

**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 JACK ELLIS ON
ASSIGNED COMMISSIONER'S RULING PROPOSING STORAGE
PROCUREMENT TARGETS AND MECHANISMS
AND NOTICING ALL-PARTY MEETING**

Jack Ellis
PO Box 6600
1425 Alpine Way
Tahoe City, CA 96145
+1 530-581-2134
Email: jack@casaraquel.com

Dated: July 3, 2013

**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)

**REPLY COMMENTS OF JACK ELLIS ON
ENERGY STORAGE PHASE 2 INTERIM STAFF REPORT AND
SEPTEMBER 7, 2012 AND JANUARY 14, 2013 WORKSHOPS**

I. Introduction

I am submitting these reply comments pursuant to Commissioner Carla Peterman's June 10, 2013 ruling ("Ruling") in the above-captioned proceeding. My comments will address a) the market transformation rationale that is the foundation of Commissioner Peterman's proposal for procurement targets ("the Proposal"), b) the presumption that procurement targets are an efficient way to help diminish other market barriers for emerging storage technologies by gathering certain data, such as cost-effectiveness, operational data, and greenhouse gas impacts¹, c) the cost-effectiveness analyses conducted by the Electric Power Research Institute (EPRI) and DNV/KEMA, d) the additional costs that will be borne by consumers as a result of this proposal, e) technical

¹ Ruling, page 4.

and economic factors that will limit storage penetration, and e) additional measures that should be outlined in the Proposal to ensure risks are properly allocated among consumers and storage project sponsors and/or developers. More specifically:

- The Ruling erroneously justifies procurement targets on the basis that "... the law also requires that the Commission set appropriate procurement targets for cost-effective energy storage systems".²
- The Proposal is unlikely to transform the market for electric storage. It will not measurably speed up cost-effective adoption, accelerate the current pace of cost and performance improvements, or create manufacturing jobs in California.
- Most of the barriers to storage adoption cited in the Ruling are not directly addressed in the Proposal. Consequently the Proposal's procurement targets could force LSEs to purchase storage that will not be able to operate as intended, much less deliver any of the benefits cited by proponents in the course of this Rulemaking unless those other barriers are dealt with first.
- None of the analyses performed in connection with this proceeding support the procurement targets set forth in the Proposal. While the cost-effectiveness analyses performed by the Electric Power Research Institute (EPRI) and DNV/KEMA indicate that the first increment of storage is cost-effective for certain applications under certain assumptions, it does not indicate how much more storage could be added before the marginal cost of that storage exceeds

² Ruling, page 13.

the marginal benefit it provides. Moreover, while the cost-effectiveness results from both analyses can help indicate which storage applications are most promising, they do not address the extent to which storage can reduce GHG reductions.

- Payments to storage procured under the Proposal's targets for energy and ancillary services amount to transfer payments from fossil-fired generators. Unless fossil-fired capacity that depends on these diverted revenues to remain in the market are allowed to retire, consumers will end up paying more than they otherwise should. Along the same lines, any savings realized by individual customers who install storage will have to be recovered from other customers who choose not to install storage or who cannot take advantage of it, and customers who do not participate may also be required to pay for any incentives .
- The Proposal focuses on applications that are likely to have modest beneficial impacts if they have any beneficial impacts at all, while ignoring a potentially significant application that could avoid significant increases in GHG emissions.
- The Proposal should be modified so that storage project sponsors and developers bear all of the operating risks and - with the exception of the distribution capacity deferral application - sponsors are required to recover their costs from market revenues.

I will also address the questions raised in the Ruling.

II. The Law Does Not Mandate Procurement Targets

The ruling contains two different references to a purported legal requirement for setting storage procurement targets³. In fact, the law does not require the Commission to set procurement targets. Public Utilities Code § 2836(a)(1) states,

On or before March 1, 2012, the commission shall open a proceeding to determine appropriate targets, if any, for each load-serving entity to procure viable and cost-effective energy storage systems to be achieved by December 31, 2015, and December 1, 2020.

Although many parties to this proceeding have repeatedly asserted that the intent of AB 2514 was to require the Commission to set procurement targets, a plain reading of the language in the statute makes clear that the only hard and fast requirement of this section is to open a proceeding. Moreover, PUC § 2836 imposes two limitations on the Commission: first, that storage be viable *and cost-effective* [emphasis added], and second, that targets shall be adopted *if determined to be appropriate pursuant to paragraph (1)* [emphasis added]. Whether to set targets and at what levels to set them is left to the Commission's discretion.

III. Market Transformation

The Proposal is unlikely to have any meaningful impact on the market for electric storage for several reasons:

- Numerous private and government-sponsored R&D efforts are already underway to develop batteries that weigh less, cost less, hold more energy per unit of weight, and can be charged and discharged more quickly. These efforts are directed at mobile electronic device, electric vehicle and grid-scale

³ Ruling, pages 13 and 15.

applications. The Oak Ridge, Sandia, Livermore and Argonne⁴ National Laboratories all have on-going research efforts dedicated to storage.

- Innovation is more likely to be driven by consumer electronic applications that demand high performance with respect to energy density, weight, reliability and safety.
- Advanced battery manufacturing is concentrated in the Midwest and China. It is highly unlikely that battery manufacturers or firms that assemble storage systems from batteries manufactured by third parties would establish production facilities in California due to its stringent regulatory regime and the high cost of doing business (including electricity).

The bottom line is that efforts aimed at increasing the market demand for electric storage in California are unlikely to speed up the pace of innovation or bring long-term manufacturing jobs to California or cause storage costs to decline more rapidly.

IV. Barriers

The Ruling asserts that,

"...additional market barriers for emerging storage technologies will only diminish through a procurement process in which certain data, such as cost-effectiveness, operational data, and greenhouse gas impacts, are specifically solicited and evaluated."⁵

A procurement target by itself will do nothing to overcome any of the barriers that do not already require action by the CPUC (RA) or the ISO. In fact, a procurement target

⁴ Argonne National Laboratory was recently awarded \$120 million over 5 years by the Department of Energy for battery research (see <http://energy.gov/articles/team-led-argonne-national-lab-selected-doe-s-batteries-and-energy-storage-hub>).

⁵ Ruling, page 4.

that takes effect before the CPUC, the ISO and the FERC have dismantled many of the barriers related to cost recovery, market prices, Resource Adequacy value, operational needs, and bidding cited in the Ruling⁶ will compel LSEs to acquire storage that must then sit idle until these issues are resolved. If the Commission believes it must implement a procurement target, no matter what the reason or rationale, it must condition the effective date on resolution of the aforementioned issues and then it must deal with them expeditiously.

More importantly, as I pointed out in prior comments⁷, to the extent it leads to flatter wholesale market prices, increased competition for a limited supply of low cost off-peak charging energy, and an increase in the supply of ancillary services-capable resources outside established markets, imposing procurement targets is likely to interfere with other Commission initiatives aimed at increasing the amount of demand response and promoting the use of electric vehicles. Using procurement targets to promote and effectively subsidize deployment of storage creates a vicious cycle that will ultimately require the Commission to direct additional incentives to demand response and EV deployment that might otherwise not be necessary.

V. There is No Support for an 1100 MW Target

The Proposal lays out a schedule for procuring 1100 MW of storage by 2020, but there is no rationale for this number other than claims throughout this proceeding by proponents, including the California Energy Storage Alliance (CESA), Megawatt Storage

⁶ Ruling, page 3.

⁷ "OPENING COMMENTS OF JACK ELLIS ON ENERGY STORAGE PHASE 2 INTERIM STAFF REPORT AND SEPTEMBER 7, 2012 AND JANUARY 14, 2013 WORKSHOPS", February 4, 2013, page 11.

Farms and the Sierra Club that storage is needed. Neither the proponents nor the analyses performed by EPRI and DNV/KEMA have attempted to determine how much storage would be cost-effective, though both EPRI and DNV/KEMA have pointed out in their reports and their workshop presentations that it is important to do so. As I pointed out in reply comments filed on February 21, 2013⁸, claims in a report sponsored by the California Energy Commission that California needed between 3,000 and 4,000 MW of storage are baseless.

The Commission should bear in mind an implicit assumption that underlies both the EPRI and KEMA cost-effectiveness assessments, which is that small amounts of storage would be added to the grid and that those additions would not lead to material changes in market prices for capacity, energy and ancillary services. In fact, as increasing amounts of storage are added to the grid, market prices that form the basis for any cost-effectiveness analysis will decline. Moreover the market prices for all of these services will be under downward pressure with or without storage as several thousand megawatts of gas-fired generation that has already been procured begin operating over the next few years.

VI. Claimed "Savings" Are Largely Transfer Payments

New storage projects that provide and are paid for ancillary services are effectively diverting revenues away from the fossil-fired generators that would otherwise provide those services. To the extent fossil-fired generators rely on ancillary services revenues to

⁸ "REPLY COMMENTS OF JACK ELLIS ON ENERGY STORAGE PHASE 2 INTERIM STAFF REPORT AND SEPTEMBER 7, 2012 AND JANUARY 14, 2013 WORKSHOPS", February 21, 2013, page 3.

remain available⁹, taking them away means either consumers will have to provide out-of-market financial support as was the case with Calpine's Sutter Plant, or the plant operators would likely mothball or retire them. While this situation exists whether storage enters the market on its own or via the Proposal's procurement targets, the difference is that in one case competition determines which resources remain viable whereas in the second, this Commission picks winners and losers via regulatory fiat. Therefore the Commission should not be surprised if all types of suppliers demand higher prices to offset the risks of regulatory intervention that cannot otherwise be hedged.

DNV/KEMA's analysis shows that storage is cost-effective when used at customer sites to shift energy use and reduce the customer's peak demand, but DNV/KEMA also notes that *Current SGIP incentives are critical to storage cost-effectiveness*¹⁰ [emphasis added]. In effect, SGIP incentives, which are paid for by customers, are being used to shift demand charges away from the recipient and onto other customers in the same class. The DNV/KEMA analysis does not attempt to determine whether installing storage at a customer site would benefit the grid as a whole, nor does it assess whether installing storage at a customer site would lead to meaningful reductions in CO2 emissions.

Consequently, one could reasonably conclude that installing storage at a customer site is little more than a wealth transfer from customers that must bear both the shifted costs and the cost of the incentives to the customer that takes advantage of incentives to install

⁹ See for example, CPUC Advice Letter E-4471 regarding Calpine's Sutter Plant.

¹⁰ "DRAFT - Energy Storage Cost-effectiveness Methodology and Preliminary Results", DNV/KEMA, June 3, 2013, page 60.

storage. It's less clear that storage installed behind the customer meter benefits the grid or customers as a whole.

VII. Procurement Targets Focus on Low Value Applications and Ignore an Important High Value Application

One conclusion that could be drawn from the storage use cases is that none of them have a significant beneficial impact on GHG emissions. Although many of the use cases show favorable benefit/cost ratios, both EPRI and DVN/KEMA have attached some caveats to those results. From an investor's point of view, the economic justification for storage absent out-of-market incentives is weak, even without considering the added risk of regulatory intervention that could render an investment worthless.

However there are important applications for storage that were not examined in any of the use cases that involve certain low use/high value standby services. For example, the ISO has identified a need for additional capacity in SCE's distribution service territory to deal with unexpected transmission outages. Depending on the length of time required for restoration, storage might be more cost-effective and it would avoid the GHG impacts associated with gas-fired generation, even if the gas-fired generation is only required to run infrequently. Another application is frequency-responsive reserves¹¹, which is described extensively in documents prepared by the North American Electric Reliability Corporation (NERC)¹². Providing frequency response using gas-fired generation would require that fossil-fired plants operate continuously, even though the service they are

¹¹ This is not the same as frequency regulation, which is an existing service and an important source of revenues for storage in the existing use cases.

¹² See <http://www.nerc.com/pa/Stand/Frequency%20Response%20Project%20200712%20Related%20Files%20DL/Forms/AllItems.aspx>

engaged to provide may only be required for a few minutes at a time on two dozen or so occasions over the course of a year.

VIII. Project Developers and Sponsors Should Bear Certain Risks

The Proposal includes some provisions for cost-containment, mainly in the form of allowing LSEs to procure less than the target quantity. These protections are insufficient. For one thing, storage developers and sponsors are only competing against one another rather than against all available options. For another, there are no incentives to operate efficiently. Finally, any cost-effectiveness evaluation is based on projections of market prices and system conditions that may or may not be realized, thereby putting customers at risk for forecasts they had no part in preparing and cannot control.

I recommend instead that project sponsors and developers for storage applications other than distribution deferral be allowed to build any projects they choose, but conditioned on recovering all of their costs from market revenues¹³, including energy purchases and sales, sales of ancillary services, sales of Resource Adequacy capacity, and customer bill savings¹⁴. In other words, storage projects could be developed without restriction but this Commission would not provide any assurance of cost recovery. This is not unreasonable, since the cost-effectiveness analyses performed by EPRI and DNV/KEMA indicate that for many of the use cases, at least incremental amounts of storage are cost-effective over a range of assumptions for market prices and system conditions. Requiring storage projects to recover their costs from the market sidesteps

¹³ In fact, all resources should be required to recover their costs from market revenues, not just storage.

¹⁴ These conditions would apply to all storage projects, including those sponsored and/or developed by LSEs.

objections by LSEs regarding the procurement targets, and from the perspective of project developers and sponsors it severely limits the ability of LSEs to block projects that would otherwise make economic sense. It protects customers from market risk and it disciplines storage project developers and sponsors by requiring them to consider the effects of storage penetration on market prices and system conditions, and to make conservative assumptions about costs and market revenues. My proposal would not necessarily prevent LSEs from entering into long-term contracts with storage project developers or sponsors, however the Commission would have to ensure that the IOUs could not pass on to customers any costs incurred under those long-term contracts in excess of the contract price. If market revenues turned out to be higher than the forecasts used in any cost-effectiveness analysis, project sponsors and developers would be able to retain them instead of earning a cost-based return. If market revenues turned out to be lower than forecast or if the storage projects were operated inefficiently, customers would be largely insulated from the impacts. There would be no need for LSEs or the Commission to create complex performance monitoring protocols¹⁵.

IX. Questions Set Out in the Ruling

Following are responses to the questions set out in Section V of the Ruling:

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

Procurement targets are unnecessary. Developers and sponsors of storage projects should be free to develop any projects they wish since the cost-effectiveness

¹⁵ I am not suggesting that storage should be singled out for differential treatment. These conditions should apply to all resources, including gas-fired generation and demand response.

evaluations suggest benefit/cost ratios greater than 1 for a variety of storage applications under a variety of assumptions.

b) Comment on whether any of the projects proposed to count toward the procurement targets be excluded, or any additional projects included, and on what basis.

The following response assumes procurement targets are adopted. First, behind-the-meter projects should be excluded unless the sponsor or developer can demonstrate before and after deployment that the project will be operated for the benefit the grid and not just for the benefit of the customer that owns it. Customers who do not install storage should not be required to bear the cost of projects that benefit specific customers who do unless the storage project demonstrably benefits all customers taken as a group. Second, the focus should be on projects that can meet the upcoming need for frequency response and other low utilization/high value services such as providing local capacity that can quickly be dispatched to deal with unexpected transmission outages.

c) Comment on how actual operational deployment should be defined for PIER- and EPIC-funded projects potentially eligible to count toward a utility's procurement target.

No comment at this time.

d) Comment on how any utility's procurement that exceeds a target in one year should be addressed and considered for future procurement targets.

No comment at this time.

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.

If procurement targets are adopted, utilities should have complete discretion to determine how much capacity to procure for each of the use-case "buckets". There is no reason to force utilities to procure storage for distribution deferral, for example, if there are no cost-effective distribution deferral projects available. As noted in response to question c) above, behind-the-meter (customer) storage should not be procured under the targets unless it can demonstrable benefit the grid.

f) Comment on the appropriate “off ramps” for relief from procuring up to each target and what metrics should be used to evaluate the appropriateness of the off ramps.

No comment at this time.

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

No comment at this time.

h) Comment on the options presented for ESPs and CCAs to either a) be required to procure an equivalent amount of storage projects commensurate with the load they serve or b) have their customers assessed the costs of the IOU procurement of energy storage projects through a cost allocation mechanism.

No comment at this time.

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

Because both cost-effectiveness models are based on incremental analysis, they provide little useful information about the amount of storage that is cost-effective. Consequently, if procurement targets are established, the preliminary results should not be used to set them. On the other hand, by placing no limitations on the amount of storage that can be developed and by also requiring storage to recover its costs from market revenues, the Commission sidesteps any need to be concerned about cost-effectiveness because this risk is transferred to developers and sponsors, which is where it should be.

j) *Based on the preliminary results, should the utilities set a cost cap for offers to be submitted in the 2014 auction? If yes, what should the cap be and how should the auction be structured to incorporate the cap?*

If procurement targets are set, fixed cost recovery for the first two reverse auctions should be limited to the capital cost values used in the cost-effectiveness evaluations less the estimates for market revenues used in the cost-effectiveness evaluations. Prospective bidders should be told in advance that any bid that seeks cost recovery in excess of the cost estimates used in the evaluations will be rejected.

X. Conclusion

The procurement targets outlined in Commissioner Peterman's proposal are unlikely to achieve their stated purpose. However if storage developers and sponsors have confidence in the cost-effectiveness analyses performed by EPRI and DNV/KEMA,

which appear to show that at least some storage is economically viable based on forecast prices for energy, Resource Adequacy Capacity and Ancillary Services, then they should be allowed to develop any project they choose subject to the limitation that they must recover their costs from market revenues. If the Commission does decide to implement procurement targets, the focus should be on high value/low utilization projects, and customer-side storage should be specifically excluded unless it demonstrably benefits the electric grid. Moreover, bids for storage projects that exceed the cost estimates used in the EPRI and DNV/KEMA cost-effectiveness analysis should be rejected.

Respectfully submitted,

/s/ Jack Ellis

Jack Ellis
PO Box 6600
1425 Alpine Way
Tahoe City, CA 96145
+1 530-581-2134
Email: jack@casaraquel.com

Dated: July 3, 2013