Commissioner Carla Peterman, California Public Utilities Commission
Energy Storage North America Expo Keynote Address
September 11, 2013

Good morning. It is my pleasure to be here with you today for the first annual Energy Storage North America conference.

As California's landmark storage legislation AB2514, authored by Assemblymember Skinner, notes, energy storage has the potential to transform how the California electric system is conceived, designed, and operated. It is the people in this room today that will be on the front lines for making that transformation happen.

I began my appointment to the California Public Utilities Commission in January of this year and was delighted to be assigned the Commission's storage proceeding. As a Commissioner at the California Energy Commission, I followed and participated in this state's discussions on storage, including multiple Integrated Energy Policy Report workshops, and am proud of the progress we have made with storage research and demonstration through the state's public interest energy research program, PIER.

In July of 2011, I participated in a storage week panel in Southern California and I noted in my remarks that due to potential storage need in the upcoming decade and storage's multi-year procurement cycle, the state needed to decide within the next few years how much storage to plan for.

Now, in 2013, buoyed by legislation and tremendous stakeholder efforts, that time has come.

This morning, I'd like to spend some time discussing the state's need for and in particular the CPUC's role, in promoting storage. I look forward to hearing from you

today how the state can most effectively position storage to support our state's reliability and clean energy goals.

Let me say at the onset, the views expressed today are my own and do not necessarily reflect the views of my fellow commissioners. Now that there is a proposed decision, they will have the opportunity to consider and decide themselves how the CPUC and investor owned utilities further engage on energy storage.

The Need

California energy policy frames a vision for our electricity future that includes an aggressive transition from fossil generation to renewable sources, highly efficient homes and businesses, a flexible and robust distribution and transmission infrastructure, and electrification of portions of the transportation system. Policies such as the state's 33% Renewable Portfolio Standard, zero net energy goals, and the Governor's Zero Emission Vehicle Plan are positioning the state to attain this future. Imbedded in this vision is the expectation that California will achieve these policy goals while promoting greater efficiency, reliability, lower costs, and increased safety.

These mandates have created new realities within our aging electric system. Variable and distributed generation provide many benefits to the state, but also present new circumstances for our traditional energy integration and reliability tools to respond to.

As renewables scale, we risk wasting some of these valuable resources if we don't have the opportunity to capture and store their excess energy and deploy it at higher value times. We need to consider revising existing tools, and investing in new technologies to meet these challenges.

Integration across a mix of generation resources is not a new problem, but the scale and diversity of resources is increasing. Coupled with growing distribution system loads, it is becoming increasingly challenging to make sure we have the right type of

generation and system resources where and when we need them, especially since we have limited means, to date, for storing electricity.

Going forward, the system may no longer be able to rely on excess capacity and rules designed before. The state and the CPUC are exploring in a number of forums and proceedings how resources such as natural gas, demand response, and storage can help us meet these system needs.

I do not think any one of these alone will be sufficient, especially if we are serious about meeting our greenhouse gas reduction goals, and thus we will need to invest in a host of possible solutions. Today, I will discuss my proposed decision for how we can further our investment in energy storage so it too can be a viable option for California.

AB 2514

As the assigned Commissioner to the storage proceeding, my charge is to implement the mandate of AB 2514. Specifically, the CPUC must: "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 31, 2020." Thus, the task laid out for the CPUC is to structure market opportunities so that energy storage meeting those attributes can respond and become a key operational component of our energy system.

In December 2010, the CPUC, under the direction of the Assigned Commissioner President Peevey, opened a rulemaking to implement the provisions of AB 2514. Since then, the CPUC staff and stakeholders have undertaken significant analysis and developed a proposal which included an analytical framework and a plan for developing policies and guidelines pertaining to energy storage.

This included defining an energy storage “end use” framework, which identified 20 types of storage depending on their application and use in the “value chain”, four basic “scenarios” for further analysis (generator-sited storage, bulk “generation,” distributed storage and demand side management), and cost-effectiveness analysis.

This year, CPUC staff oversaw two cost-effectiveness studies developed by the Electric Power Research Institute (EPRI) and DNV KEMA Energy & Sustainability which demonstrated the types of costs and benefits that need to be considered when assessing the cost-effectiveness of storage. EPRI and DNV KEMA completed their studies earlier this summer.

The initial study results are promising and indicate energy storage is cost effective for a subset of applications for a range of benefits versus range of costs. The basis for these preliminary findings are market revenue potential versus storage cost, avoided transmission and distribution investment versus storage cost, and customer bill savings versus storage cost.

We expect that these studies will not be the last word on storage cost-effectiveness and that cost-effectiveness methodologies will continue to evolve. However, these studies do provide a starting point for assessing the costs and benefits of energy storage and a basis for our action moving forward.

Assigned Commissioner Ruling on Storage Targets

On June 10th, 2013 I issued a ruling which proposed procurement targets and a framework for viable energy storage pursuant to AB 2514.

The proposal recommended that 1,325 MW of energy storage be procured in the investor-owned utility territories of PG&E, Southern California Edison and San Diego Gas & Electric through 2020.

The intent of the proposal was to solicit stakeholder input that would inform a decision on the procurement of storage.

We received comments from approximately 40 different parties of the nearly 80 represented in the case, including: members of the storage industry, the utilities, community choice aggregators and other electric service providers, and ratepayer advocates.

Parties raised questions and provided suggestions on a number of the proposal elements including: total number of MWs to be procured, timing of procurement, procurement vehicle, storage technologies to be included, and ownership models. The overwhelming majority of parties were supportive of storage, but differed in their views regarding whether targets are appropriate now and how much the state should invest.

We've considered all the comments carefully, and last week I issued a proposed decision which adopts a procurement plan for energy storage. I think the proposed decision strikes a reasonable balance between positioning California to receive the benefits of storage, and the costs and uncertainties associated with procuring an emerging technology.

Energy Storage Proposed Decision

Consistent with AB 2514, my proposed decision lays out an energy storage procurement policy that is guided by the following three principles:

1. The optimization of the grid, including peak reduction, contribution to reliability needs, or deferment of transmission and distribution upgrade investments;
2. The integration of renewable energy; and
3. The reduction of greenhouse gas emissions to 80 percent below 1990 levels by 2050, per California's goals.

As proposed, the decision directs the utilities to procure 1,325 MW of energy storage by 2020. The storage would be procured in four solicitations beginning in the end of 2014 and every two years thereafter through 2020. The decision sets specific targets for transmission-, distribution-, and customer-side connected storage in each solicitation.

We agreed with comments from a number of parties that said the reverse auction or RAM process may not be the best way to procure energy storage because of the diversity of technologies involved. The decision instead orders the utilities to procure storage through a request for offers or RFO process. This process enables the utilities to tailor a "targeted" RFO to reflect their specific resource needs and the specific characteristics that each type of storage technology can deliver.

The decision directs the utilities to file an application containing an energy storage solicitation proposal. I appreciate the interest storage providers and environmental and consumer stakeholders have in being able to respond upfront to the utilities solicitation design. As designed, parties will have the opportunity to comment on the solicitation proposal. Following CPUC review and approval of the solicitation application, the utilities will then hold a competitive solicitation by issuing the RFO for energy storage resources.

When presenting its solicitation results to the Commission, the utilities must also include a cost-effectiveness analysis for all bids received that will be used in conjunction with the current two cost-effectiveness methodologies available, with which all parties are familiar.

The decision allows for flexibility within the procurement targets. The utilities may shift up to 80 percent of MW between Transmission and Distribution grid domains. And, the utilities may defer up to 80 percent of MW within a given solicitation to later solicitations.

However, I want to see all reasonable storage procured, and each utility must prove that a deferment is warranted through an affirmative showing of unreasonableness of cost or the lack of operationally viable bids in the solicitation. In order to defer the procurement, the Commission would have to agree that the utility's proposal is reasonable in light of the solicitation results.

We appreciate that many of you are already developing energy storage in other proceedings and want to reward that. Energy storage procured through other proceedings or mechanisms - such as the Renewables Portfolio Standard proceeding and the Long Term Procurement Plan proceeding – will count towards the procurement targets and we will continue to coordinate with these efforts.

The proposed decision deems eligible a host of energy storage technologies, but does limit pumped storage to smaller projects, less than 50 MWs. We are sympathetic to parties' arguments that pumped storage complies with storage definitions under AB 2514. However, the sheer size of pumped storage projects would dwarf other smaller, emerging technologies; and as such, would inhibit the fulfillment of market transformation goals. Therefore, we find it is appropriate to exclude large-scale pumped storage projects from the targets.

However, our purpose in making this exclusion is not to discourage pumped storage projects. On the contrary, these types of projects offer the same or better potential benefits as all of the emerging storage technologies targeted by this program; it is simply their scale that is inappropriate for inclusion in this particular framework we have outlined at this time.

I strongly encourage the utilities to explore opportunities to partner with developers to install large pumped storage projects where they make sense within the other general procurement efforts underway.

The decision also directs community choice aggregators and other electric service providers to procure 1 percent of their annual peak load by 2020. Doing so allows CCAs and ESPs to participate in our storage efforts, but acknowledges their limited customer segments and their lack of responsibility for distribution system management.

As excited as we are about the potential for storage, this is a relatively new area we are asking utilities and the public to invest in and as such we have to be flexible and open to program changes as more experience is gained.

The decision directs the utilities to collect funds for the evaluation of the storage procurement program. In 2016 and every three years thereafter, CPUC staff will conduct a comprehensive evaluation of the program. Findings from the evaluations will inform any needed adjustments to the program to help ensure we meet our policy goals.

Next steps

As I noted earlier, our work on storage is not happening in isolation and it is important for it to be coordinated with, and responsive to, developments in other areas. For example, other Commission proceedings are continuing to address the need for flexible resources and distribution system upgrades.

I'm supportive of our efforts to further define the state's flexibility needs and making sure the procurement framework for these needs is inclusive of the beneficial attributes storage can provide.

The Commission and the state are also considering how transportation technologies such as electric vehicles can provide energy storage. The state's ZEV Action Plan recognizes the storage potential for vehicle batteries after they are no long considered useful for transportation. Developing a method to use these batteries as grid storage after they are removed from the vehicle would 'unlock' this future value to vehicle owners, increasing the total value of electric vehicle ownership. The ZEV Action Plan

directed the Commission to explore utility actions that could enable vehicle battery second-life use. The fact that vehicles, unlike stationary storage, can move off the grid and primarily use their storage functionality for transportation purposes adds complexity to quantifying their grid value. Additional pilot studies may be necessary to fully understand the scope and benefits of vehicle grid integration projects. As the assigned commissioner for the Commission's alternative vehicle proceeding I will continue to be engaged in these efforts.

How successful the proposed targets for storage will be depends largely on the quality and viability of projects you all in this room will bring forward. So, please bring us the best you have and continue to work with us to make sure we are creating the appropriate framework for you to offer these projects up for consideration.

Some media coverage on the proposed decision notes that if we reach the target of 1.325 GWs of storage then we will have increased the worldwide amount of non-pumped hydro by nearly 50%. If we do reach our targets, then I hope and expect this percentage to be much lower because it assumes that other states and countries will not be building any more storage during that time.

Indeed, even prior to this proposed decision we have seen the adoption of energy storage technologies by our investor-owned utilities, some of California's municipal owned utilities, who have deadline of next year to respond to AB2514, other U.S. utilities, federal support of storage project through DOE, and investment internationally, especially in Asia in these technologies.

Through this proposed decision, California is adding to the collective pursuit of energy storage and no doubt many will be watching to see how we do. The international presence here today is a testament to that. I believe that if we demonstrate value and success over the next few years, others will follow and we will see storage development worldwide increase.

It is through this scaling of storage and on the ground experience that we can begin to chip away at market barriers limiting storage and start to truly see what value this resource can provide to the state.

Thank you again to all of you for your engagement to date and going forward. If adopted, this proposed decision is merely one of the first steps in our journey towards creating a sustainable and valuable energy storage market, but it is a step that I am honored to be taking with you.