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)

CLEAN COALITION COMMENTS ON INTERIM STAFF REPORT AND ENERGY STORAGE WORKSHOPS

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In accordance with the Administrative Law Judge's ruling of January 18, 2013, the Clean Coalition provides these comments on the Energy Storage interim staff report and the December 4, 2012, and January 14, 2013, workshops.

The Clean Coalition is a California-based group that advocates for vigorous expansion of the Wholesale Distributed Generation (WDG) market segment, which is comprised of renewable energy generation that connects to the distribution grid and serves local load. Since penetrations of WDG above about 20% require local balancing of supply and demand of energy, the Clean Coalition not only drives policy innovation that removes the top barriers to WDG (procurement and interconnection), but also drives policy innovations that will allow private capital to deploy Intelligent Grid (IG) solutions like demand response and energy storage. The Clean Coalition is active in proceedings at the California Public Utilities Commission, the Federal Energy Regulatory Commission, and related federal and state agencies throughout the United States. The Clean Coalition also designs and implements WDG and IG programs for local utilities and governments around the country.

A summary of our comments follows:

- The value of Energy Storage in supporting grid resilience and much greater levels of cost effective local renewable resource capacity is not adequately recognized.
- The Clean Coalition supports energy storage as a key part of the Distributed Generation + Intelligent Grid solution
- We support an energy storage procurement target for distribution-level storage, by the end of 2015 or 2016; a one-year evaluation period to review costs and

benefits of storage; and, if results are positive, a more substantial procurement target by the end of 2020

- We also support the Commission designating energy storage as a preferred resource, but only for technologies and facilities that are found to be GHG positive (net GHG reductions benefits), and continuing to work with the Joint Agencies to update the Energy Action Plan
- The Clean Coalition supports in general the use cases presented but cautions that these use cases should not be considered comprehensive
- We support further development of the cost-effectiveness tools and recommend that an additional workshop be held to further review the available tools for evaluating cost-effectiveness

I. Discussion

a. General comments

i. The Distributed Generation and Intelligent Grid solution to California's energy needs

The Clean Coalition has long championed the transition to distributed energy and a more intelligent grid. We call this effort the DG+IG (Distributed Generation plus Intelligent Grid) solution. Energy storage will play an increasing role in this transition, and this proceeding is very important for ensuring that energy storage meets its potential. Transitioning to an electricity system dominated by renewable distributed generation and a more intelligent grid will, among many other benefits, improve the resilience of our energy supply.

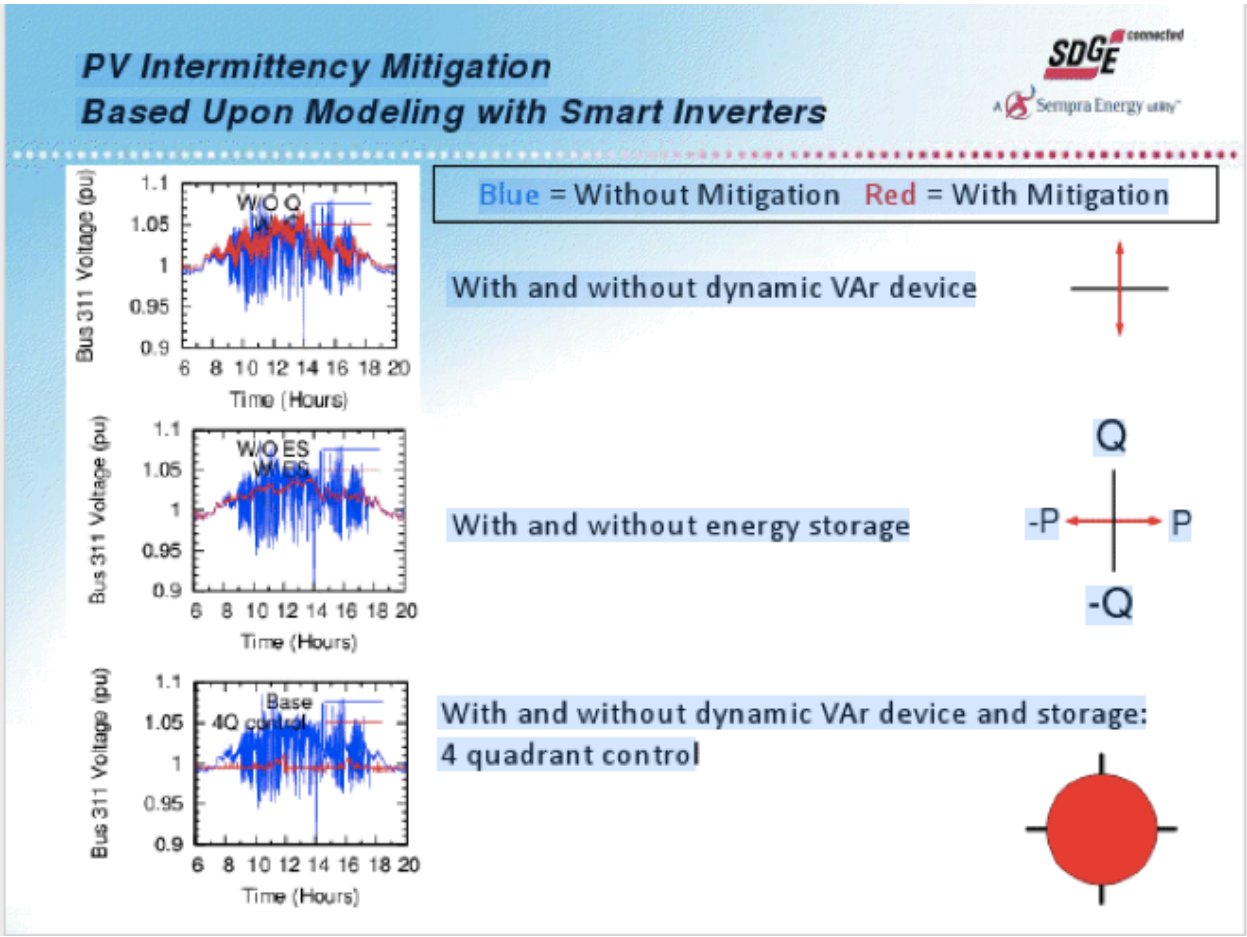
Although increasingly important, the resilience available through DG and IG is currently undervalued and overlooked by utilities and policymakers alike. The resilient electric grid of the future will be based on high penetration levels of DG, balanced and managed by an intelligent grid, capable of maintaining reliability even in the case of transmission-level failures, and with sufficient energy storage to cost-effectively balance

variable renewables. Distributed renewable energy, combined with intelligent grid solutions such as storage, better demand-side management, and advanced inverters, can create a more stable, secure, and robust energy system than we currently have in California. Advanced inverters are one of the most cost-effective ways to integrate high levels of renewable energy, while enhancing grid stability and resilience.[1]

To get to this better future, the ability of DG and IG solutions like energy storage to increase resilience must be acknowledged and the value of a resilient grid must be more effectively monetized. Some benefits of local energy are already recognized, and compensation of those benefits is under discussion in multiple proceedings, including this one. This limited recognition falls far short of energy storage's full value, however, with many of its benefits still disputed or not yet valued at a reasonable level.

Our activities in this proceeding are designed to help create policies to realize the DG+IG future in a timely manner, with energy storage a key part to realizing this future. The value and effectiveness of storage combined with advanced inverters was clearly demonstrated by San Diego Gas & Electric at the Commission's Energy Storage Workshop on January 14, 2013

[1] Distributed generation (DG) has often been regarded as "negative load" to utility companies and system operators, which under current standards have required such generation to produce only real power and no reactive power. However, advanced inverters are inherently capable of providing extremely fast and flexible control of both real and reactive power output. These capabilities can be used to provide reactive power support, voltage support, fault ride-through, ramp rate control, and other useful grid support measures. Indeed, as DG penetrations increase, these support functions will become increasing valuable, allowing for significantly higher penetrations in distribution networks – up to penetration levels twice as high compared to the same network using standard inverters.



This graphic separates the effects of the real power (P) & reactive power (Q) components:

- The 1st example using only advanced inverter reactive power capabilities definitely reduces the range, but cannot always shave off the excessive peaks that exceed the 5% upper limit because a pure reactive load does not move the real voltage down that much.
- The 2nd example from energy storage with the inverter fixed to a power factor of 1.0 (no reactive power) definitely narrows the range since the battery can now add load to that node to help lower the peaks, but there is still quite a bit of variability.

- The 3rd example demonstrates superb voltage control, which also supports application of conservation voltages.

ii. The Clean Coalition supports a Distribution Grid energy storage procurement target by end of 2015/2016 and, subject to review, further targets by end of 2020

The Interim Staff Report ("Report") states (p. 4) that "the major issue for consideration in this proceeding is whether procurement targets for energy storage are appropriate and, if so, how much should be procured." The Clean Coalition has not previously supported state-wide storage procurement targets. We did, however, support the utility-specific 50 MW energy storage carve out in the Track I Proposed Decision in the LTPP (R.12-03-014) in order to provide experience in increased deployment and interconnection of storage technologies. We are now swayed by CESA's "example" goals from their Jan. 13, 2013 presentation in the Commission's workshop in this proceeding. We support consideration of state-wide storage procurement targets on the Distribution Grid by end of 2015/2016, in line with CESA's example (1% by 2015, 5% by 2020) as a starting point for discussion. Energy storage should be targeted at locations that will benefit the most from energy storage (criteria to be developed later in this proceeding), with evaluation of the initial statewide deployment prior to establish appropriate more substantial targets.

Statewide targets will expand the experience gains across a broader range of applications and utilities as initial installations provide guidance. We cannot at this time fully endorse CESA's example targets because it seems very ambitious to seek 600 MW of energy storage by 2015, and is probably ambitious to achieve this even by the end of 2016.

The Report (p. 19) lists a number of challenges to setting storage procurement targets, including the lack of robust data about costs and performance of energy storage

systems. We recognize that data availability is not ideal on these issues but we feel that there is sufficient data at this time to pursue the above tentative goals. Specifically, setting a substantial statewide goal for 2015/2016 will allow significant and meaningful energy storage deployment to take place. This will, in turn, help provide far more data for evaluating this procurement before finalizing a target for future years.

This procedure strikes an appropriate balance between lack of perfect information and recognition of the grid benefits of energy storage for reaching a more resilient, cost-effective and clean grid in a timely manner. Energy storage will become increasingly important for integrating renewable energy as we reach higher levels of renewables penetration. Developing energy storage technologies in the manner we have recommended here will help to ensure that energy storage is available for mass deployment as it becomes necessary.

We also recommend that the Commission track all energy storage facilities that are installed in California, regardless of what, if any, procurement targets are adopted, as a means for ongoing assessment of the costs and benefits of energy storage.

iii. Staff should use "variable" instead of "intermittent"

Renewable energy resources are technically "variable" rather than "intermittent" because they generally ramp up and down fairly smoothly, particularly in the aggregate. In distinction to a large fossil fuel or nuclear power plant going offline unexpectedly, all at once, renewables like wind and solar will ramp smoothly as individual units receive more or less wind or sun. Last, applying the term "intermittent" to renewables unreasonably suggests that only renewable resources suffer from less than full capacity power production. To the contrary, all energy generation technologies suffer from less than full production due to planned and unplanned outages or slowdowns. Because renewable energy resources like wind and

solar have lower capacity factors than most fossil fuel and nuclear technologies does not warrant different treatment. It is a matter of degree for all technologies in terms of how much backup supply is required to ensure a reliable grid – as we're seeing now vividly illustrated by the unplanned and extended outage of the SONGS nuclear facility.

Moreover, solar PV's availability factor has been about 96 percent during the top 100 demand hours in the Southern California region, demonstrating that PV in association with related Intelligent Grid facilities may provide a viable one to one replacement for conventional generation at peak demand.[2] Combined with storage these figures for solar PV are even more positive. For these reasons, we recommend that the Commission substitute "variable" for "intermittent."

b. Responses to workshop questions

Clean Coalition responses to specific questions from the Report follow.

1. *Use Cases*
   - Do the Use Cases provide an adequate representation of the range of valuable applications that energy storage currently provides to the electric grid?
   - Besides the section on cost-benefit analysis, which is still a work-in-progress, is there some critical element missing from the Use Cases?

As active participants in the use case development process, the Clean Coalition supports the collaborative approach in creating a framework to explore potential uses for energy storage. We caution, however, that the use cases are not an exhaustive representation of the range of uses for energy storage in our energy system. Use cases are a necessarily limited tool to frame the Commission's thinking on these issues. We agree entirely with CESA's statements that storage is a multi-purpose tool that may

[2] Prepared Testimony of Bill Powers on behalf of the California Environmental Justice Alliance, CPUC R.12-03-014, March 22, 2012

have applications that have not yet been contemplated, much like the computer when it was first introduced.[3]

For example, while storage installed at the substation and community levels has several immediate applications in deferring distribution upgrades and integrating variable energy sources, it provides additional value by laying the foundation for more resilient local generation and micro-grid based energy systems.

Accordingly, while we fully support the Commission's development of use cases to guide policymaking in this proceeding, we caution against viewing the use cases developed thus far as comprehensive or limiting in making optimal policies.

2. *Preferred Resources*
   - Why should Energy Storage be considered a "preferred resource"?
   - Does the Commission need to work with Joint Agencies to modify the Loading Order or will a Commission policy statement suffice?
   - What are the implications of designating Energy Storage as a "preferred resource" in this Proceeding for other procurement proceedings?

As stated in the Joint Parties' (the Clean Coalition was a joint party) response to Megawatt Farms' Motion to Include Energy Storage in the Loading Order[4], there are several reasons why energy storage should be included in the state Loading Order as a preferred resource:

- Like the other preferred resources, energy efficiency and demand response, energy storage can reduce the need for additional new generation by improving the utilization of existing resources through the capacity and peaking functions identified by the Use Cases.

[3] Janice Lin, with the California Energy Storage Alliance, has previously used this comparison.
[4] Response to Megawatt Storage Farms' Motion on Behalf of the California Environmental Justice Alliance, the Clean Coalition and the Community Environmental Council, R.12-03-014 (October 22, 2012)

- Its deployment also increases market participation for intermittent preferred resources like wind and solar through the VER-sited and distribution level functions described in the Use Cases.
- Consistent with the Commission's own guidance on preferred resources, energy storage can optimize energy consumption and reduce carbon emissions.
- Designating energy storage as a preferred resource will allow the Commission to more readily create comprehensive policies regarding the role that energy storage should play in tomorrow's grid.

Other entities, such as the legislature, which originated AB 2514, and the California Energy Commission,[5] have highlighted the importance of storage as a key building block in California's clean energy future. A policy statement from the Commission recommending that energy storage be considered a preferred resource would be helpful, but the Commission can and should go further at this time by designating energy storage as a preferred resource independent of any changes to the multi-agency Energy Action Plan. We also support revising the Energy Action Plan, but the Commission should lead the way by designating energy storage as a preferred resource in this proceeding.

In addition, the Commission should work to strengthen compliance with the Energy Action Plan, as it has noted the utilities' commitment to procure in line with the loading order is ongoing, even after targets for preferred resources have been met.[6]

[5] http://energy.aol.com/2012/07/03/nuclear-concerns-policy-fuel-california-energy-storage-boom/ Michael Gravely, deputy chief of R&D at the California Energy Commission said he anticipated "fairly substantial amount of increase in services" in energy storage to balance the grid and integrate renewables over the next decade."We expect a floor of a 1,000 MW or 2,000 MW of energy storage by 2020 on the basis that 4,000 to 8,000 MW could be the real number," he said.

[6] D.12-01-033 stated the Commission's commitment to an ongoing loading order approach, under which utilities must first look to preferred resources in all procurement decisions, regardless of state renewable energy or climate mitigation goals.

3. *Cost-Effectiveness Methodologies*

- What models should be pursued for running the cost-effectiveness test?
- Is there a simplified approach to cost-effectiveness that would meet the Commission needs?
- To address Staff's concern that it may not be the best use of resources to run all of the Use Cases through cost-effectiveness models, is there a priority criteria or prioritized list of Use Cases that can be utilized?
- If not, how can we ensure that the analysis gets done for all the Use Cases in a timely manner?

The Clean Coalition appreciates the Commission's goal to create a robust cost-effectiveness tool to evaluate the potential for energy storage to provide grid and ratepayer benefits. Unfortunately, there is currently a chicken and egg problem when it comes to storage: it is difficult to determine its cost-effectiveness due to the small number of deployed projects, and these technologies are not being deployed at a significant rate because there is too little data to support the claimed grid benefits.

The Commission should break this logjam in this proceeding and setting modest procurement targets, as we recommend above, will be a key step in doing so. Developing rigorous cost-effectiveness tools is another key step.

In terms of the appropriate priority of use cases to be run through the cost-effectiveness model, we believe that distribution level installation use cases should be the first priority. These installations are most likely to be utility owned and will need to prove their cost-effectiveness to the Commission in a utility's General Rate Case. The drivers for utility-owned projects and upgrades can be more complicated as there may not be a direct revenue stream as with a peaker or bulk grid storage project, and the benefits that distributed level storage provides are not necessarily valued by outside markets. The Commission 's limited resources should be used to run these use cases first and we recommend that another workshop be held to further familiarize stakeholders with the cost-effectiveness evaluation tools.

4. *Policy Options*
    - Does Staff's priority listing of Policy Options accurately represent the most important issues facing storage in the identified proceedings?
    - Are suggested actions for resolution of barriers the best approach to advancing energy storage deployment?

We have no response at this time to this question.

5. *Related Proceedings*
    - Does the list of issues in related proceedings capture the work being done in the other proceedings described?
    - Is there more that should be done in the identified proceedings to advance energy storage deployment, aside from establishing procurement targets?

The list of barriers and policy options that has been developed through the use case process is comprehensive and accurate. However, aside from the barriers related to cost-effectiveness, the barriers all seem to reside in other proceedings and with other agencies. While the Report does an impressive job of listing the appropriate actions that need to be taken in order to increase the viability of storage, it seems that stakeholders must address each issue separately in each proceeding. We recommend that the Commission detail to what extent there should be collaboration between Energy Division staff on these issues, particularly in the Rule 21, Resource Adequacy and LTPP proceedings and how it can be improved.

c. Additional comments

The Report describes "supply-side" storage as only transmission-interconnected facilities (p. 17), but this term should of course include distribution-level storage facilities that send power into the distribution grid.

II. Conclusion

In conclusion, we believe the Interim Staff Report is a useful step in the right direction and we urge the Commission to set an interim storage procurement target for

distribution-interconnected energy storage, and to designate energy storage as a preferred resource.

Respectfully submitted,

_____/s/_____

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