which cost-effectiveness models are still being developed. Meanwhile, the proposals that have been developed in this proceeding to address the list of identified barriers to storage have not yet even begun to be implemented.

For all of these reasons, as raised by various parties throughout this proceeding and as discussed below, the conditions outlined in AB 2514 that must be demonstrated in order to warrant a storage mandate do not yet exist and the proposed targets in the ACR are premature. However, this proceeding should explore more targeted approaches, and, more broadly, the

Commission should facilitate the ability of potentially competitive technologies to compete against fossil-fuel resources by addressing multiple long-term system needs simultaneously, enabling the utilities to optimize overall long-term procurement.

II. No need for additional electric system services of any kind has been established for the 2020 timeframe.

In the various proceedings before the Commission, there is currently no identified need for additional integration services that storage could address in the 2020 timeframe (for which procurement has not already been authorized). If there is no need, by definition it is not possible to cost-effectively satisfy that need with additional (un-needed) resources. Until such time as specific needs are determined, it is thus very unlikely that any "cost-effectiveness" model, anticipated to support procurement under the ACR in the pre-2020 timeframe,[2] will be able to support 1,300 MW of emerging storage technologies in multiple small-scale applications as the ACR anticipates.[3] Moreover, the Commission has yet to adopt a cost-effectiveness model, which is likely to be assumption-driven and controversial unless a robust array of assumptions is built into the methodology.

The following briefly reviews the status of various proceedings where electric system needs have been and continue to be considered. In sum, at the present time, no need for additional integration services of any kind has been established for the balance of the decade.

- In April 2012, the CPUC approved a multi-party settlement that no need had been demonstrated based on CAISO and utility studies for adding flexible reserves to the system in order to accommodate 33% renewable energy on the grid in 2020.[4] Studies showed that the flexibility already built into California's power system, in the form of existing dispatchable natural gas plants and hydro resources, provide plenty of physical capability to integrate renewables. In the same decision, the CPUC found that there

[2] See ACR at p. 14.
[3] See ACR at p. 8 (Table 1).
[4] CPUC Decision 12-04-046.

may be local capacity requirements to ensure system reliability in the Los Angeles basin due to the expected retirement of once-through-cooling (OTC) facilities.

- In February 2013, the CPUC authorized long-term procurement to meet the identified local capacity need in the LA Basin of between 1,400 and 1,800 MW, including a requirement that at least 50 MW be procured from energy storage resources, 150 MW be procured from preferred (non-conventional-gas) resources, and with the limitation that 600 MW of the maximum 1,800-MW need may be met only with energy storage resources and/or preferred resources. [5]

- In June 2013, the CPUC determined that, while sufficient physical system capacity exists to integrate 33% renewables, a flexible resource adequacy (RA) program should be established to ensure that resources with adequate flexibility to meet load following needs are actually made available to the CAISO in real time when needed.[6] The Commission determined that the flexible-RA program will not be needed until 2015. In 2014, the Commission will finalize the details of the flexible RA program, including establishing means for preferred and storage resources to "count" toward meeting the new flexible RA requirements.

- The need for flexible-RA is also likely to be reduced as a result of several CAISO initiatives which promise to reduce substantially the need for, and the cost of, the flexible RA capacity that may be required to integrate increased amounts of renewables. These include:
    - Allowing supply and demand resources to schedule more granularly and closer to real-time operation;
    - Allowing all intermittent resources to voluntarily provide ramping and other flexible capability, using submission of economic bids, to the grid operator;

[5] CPUC Decision 13-02-015 (February 13, 2013), p. 130-131.

[6] CPUC Decision 13-06-024.

- Introducing new market mechanisms such as the Flexible Ramping Product to encourage generators to change their behavior and to offer greater flexibility;
- Establishing rules as part of the CAISO's compliance effort for FERC Order 764 that will encourage imports to participate in the CAISO's new 15-minute market.
- Implementing the CAISO-PacifiCorp Energy Imbalance Market, which will capture the benefits of geographic diversity in renewable output, offer a larger pool of flexible resources, and facilitate faster scheduling and dispatch of resources across both systems.

- While the closure of SONGS is likely to require additional local reliability resources, which could be satisfied in part by storage resources, the amount of local capacity required has not yet been determined. The Commission has established a Track 4 of the 2012 LTPP case to make this determination.

- As noted above, the conditions under which preferred and storage resources can offer flexible RA have not yet been established. For example, in the flexible-RA proceeding, the Commission will determine whether a maximum 3-hour continuous upward ramp, or something else, is needed to satisfy the flexible-RA need in the near-term. Capabilities that may be needed over the longer term have not been identified. As different storage technologies are suited to different applications (energy management, power quality, etc.), it is necessary to understand the needs that exist before any targets are considered, so that, at a minimum, they are designed to address the identified needs.

- Finally, CalWEA notes that the question of whether any additional system resources are needed to address the system's long-term operating flexibility needs is still under

review in Phase 2 of the 2012 LTPP case.[7] The parties are performing both deterministic and stochastic modeling to address this issue. CalWEA submits that it would be prudent to wait for the outcome of this Track before authorizing procurement of storage for which the purported chief benefit is to help integrate renewables.

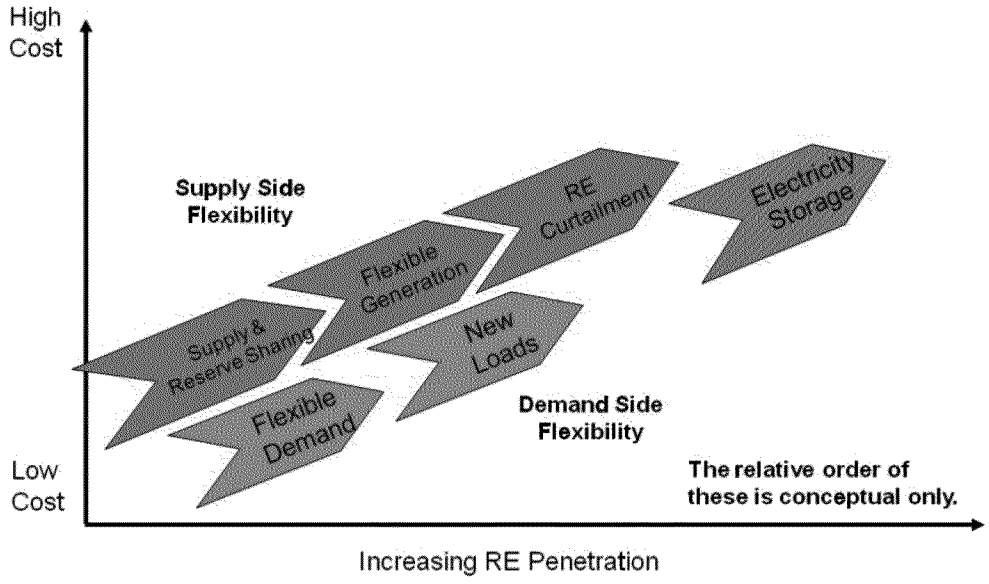
III. If any need for additional flexible system resources is identified in the 2020 timeframe, it is very likely capable of being satisfied at a far lower cost than emerging storage technologies.

In addition to emerging storage technologies, various tools have historically been called upon, and remain available, to increase the efficiency of grid operations and enable greater use of variable generation, including shifting power from periods of low to high demand, providing flexible response and load-following capability that base load plants are unable to provide, and providing ancillary services. These other tools include power markets, reserve sharing pools, conventional power plants including pumped hydro storage, limited curtailment of certain renewable resources, demand-response resources, and improved load forecasting.

The "Flexibility Supply Curve" shown on the following page is a conceptual representation of the cost of these various options, in order of increasing cost, with energy storage at the high-cost end of the spectrum. The cost of storage needs to be compared to the alternatives, including the efficiency losses in the storage process that may be avoided by using other enabling resources.

In addition, transmission improvements can add integration capabilities to the system. For example, PG&E's long-proposed C3ETP project would enable more use of the existing Helms Pumped Storage project and improve North-South interconnection which, in turn, would facilitate resource sharing across the state. Other strategic transmission improvements could also enable renewable energy resources, perhaps in combination with pumped hydro storage, to provide for needed local reliability in load centers.

[7] See R. 12-03-014, Scoping Ruling and Memo of the Assigned Commissioner and Administrative Law Judge (May 21, 2013).



Source: Paul Denholm, Erik Ela, Brendan Kirby, and Michael Milligan, *The Role of Electricity Storage with Renewable Electricity Generation*, National Renewable Energy Laboratory (January 2010). Available at: http://www.nrel.gov/docs/fy10osti/47187.pdf.

IV. Particularly given the as-yet-unidentified need for integration services in the 2020 timeframe, the Commission's focus should be on removing barriers to the most competitive technologies, avoiding the "siloing" of various system needs and promoting holistic procurement, supporting demonstration projects to test and develop emerging technologies, and exploring the need for more targeted mandates.

The Energy Division identified a number of actions that can address the barriers that it and the parties to this proceeding have identified as hindering storage technologies, both proven and emerging.[8] These proposals should generally be pursued.

In addition, storage will benefit from a broad planning and procurement effort that avoids the "siloing" of various system needs. Some storage technologies can simultaneously address several of the potential system needs, such as resource adequacy, local capacity, short-term regulation, longer-term ramping, voltage support, spinning reserve, and/or load-following. Procuring to meet all needs simultaneously will enable the utilities to optimize overall procurement and will enable storage providers to more effectively compete to simultaneously

[8] See the Energy Division's January 4, 2013, Report on Energy Storage in this proceeding, at p. 15-16.

provide a spectrum of needs, rather than just one need that might be addressed in a procurement "silo." The valuation of storage technology services will also benefit from new markets and methodologies being created by the California Independent System Operator (CAISO), such as the CAISO's new flexible ramping product and its frequency regulation service recently required by FERC Order 755. This type of broad-based procurement also is more likely to provide the scale required for some technologies to be able to participate, as compared to the highly fragmented procurement proposal in the ACR. Storage targets that exist separately from these other needs would essentially create yet another silo.

Many emerging-storage demonstration projects are expected to be supported through the new Electric Program Investment Plan (EPIC). The experience gained will help position emerging technologies to compete once more specific needs and strategic system locations are identified, and when a greater need for integration services is likely to exist in the post-2020 timeframe as more aggressive greenhouse-gas goals are pursued.

Finally, the Commission should continue the work of this storage-focused proceeding, in coordination with EPIC program, to consider specific and strategic system needs that may warrant a more targeted near-term mandate, such as customer-side storage that could facilitate an increasing penetration of distributed renewables, or storage co-located with central renewable energy generation that could reduce associated local transmission capacity needs. In particular, a more targeted mandate could be justified under the requirements of AB 2514 if the cost-effectiveness models that are developed demonstrate cost-effectiveness, as compared to other available alternatives, *under a robust range of assumptions* (a type of "least regrets" planning).

V. If the Commission mandates emerging storage technologies without a clear need for the services provided, and technologies are not carefully targeted to the most beneficial applications and locations, storage has the potential to result in unwarranted environmental and ratepayer costs.

If there is no need for system integration services, or if identified potential needs can be eliminated through means such as designing the market with renewable energy in mind (as the

CAISO is now doing), very limited paid curtailments of renewable resources,[9] demand-response and energy efficiency, then requiring storage under any model will result in increased greenhouse gas emissions. This is due to the significant energy losses involved when energy is stored – 10-50% depending on the technology, compared to the extremely small increase in emissions involved in the additional cycling and ramping of gas units to integrate variable renewables. The National Renewable Energy Laboratory has confirmed that the incremental need for cycling and ramping conventional generators in response to wind and solar variability has a negligible impact on the emissions benefits of wind and solar energy, with the cycling- and ramping-related change in emissions being either positive or negative and on the order of a few percent of the emissions savings.[10]

Further, as parties in this proceeding have just begun to highlight and discuss, energy storage may not reduce GHG emissions even when there is a demonstrated need for services such as load-shifting.[11]

This proceeding has highlighted the fact that there are a number of different storage technologies that address different types of electric system needs and are at various stages of development and cost-effectiveness. Given this situation, it is not appropriate to set targets for storage applications in all areas of the grid – transmission, distribution, and customer-side, as the ACR proposes. To do so, particularly without accepted cost-effectiveness models pared with a broad range of assumptions to support the targets, runs the risk of uneconomic procurements.

Excluding proven storage technologies, such as pumped hydro storage, from anytargets, as the ACR proposes, would compound these problems. Indeed, pumped hydro storage is likely the least-cost, and potentially the most-competitive, form of storage available today assuming

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[9] Existing RPS contracts provide an option for more downward flexibility than studies show that the CAISO needs in 2020. See "Comments of the California Wind Energy Association on Phase 2 Resource Adequacy Issues" (filed April 3, 2013in Rulemaking 11-10-023), at 12-13.

[10] National Renewable Energy Laboratory, "The Western Wind and Solar Integration Study " (September 2012). Available at http://www.nrel.gov/docs/fy12osti/55999.pdf.

[11] See, e.g., the February 4, 2013, Opening Comments of Calpine (at p. 2) and the Reply of Alton Energy (at p. 16) in this proceeding.

the availability of power purchase agreement of at least 20 years. Pumped hydro storage has also been found to be far less energy-intensive, on a life-cycle basis, than advanced batteries and compressed air energy storage.[12]

VI. If a target is imposed, it should be done in the context of the needed services.

Once integration-service and/or other system needs (if any) are identified which storage resources are capable of supplying, and the Commission wishes to impose a storage mandate based on the results of models rather than as a result of direct cost comparisons with other means of addressing the need, it should be done in the context of the needed services, as was done in the Track 1 LTPP decision. As in the Commission's decision in the LTPP Track 1 case, the Commission should continue to heed TURN's recommendation that the subject utility(ies) be allowed to "invoke a price circuit-breaker for storage procurement if storage providers cannot provide resources that help meet local reliability at a reasonable price."[13] Alternatively, as noted above, a mandated target could be supported if it is demonstrated to be cost-effective under a robust range of assumptions as compared to other alternatives that address the need.

V. Conclusion

For the foregoing reasons, CalWEA believes asserts that the conditions outlined in AB 2514 that must be demonstrated in order to warrant a storage mandate (or targets under a currently undefined cost-modeling approach) do not yet exist and the proposed mandate in the ACR is premature. However, CalWEA urges the Commission to consider, in this proceeding, more refined approaches to storage targets and urges the Commission, more broadly, to facilitate the ability of potentially competitive technologies to compete against fossil-fuel resources by addressing multiple short- and long-term system needs simultaneously, enabling the utilities to optimize overall procurement.

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[12] See, e.g., Paul Denholm and Gerald Kulcinski, Energy Center of Wisconsin, "Net energy balance and greenhouse gas emissions from renewable energy storage systems" (June 2003), located at http://fti.neep.wisc.edu/pdf/fdm1261.pdf.

[13] D.13-02-015, pp. 88-89.

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Respectfully submitted,

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