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)

PACIFIC GAS AND ELECTRIC COMPANY'S (U 39 E) COMMENTS ON ADMINISTRATIVE LAW JUDGE'S RULING ENTERING INITIAL STAFF PROPOSAL INTO RECORD AND SEEKING COMMENTS DATED DECEMBER 14, 2011

ALICE L. REID
CHARLES R. MIDDLEKAUFF

Pacific Gas and Electric Company
P.O. Box 7442
San Francisco, CA 94120-7442
Telephone: (415) 973-2966
Facsimile: (415) 973-5520
E-Mail: ALR4@pge.com

Attorneys for
PACIFIC GAS AND ELECTRIC COMPANY

January 31, 2012

Table of Contents

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)

PACIFIC GAS AND ELECTRIC COMPANY'S (U 39 E) COMMENTS ON ADMINISTRATIVE LAW JUDGE'S RULING ENTERING INITIAL STAFF PROPOSAL INTO RECORD AND SEEKING COMMENTS DATED DECEMBER 14, 2011

In response to the *Administrative Law Judge's Ruling Entering Initial Staff Proposal Into Record And Seeking Comments*, issued on December 14, 2011 in this proceeding ("ALJ Ruling"), Pacific Gas and Electric Company ("PG&E") provides the following comments.

I. INTRODUCTION

PG&E appreciates the opportunity to provide the Administrative Law Judge ("ALJ") and Energy Division Staff ("Staff") comments to aid them in their preliminary assessment of energy storage. PG&E is providing comments on the four categories listed in Section 4.2 of the Staff Proposal attached to the ALJ Ruling. These categories are: (1) Regulatory Framework; (2) Cost Effectiveness; (3) Roadmap; and (4) Procurement Objectives. PG&E understands that the parties' comments in this proceeding will be used to develop several work products, including an updated storage barrier[1] regulatory matrix, a cost-effectiveness methodology proposal, and an

[1] A barrier is defined as "something material that blocks or is intended to block passage." (Merriam-Webster Dictionary) The impediments that were identified by the Commission and other stakeholders are not intentional rules erected to prevent the participation of energy storage. Instead, PG&E believes they are challenges and should be referred to as challenges, rather than barriers. The identified challenges can be overcome through modifying existing frameworks, rules, and operations to accommodate a technology class that has had limited participation. As new technologies are introduced, PG&E believes that challenges must be removed, such that the new technology can participate on a level playing field with other comparable resources.

energy storage adoption roadmap. PG&E supports the development of these work products. However, Staff has also stated that "[t]he outcomes of the analysis outlined above will be used to evaluate a possible procurement target or other policy options to meet the objectives of AB 2514."[2] As explained in more detail below, PG&E strongly opposes the setting of a procurement target for energy storage. In any case, a discussion of a procurement target belongs in the Long Term Procurement Plan ("LTPP") proceeding (Rulemaking 10-05-006) and not in this proceeding.

II. RESPONSES TO QUESTIONS PRESENTED IN SECTION 4.2 OF THE INITIAL STAFF PROPOSAL

A. Regulatory Framework

CPUC Staff wants to ensure that the draft storage barriers regulatory matrix (see Figure 1: Storage Barriers Regulatory Matrix) is complete and that all proceedings relevant to electric energy storage are taken into consideration. If there are other proceedings that have impact on electric energy storage, the parties are requested to identify those and describe how they propose energy storage should be addressed. This should include efforts by other entities, such as CEC, CAISO and FERC.

1. All relevant proceedings have been taken into consideration

PG&E does not believe that the Commission has omitted any proceedings from the Storage Barriers Regulatory Matrix (Figure 1 in the Staff Proposal). With respect to the Storage Barriers Regulatory Matrix, PG&E appreciates Staff's efforts to identify challenges associated with energy storage development and how these challenges might be addressed across several proceedings. However, the overall objective of this matrix is unclear. PG&E is concerned that the matrix outlined in the Staff Proposal implies that each challenge should be addressed in each of the proceedings identified. Addressing each of the identified challenges in each of the listed proceedings is both unnecessary and inefficient. For example, it is unclear what purpose there is

[2] Staff Proposal at p. 17.

in addressing the issue of Resource Adequacy ("RA") accounting within the SGIP/CSI proceeding, especially given the fact that the Commission has a separate, ongoing RA proceeding. The Staff should clarify the intended purpose of the matrix and its use in this proceeding. Without such clarity, PG&E is unable to provide substantive comments or recommendations on the applicability of the information that is presented.

2. Greater clarification is needed to address the "Lack of cost transparency and price signals" challenge identified in the proposal.

The Commission identified lack of transparency and price signals with the California Independent System Operator ("CAISO") energy and ancillary services markets, utility procurement planning and contract evaluation, and retail rate design act as 'barriers' or challenges to energy storage. PG&E does not agree with the grouping of these items and does not agree that they are challenges.

With regards to CAISO energy and ancillary services markets, these are existing markets with prices determined based on supply and demand forces. These markets are transparent and simply reflect the current value of energy and ancillary services in California. The CAISO markets are not a barrier to entry, but instead simply reflect the value of resources. The CAISO's markets will continue to evolve to reflect the needs of the system, such as renewable integration. As the markets evolve, PG&E believes that new and existing products should give an opportunity for electric storage and other flexible resources to contribute to efficient market operation.

With regards to utility procurement planning, the process is transparent through existing modeling work at the CAISO and stakeholder processes in the CPUC's LTPP proceeding. Similarly, the utilities' respective contract evaluation processes are based on clear criteria that are typically presented to a utility's Procurement Review Group ("PRG") and the Commission both before a competitive procurement process and in an application for approval of a specific

transaction. While specific evaluation criteria is necessarily confidential, given the potential for gaming if this criteria was made public, the Commission and non-market participants are fully aware of the evaluation criteria and market participants are able to review high-level, public descriptions of the contract evaluation criteria.

With respect to retail rates, while the current retail rates may not be ideal for energy storage, their design reflects a balancing of various objectives within regulatory and legislative constraints, and any shifts that would be favorable to energy storage may be unfavorable from other perspectives. In short, the CAISO markets, procurement planning process, contract evaluation process, and retail rates are sufficiently transparent and do not create any unique challenges to energy storage.

PG&E believes that the key issue is having transparency for the cost of integrating intermittent resources and cost causation allocation for those integration costs. As stated in PG&E's previous comments,[3] currently ancillary service costs are primarily allocated to load-serving entities ("LSEs"). This practice results in price signals that may not be reflective of the value of firming and shaping resources. Resources such as energy storage can provide this service. A clear definition, transparency, and cost-causation allocation of integration costs can help energy storage monetize this benefit.

B. Cost Effectiveness

CPUC Staff would like to leverage the 'end use' framework outlined in Section 3 of this proposal to assess cost effectiveness methods for energy storage. The parties are requested to suggest how the Commission can use this framework to determine the cost effectiveness of a project and what additional information is needed to do that. Parties are also invited to provide general comments regarding the relative usefulness of the four primary Standard Practice Manual alternatives utilized by the Commission to evaluate cost effectiveness, namely: 1) Participant Test; 2) Ratepayer Impact Measurement Test; 3) Total Resource Cost

[3] *Comments of Pacific Gas and Electric Company on Presentations made at the June 28, 2011 workshop on the Energy Storage OIR* filed on August 28, 2011, p. 7 in R.10-12-007.

Test including the Societal Cost Test); 4) Program Administrator Cost Test.

PG&E supports the proposed next steps in the Staff Proposal to address the lack of cost-effectiveness evaluation methods for energy storage.[4] In particular, PG&E supports the Commission seeking "general consistency" with the previous decisions in which the Commission has utilized cost-benefit tests, including energy efficiency, distributed generation and demand response.

Below, PG&E provides general comments in support of the relative usefulness of the four primary Standard Practice Manual[5] ("SPM") tests used by the Commission to evaluate cost effectiveness: (a) Participant ("PCT") Test; (b) Ratepayer Impact Measure ("RIM") Test; (c) Total Resource Cost ("TRC") Test (including the Societal Cost Test); and (d) Program Administrator Cost ("PAC") Test.

In addition, PG&E suggests how the Commission could leverage the 'end use' framework outlined in Section 3 of the Staff Proposal to assess cost effectiveness methods for energy storage and what additional information is needed to do that. Of particular concern is the fact that evaluating the benefits and costs of energy storage—as well as other flexible resources—require simultaneous consideration of multiple end uses, which are often overlapping and sometimes mutually exclusive.

1. Relative usefulness of the SPM tests to evaluate energy storage cost effectiveness

The California SPM tests are useful in evaluating the cost effectiveness of energy storage. However, it is important to note that the four SPM tests are not intended to be used individually. Each test measures cost effectiveness from a different perspective, *i.e.*, the utility's, the program

[4] Staff Proposal, Section 2.5.2, p.7

[5] http://www.energy.ca.gov/greenbuilding/documents/background/07-J_CPUC_STANDARD_PRACTICE_MANUAL.PDF

participant's, the non-participant ratepayers' and society at large. The SPM tests are to be compared to each other so the tradeoffs between the tests can be considered, in particular, income transfers between program participants and non-participant ratepayers.

SPM tests compare costs and benefits over the lifecycle of those impacts to generate results using two standard financial analysis techniques, that is, net present value ("NPV") and benefit-cost ratio ("B/C Ratio"). These are defined as follows:

- Net Present Value: the present value of future benefits, minus the present value of future costs; and
- Benefit-Cost Ratio: the present value of future benefits, divided by the present value of future costs.

The SPM specifies which costs and which benefits are to be included in each of the four different tests and there is general consensus around the SPM's assignment of costs and benefits to each of the four tests. Table 1 is a summary of how the SPM assigns costs and benefits to each test.

Table 1
Costs and Benefits Assigned to each SPM Test

	TRC	PAC	RIM	Participant
Administrative costs	COST	COST	COST	
Avoided costs of supplying electricity	BENEFIT	BENEFIT	BENEFIT	
Bill Increases				COST
Bill Reductions				BENEFIT
Capital costs to LSE	COST	COST	COST	
Capital costs to participant	COST			COST
Incentives paid		COST	COST	BENEFIT
Increased supply costs	COST	COST	COST	

Revenue gain from increased sales			BENEFIT	
Revenue loss from reduced sales			COST	
Tax Credits	BENEFIT			BENEFIT

The Commission has been relatively consistent in limiting what should or should not be included in each category of cost and benefit for any given proceeding. For example, the benefit category of "Avoided costs of supplying electricity" as used by the Commission has included some or all of the following items where applicable: (a) avoided capacity costs; (b) avoided energy costs; (c) avoided ancillary services costs; (d) avoided over-market renewable procurement costs; (e) avoided cost of deferred transmission and distribution investments when demonstrated; (f) avoided greenhouse gas compliance costs; and, (g) avoided average line losses. When such costs are actually avoided, it is absolutely appropriate to include them in the SPM test calculation.

However, intervenors have made numerous proposals to change the Commission's inputs to the SPM tests and definition of avoided costs that would work to their advantage, *e.g.*, increasing the amount of alleged avoided cost benefits used in the SPM tests. Intervenors have suggested that the Commission to deem that some costs of supplying energy will be avoided in the absence of any evidence such costs will actually be avoided. Such deemed—but not demonstrated—avoided costs promoted by intervenors include avoided transmission and distribution investments, resource adequacy procurement costs, and "environmental" costs such as avoided water use, avoided criteria pollutant emissions, avoided volatile organic compounds, and "health benefits."[6]

[6] For example, "Joint Motion of The Center for Energy Efficiency and Renewable Technologies; AG Power Group, LLC; Sustainable Conservation; Agricultural Energy Consumers Association; Green Power Institute; California Wastewater Climate Change Group; California Farm Bureau Federation; Fuel Cell Energy; and Flexenergy, Inc., for a Ruling Directing The Consideration of an Administratively Determined Avoided Cost Pricing Methodology for The Renewable FIT at a January 2012 Workshop

In its application of the SPM tests and avoided cost methodology to evaluating the cost effectiveness of energy storage, PG&E encourages the Commission to be consistent with its own precedents by including in the SPM test calculation only demonstrated benefits and not deemed benefits. Following such precedent will minimize subsidies to non-cost effective energy storage technologies and prevent an income transfer to energy storage program participants from non-participating ratepayers.

2. Leveraging the 'end use' framework to assess cost effectiveness methods

PG&E believes the 'end use' framework identified in the Staff Proposal will aid in the identification of appropriate costs and benefits for evaluating the cost effectiveness of energy storage. However, the 'end use' framework does add some complexity to the analysis.

First, a given energy storage project might be able to satisfy several 'end uses.' However, the total benefit of such a project is not a sum of the benefits for each 'end use.' In many cases, allocating some portion of an energy storage project to one 'end use' limits the ability of that portion of the energy storage project to satisfy any other 'end use.' Double-counting of energy storage benefits should be avoided.

Second, the benefits of an energy storage project are dependent on many factors, including but not limited to: (a) the project's location, (b) its amount of megawatts, megawatt hours, and ramping capability (c) the conditions at any given time on the electrical circuit to which it the project is interconnected, and (d) day-to-day operational decisions[7]. Each of these factors need to be taken into account when identifying benefits for a given energy storage project. For example, the transmission and distribution 'end use' is applicable for an energy

---

That Would Be Part of The Record for The Decision on The Renewable FIT" filed December 19, 2011 in R.11-05-005.

[7] Day-to-day operational decisions are decisions that determine the timing of charge, discharge, and services to be provided by a project.

storage project only for the transmission and/or distribution circuit to which it provides a benefit, if any.

Thus, evaluating the benefits and costs of energy storage is non-trivial and the results can be applied generally only by making heroic assumptions. In an ideal world, energy storage benefits and costs should be calculated on a case-by-case basis for a given project. For example, electric storage evaluations may require production simulation and optimization of multiple end uses to determine the overall benefits and costs for each individual energy storage project. In that way the constraints for the intended operating use of an energy storage project can be considered. Even then, a result using this method still would represent only the upper limit of benefits of an energy storage project because such modeling would be assuming perfect foresight.

C. Roadmap

The parties are requested to provide potential goals or milestones in adoption of energy storage to be incorporated into the energy storage roadmap. The goals or milestones should be focused on the near term (1-3 years), medium term (3-5 years) and long term (5 years and beyond). The proposed goals or milestones should be based on reality of current state energy storage adoption and technology maturity. For each one of the proposed goals or milestones the party should identify key enablers that are needed in order to make this goal or milestone achievable. An example can be ability for stand-alone energy storage solutions to get RA value by 2015, with a corresponding key enabler being adjustment to RA value calculation rules. CPUC Staff envisions the Roadmap will be reflective of priorities of energy storage uses and corresponding issues. A priority is to be reflective of system needs and technology maturity, among other considerations, and CPUC Staff encourages the parties to submit proposed priorities as part of their comments. An example of a priority is to increase the amount of distributed energy storage that functions to meet peak demand.

1. Define the endpoint of the roadmap

Staff has requested that the stakeholders provide potential milestones for an energy storage roadmap, although the intended endpoint of the roadmap has not been clearly defined by Staff. PG&E requests that the Commission clearly define the overall endpoint of the roadmap so

that stakeholders can then suggest the achievable milestones and goals necessary to reach the endpoint.

2. PG&E believes that the endpoint of the roadmap should be an environment where energy storage competes on a level playing field

PG&E believes that the endpoint for the roadmap should be the creation of an environment where energy storage technologies can compete on a level playing field with other technology alternatives without technology carve-outs and preferential treatment. Having such a technology neutral environment allows procurement and electric system decisions that balance cost, reliability, and environmental impacts.

3. Near-term and medium-term milestones should focus on removing the identified barriers

Staff has identified nine challenges to the development of energy storage. PG&E believes that the near-term and medium-term goals and milestones should only focus on the overcoming the challenges to the development of energy storage. In the near-term, PG&E believes that the following challenges are highest priority.

a. Clarify the Resource Adequacy counting rules for energy storage

The Scoping Memo for the RA proceeding states that the Commission will investigate two of the challenges identified by the Commission in the proposal.[8] Phase 1 of the RA proceeding will investigate a multi-year RA program to help integration of 33% RPS. This addresses the identified challenge of "lack of cost recovery policy" by enabling longer-term contracts for resource adequacy. Phase 2 of the RA proceeding will consider the counting rules for resources that provide flexible grid attributes, such as energy storage. The timeline for completion of Phase 1 is June 2012 and Phase 2 is June 2013.

[8] *See* Scoping Memo in R. 11-10-023.

b. Determine system need through LTPP and Renewable Integration modeling

For several years, the Commission has been considering the issue of system need in the 2010 LTPP proceeding. Under a proposed settlement agreement in Track I of that proceeding, consideration of system need and related modeling will continue through 2012. System needs, including the need for energy storage, should be addressed in the broader context of the LTPP proceeding, rather than being narrowly addressed in this proceeding. The Energy Storage OIR should not duplicate the purpose of the LTPP.

c. Provide transparency and cost-causation allocation for integration costs

As mentioned by several stakeholders in previous comments, transparency for cost of integration and allocation of those costs can aide in quantifying one of the benefits that energy storage can provide. The CAISO has expressed its intention to start a stakeholder process in 2012 to address this issue for all CAISO products.[9] Staff can aid by participating in the CAISO stakeholder process and advocating for transparency and cost-causation cost allocation.

d. Integrate energy storage into CAISO systems to participate in current and future market products

For energy storage to provide system benefits and earn revenues, it must be integrated into the CAISO markets and products. The CAISO has several initiatives that help the integration of energy storage into the current and future markets.

The first, pay-for-performance, is based on a Federal Energy Regulatory Commission ("FERC") ruling[10] that requires a two part payment for regulation that includes a payment for the capacity offered for regulation, as in the current market, and a new component that has a

---

[9] "Flexible Ramping Products Second Revised Straw Proposal" CAISO, Jan 5, 2012

[10] *See* FERC Order No. 755.

payment for performance of a resource in response to the provided regulation signal. The ruling mandates that the CAISO must implement the new rule by October 2012.[11] The rule will benefit faster responding resources, such as energy storage, with a higher compensation for responding to the CAISO's regulation signals.

The CAISO has also outlined a larger initiative designed to address the participation of non-generator resources ("NGR") – resources that operate as either generation or load, that can be dispatched seamlessly within their entire capacity range, inclusive of generation and load, and are constrained by an energy limit to generate or consume energy on a continuous basis. NGR includes all limited energy storage resources ("LESR"), such as flywheels, batteries, and other energy storage devices, as well as dispatchable demand response ("DDR"). By modeling the generation range from negative to positive, the CAISO's NGR model will provide these resources the same opportunity as generators to participate in the energy and ancillary service markets, something they were not afforded prior. As part of this NGR initiative, the CAISO has also created a new product called Regulation Energy Management ("REM"). NGR resources that elect REM treatment may only provide regulation service to the market and are known as NGR-REM. The NGR-REM awards a regulation capacity in the day-ahead market equal to four times the regulation energy that an LESR or DDR can provide within 15 minutes, while subjecting the participating NGR resources to certain constraints.[12] In addition to these initiatives, the CAISO has also lowered the requirements for spin and non-spin from two hours to thirty minutes.[13]

---

[11] "Pay for Performance Regulation Revised Proposal" from CAISO on Jan 4, 2012. http://www.caiso.com/Documents/Pay%20for%20performance%20regulation%20-%20papers%20and%20proposals/PayPerformanceRegulationRevisedStrawProposal.pdf

[12] Business Requirements Specification – Regulation Energy Management (REM) – Non Generator Resource (NGR) from CAISO on October 19, 2011 at p. 6.

[13] "CPUC Storage Proceeding" from CAISO on June 28th, 2011.

e. Define cost-effectiveness methodology for energy storage to enable valuation of projects

The Commission has already indicated that it plans to investigate this issue in Phase 2 of this proceeding.

4. Procurement targets do not belong in the roadmap

The Commission has appropriately focused on the challenges that impede energy storage from participating and identified next steps for each of the challenges. PG&E does not believe that procurement targets will alleviate these challenges and the focus of this proceeding should remain on creating an environment that allows energy storage to compete on a level playing field with other resources. There are considerable efforts already being undertaken in California to address these challenges and the completion of these efforts are significant milestones for this proceeding.

D. Procurement Objectives

The parties are requested to submit proposed criteria for evaluating procurement targets. CPUC Staff will leverage these criteria to ensure that the analysis is comprehensive and that procurement requirements are effective.

PG&E does not support the concept of having targets or mandates for energy storage. Future decisions relating to procurement must consider the following criteria:

- Reliability: the incremental impact on improving system reliability;
- Customer cost: the impact to customer cost for that resource versus another resource that provides similar benefits;
- Fairness among all customers: customers not participating in the programs should not subsidize the cost of it; and
- Inclusion of Load Serving Entities ("LSEs"): All LSE must be subject to the adopted rules, not just the IOUs. The direct access and municipal utilities must be subject to the same regulations.

PG&E does not support a procurement target or the addition of energy storage to the

---

http://www.cpuc.ca.gov/NR/rdonlyres/09262274-EC45-4746-B7C1-18FFB4D7B1E5/0/CAISO.pdf, pg 5-

loading order.

III. CONCLUSION

PG&E appreciates the opportunity to provide these comments to the Commission.

Respectfully submitted,

ALICE L. REID
CHARLES R. MIDDLEKAUFF

By: /s/
ALICE L. REID

Pacific Gas and Electric Company
P. O. Box 7442
San Francisco, CA 94120-7442
Telephone: (415) 973-2966
Facsimile: (415) 973-5520
E-mail: ALR4@pge.com

Attorneys for
PACIFIC GAS AND ELECTRIC COMPANY

Dated: January 31, 2012