Docket No.: R.13-12-010

Exhibit No.:

Date: December 18, 2014

Witness: Janice Lin

REPLY TESTIMONY OF JANICE LIN
ON BEHALF OF THE CALIFORNIA ENERGY STORAGE ALLIANCE
CONCERNING LONG TERM PROCUREMENT
PLANNING, PHASE 1A

Q: Please state your name and business address.

A: My name is Janice Lin. I am Executive Director of the California Energy Storage Alliance ("CESA"). I am also Managing Director of Strategen Consulting, LLC. My business address is David Brower Center, 2150 Allston Way, Suite 210, Berkeley, CA 94704

Q: Please summarize your professional and educational background.

In my capacity as Managing Director of Strategen Consulting, LLC, and Co-Founder and Executive Director of CESA, I am actively involved in helping clients market distributed grid connected energy systems to a wide range of potential customers. I provide strategic and technical support to CESA member companies and end users of energy storage to deploy new energy storage projects, and accomplish their business objectives. Prior to founding Strategen and CESA, I served as Vice President of Business Development and Vice President of Product Strategy at PowerLight Corporation, a leading designer and installer of large-scale grid-connected solar electric systems and energy efficiency services (now SunPower Systems). I hold an MBA from the Stanford Graduate School of Business, a BS from the Wharton School of Business and a BA in International Relations form the University of Pennsylvania's College of Arts and Sciences.

Q.: Have you ever testified before this Commission?

A: Yes.

Q: On whose behalf are you testifying?

A: I am testifying on behalf of CESA. CESA is a broad-based advocacy coalition that is committed to advancing the role of energy storage to promote the growth of renewable energy and a more efficient, affordable, clean, and reliable electric power system.

CESA's members are a diverse mix of energy storage technology manufacturers, renewable energy component manufacturers, and developers and systems integrators. CESA is a technology-neutral and business model-neutral association of members who share a common mission, the promotion of energy storage solutions to the energy infrastructure, and is supported solely by the contributions and coordinated activities of its members.[1]

Q. What is the purpose of your testimony?

A: The purpose of my testimony is to explain why additional modeling is needed to determine California's true future system reliability needs.

1. System reliability should not be looked at in isolation from California's policy goals

It is becoming increasingly clear that the legacy approach to Long-term Procurement Planning ("LTPP") through 10 year cycles - which allowed California investor owned utilities ("IOUs") to recover from the energy crisis in 2002 - is no longer suited to meet the true long term energy policy goals of our State. The current approach advocated for by some parties of "kicking the can down the road" and assuming that "2016 LTPP will provide sufficient time to procure, permit, and construct new resources for 2024,"[2] will create a series of negative side effects and could certainly compromise the ability to meet the targets established in the Global Warming Solutions Act of 2006 and other California greenhouse gas ("GHG") emission reduction-oriented laws and policies.

At this critical crossroads for California, when "the electrical system is undergoing and planning for unprecedented changes, including the introduction of unprecedented levels

[1] *See*, "About Us – Overview." *California Energy Storage Alliance,* http://www.storagealliance.org/about.html.

[2] *See, e.g.,* System and Flexibility Analysis Results for the 2014 LTPP Phase 1a, Southern California Edison, Slide 3

of intermittent renewable energy,"[3] it seems myopic to take shortcuts when it comes to understanding the true needs of a carbon free electric power system. It seems equally dangerous to consider reliability needs in isolation from California's policy goals.

2. Modeling efforts should project beyond 10 years and include solutions to reach the State's Policy Goals

The Commission should take an approach in this proceeding that focuses efforts to expressly incorporate California's environmental policy goals. At a minimum, this means:

- Evaluating GHG emission impacts of various reliability procurement options and providing guidance to IOUs on the GHG implications of power procurement options.
- Examining long term evolution of the energy resource mix, beyond 10 years into the future.

CESA is currently involved in efforts similar to the approach that was modeled by NREL for the recent "California 2030 Low Carbon Grid Study."[4] That modeling will give the Commission better information to begin to determine the most appropriate solutions to meet the California Air Resources Board's 2030 goals, on its trajectory to 2050 goals, requiring carbon-free primary energy that amounts to approximately 55% renewable energy penetration.

[3] "A Review of Current Issues with Long Term Resource Adequacy." Prepared by the Commission's Energy Division & Policy and Planning Division, February 20, 2013, p. 5.

[4] *See*, http://www.lowcarbongrid2030.org.

3. The results of LTPP modeling to date are inconclusive and there are many solutions to overgeneration and capacity shortfall that need to be modeled in the LTPP Process.

Overgeneration and capacity shortfall have been concerning issues in the modeling completed to date in this proceeding. Numerous solutions to overgeneration exist, as highlighted by Southern California Edison ("SCE"): exports, price incentives, non-traditional demand response, curtailment, directed EV charging, energy storage, etc.[5] We must model solutions to generation, and make sure that modeling includes an evaluation of the grid heat rate with different options.

CESA disagrees with SCE that we should wait until 2016 to conduct this modeling and any consideration of potential need for new procurement. Given the discrepancy between the California Independent System Operator's ("CAISO's") stochastic modeling results, it appears that significant capacity additions may very well be required by 2024. As the Commission evaluates those potential capacity additions, we should be modeling overgeneration options that may improve the benefit of the renewables we are installing through the Renewables Portfolio Standard ("RPS").

Further exploring the four variables of stochastic modeling (load, solar, wind, and forced outage) is the only way to capture the true requirements of a less constant supply profile, more variable generation, and more flexible demand. CESA is committed to finding a solution to this evolving grid that requires increasing flexibility, intelligence, and diversity to remain reliable, sustainable, efficient, and effective. Energy storage is a crucial asset in this energy future - and thus it needs support and emphasis at all levels, as advocated for by utilities such as San Diego Gas & Electric Company:

[5] System and Flexibility Analysis Results for the 2014 LTPP Phase 1A presented on December 5, 2014, Slide 5.

> "Storage Technology (ST) can also be used with DR [Distributed Renewables] and DG [Distributed Generation] to provide dispatchable energy and capacity, ramping, voltage support, and frequency control. The most advanced ST can provide capacity, instructed energy, and other CAISO services in order to obtain greater revenue. Location on the grid is also a possible NPV/BCR driver, particularly to remedy specific grid constraints. Strategically located ST may directly reduce T&D costs. *ST is similar to DR but provides even greater optionality* (Emphasis added)". [6]

In addition to its strong time shifting capability and as an -generation solution, there is also a huge opportunity for distributed and bulk energy storage and strategically sited distributed energy storage, to displace a very significant portion of the inefficient high heat rate peaking plant dispatch, and also to displace lesser efficient fossil plants.

4. Storage is a solution with clear benefits that will contribute to California's policy goals.

CESA advocates that, out of all the overgeneration solutions proposed by SCE, energy storage is most likely to provide the greatest GHG emissions reductions, given California's renewable energy portfolio.

Energy storage can capture excess renewable energy and use it to provide zero emissions capacity at a later time. Given that the CAISO modeling results show 822 hours of renewable curtailment, peaking at nearly 13,402 megawatts, that could arise in 2024 under a 40% renewable portfolio standard[7], the benefits of energy storage are likely to be very significant.

As CESA believes modeling will show, energy storage can also greatly reduce the quantity of thermal resources starting and operating at inefficient pMin levels in order to

[6] "Integrated Demand-Side Management ("IDSM") Cost-Effectiveness Framework White Paper." Prepared by Black & Veatch Corporation for San Diego Gas & Electric Company, May 12, 2011. p. 8.

[7] Attachment 1 to the CAISO's Testimony, p. 1.

provide sufficient ramping capability to ensure reliable grid operations.[8] Energy storage can provide load leveling, energy time transfer, energy reserve capacity, and voltage regulation. These benefits that may be applied in multiple flexible situations to further a number of policy goals, from infrastructure investment management to emissions reduction.

Deployment of energy storage will result in greater utilization of our existing assets - both conventional and renewable energy facilities, transmission and distribution infrastructure, and consumption-level resources - leading to savings for ratepayers and a more secure, resilient electric system. Importantly, it is readily apparent in testimony submitted to date that the benefits of energy storage will increase more renewables are added to the grid.

5. The Commission's long-term procurement planning analysis for Phase 1b should emphasize the value of energy storage.

CESA recommends that both SCE and the CAISO run sensitivity scenarios with incremental energy storage added. CESA recommends running at least two sensitivities using quantities and configurations of energy storage, similar to that which was modeled by NREL for the 2030 Low Carbon Grid Study. Each of the sensitivities should be modeled as part of other portfolio scenarios, including the High Case, Trajectory Case, 40% RPS, and Expanded Preferred Resources scenarios.

Storage Sensitivity Scenario One should add 1000 MW of pumped energy storage to the grid resource mix modeled by SCE and the CAISO.

[8] In its Testimony served on November 24, 2014, CESA included reference to the frequency response levels required to support NERC reliability standards in the CAISO's deterministic model, which was based upon analysis by Union of Concerned Scientists.

Storage Sensitivity Scenario Two should add 1000 MW of pumped energy storage to the grid resource mix, as above, as well as 1200 MW of bulk and distributed energy storage. Storage Sensitivity Scenario Three is an optional sensitivity that would evaluate 1200 MW of bulk and distributed energy storage.

The amount of pumped energy storage requested to be modeled is highly viable. Several CESA member companies are actively developing projects in locations in California and adjacent grid-connected states that total well over 1,000 MW. These projects are a very useful source of cost and performance data for the 2030 Low-Carbon Grid Study. Those developers are able to provide actual cost and performance data for the Commission's analysis in this proceeding.

6. The Commission should continue to reiterate the importance of procuring established energy storage technologies like pumped energy storage and stress that its energy decision was not intended to discourage the development of such projects.

The Commission's energy storage decision mandating the procurement of energy storage projects will likely drive the development of new and increasingly cost-effective energy storage technologies. That decision went out of its way to suggest that the Commission recognize the important role that pumped energy storage should play going forward.

> "We emphasize that our decision to limit the size of pumped storage projects in the decision is not to discourage large-scale pumped storage projects. On the contrary, these types of projects offer similar benefits as all of the as all of the emerging storage technologies targeted by this program; it is simply their scale that is inappropriate for inclusion here. *We strongly encourage the utilities to explore opportunities to partner with developers to install large-scale pumped storage projects where they make sense within the other general procurement efforts underway in the context of the LTPP proceeding or elsewhere.* (Emphasis added)"[9]

[9] D.13-10-040, p. 36.

The Commission should continue to emphasize this important message in this proceeding, including, as noted above, by running sensitivity analyses that include realistic energy storage scenarios.

Q: Does this conclude your testimony?

A: Yes it does.