BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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SIERRA CLUB OPENING COMMENTS ON TRACK 2 ISSUES

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SIERRA CLUB COMMENTS ON TRACK 2 ISSUES

Pursuant to the Assigned Commissioner and Assigned Administrative Law Judge's Scoping Memo and Ruling Seeking Party Comments ("Scoping Memo"), the Sierra Club respectfully submits the following timely comments.[1]

INTRODUCTION

Sierra Club submits the following comments regarding revisions to the energy storage procurement targets set in D.13-10-040. Sierra Club recommends that the California Public Utilities Commission ("Commission") increase those energy storage targets, due to state climate policy, federal air quality standards, and the growth of the renewable energy sector as well as the energy storage market in recent years.

Energy storage procurement targets have helped to overcome the challenges that the current market poses to new, innovative energy resources like energy storage. The targets are essential because the resources themselves are essential; state law and various executive orders make it clear that California's grid must decarbonize, and it cannot do so without energy storage and preferred resources. For example, SB 350 and other state policies are moving California toward procurement that emphasizes the zero-carbon renewable integration resource solutions

[1] By email, Administrative Law Judge Halligan extended the due date for opening comments to February 5, 2016.

needed to reach California's greenhouse gas reduction objectives.[2] In the future, Sierra Club envisions a market for non-fossil-reliant technologies to compete to meet California's resource needs and climate goals. In the interim, Sierra Club urges the Commission to expand upon the momentum of California's energy storage procurement by increasing existing energy storage procurement targets to ensure continued robust progress toward California's clean energy and climate goals.

Specifically, Sierra Club endorses adding 3,000 MW of energy storage procurement to the existing 1,325 MW target, while also extending the deadline for procurement of the full 4,325 MW (3,000 MW added to the existing 1,325 MW target) of energy storage. An additional 3,000 MW of energy storage will allow the grid to operate with minimal renewable curtailment under the 50% Renewable Portfolio Standard ("RPS") in 2030.[3] Energy storage procurement target revisions should apply for the next ten years, with the final biennial procurement cycle ending in 2026. Sierra Club limits its comments to these issues but reserves the right to address additional issues on reply.

REVISION OF ENERGY STORAGE PROCUREMENT TARGETS

I. Should the Commission increase or revise the adopted ESP targets for IOUs and/or ESPs/CCAs applicable for the 2018 and 2020 solicitations? What factors should the Commission consider in increasing or revising the adopted ESP targets?

Given energy storage needs and the success of the initial procurement cycles, the Commission should increase energy storage procurement targets. The utilities easily met the 2014 procurement cycle targets. In fact, SCE's 2014 storage procurement amounted to three

[2] See Cal. Pub. Util. § 454.51(a) [The Commission is required to "[i]dentify a diverse and balanced portfolio of resources" that "provides optimal integration of renewable energy in a cost-effective manner" and relies "upon zero carbon-emitting resources to the maximum extent reasonable" to achieve California greenhouse gas mandates].

[3] See James H. Nelson, Laura M. Wisland. 2015. Achieving 50 Percent Renewable Electricity in California: The Role of Non-Fossil Flexibility in a Cleaner Electricity Grid. Union of Concerned Scientists, pp. 26-27.

times its 2014 procurement target.[4] The market for energy storage can meet the needs created by higher amounts of renewable energy resources entering the grid. A report developed by KEMA on behalf of the California Energy Commission ("CEC") in 2010 found that the state's utilities would need to add at least 3,000 MW of energy storage to the grid by 2020 to accommodate growing amounts of renewable energy.[5] Increasing the energy storage procurement targets for 2018 and 2020 would bring California closer to the CEC's recommended procurement amount and would benefit the grid. Accordingly, the Commission should increase energy storage targets for the 2018 and 2020 procurement cycles, with the ultimate goal of procuring 4,325 MW of energy storage by 2026.

In revising the energy storage procurement targets, the Commission should focus on the reasons for California's push to reduce reliance on fossil fuels: mitigating climate change and improving air quality across the state. The decision that set energy storage procurement targets, D.13-10-040, includes the state's climate goals as part of its guiding principles, and the Commission should continue adhering to those principles as the targets are revised.[6] The Governor's executive order setting a goal to reduce greenhouse gas emissions 80% below 1990 levels by 2050 states that "projections of climate change show that, even under the best-case scenario for global emission reductions, additional climate change impacts are inevitable, and these impacts pose tremendous risks to the state's people, agriculture, economy, infrastructure

[4] Southern California Edison. January 4, 2016. Report of Southern California Edison Company (U 338-E) Demonstrating Compliance with Energy Storage System Procurement Targets and Policies, p. 1.

[5] KEMA, Inc. 2010. Research Evaluation of Wind and Solar Generation, Storage Impact, and Demand Response on the California Grid. Prepared for the California Energy Commission. CEC-500-2010-010, p. 65; Andris Abele, Ethan Elkind, Jessica Intrator, Byron Washom, et al (University of California, Berkeley School of Law; University of California, Los Angeles; and University of California, San Diego) 2011, 2020 Strategic Analysis of Energy Storage in California, California Energy Commission. Publication Number: CEC-500-2011-047, p. 6.

[6] D.13-10-040, pp. 9-10.

and the environment."[7] State goals and policies to reduce fossil fuel use and increase renewable energy procurement are necessary steps that must be taken to protect all Californians from the damage that climate change can do to our health and our environment. While those impacts will affect everyone, they will be felt most by vulnerable and disadvantaged communities throughout the state. Energy storage is essential to achieving emission reductions because the ancillary services that energy storage provides can help reduce the grid's reliance on natural gas power plants.[8]

The state's need for energy storage resources has only grown since the Commission initially set energy storage procurement targets in 2013, as the state has increased its greenhouse gas emission reduction targets and the renewable portfolio standard. There is new legislation requiring California to meet a 50% renewable portfolio standard and double energy efficiency savings by 2030.[9] California must also meet federal clean air standards, which will require dramatic reductions in the use of fossil fuels and substantial decreases in air pollution emissions. Specifically, the Los Angeles region and the San Joaquin Valley will need to reduce NOx emissions 90% below current levels to meet federal clean air standards for ozone pollution.[10] NOx pollution contributes to the formation of ozone and particulate matter, which exacerbate respiratory illnesses and cardiovascular disease, and can cause developmental delays in children.[11] Natural gas power plants are an important source of NOx emissions. By storing

[7] Executive Order B-30-15. April 29, 2015. https://www.gov.ca.gov/news.php?id=18938.

[8] KEMA, Inc. January 2012. Market Evaluation for Energy Storage in the United States, pp. 2-6 – 2-7. Prepared for the Copper Development Association, Inc.

[9] Clean Energy and Pollution Reduction Act of 2015, Cal. Pub. Util. Code § 399.11(a).

[10] California Energy Commission. 2015. 2015 Draft Integrated Energy Policy Report. Publication Number: CEC-100-2015-001-CMD, p. 285. http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-01/TN206330_20151012T134153_2015_Draft_Integrated_Energy_Policy_Report.pdf

[11] California Energy Commission. 2015. 2015 Draft Integrated Energy Policy Report. Publication Number: CEC-100-2015-001-CMD, pp. 150-151.

renewable energy that reduces the need for natural gas, energy storage contributes to reductions in emissions of dangerous air pollutants and greenhouse gases.

California's transportation electrification goals also support increasing energy storage procurement targets. Energy storage can help meet the increased demand that will result from the growth of the electric vehicle industry. California has set a target of 1.5 million zero-emission vehicles on the road in-state by 2025.[12] The majority of these vehicles likely will be electric vehicles, and their charging will increase customer demand. Being able to store renewable energy for use at higher demand times will benefit Californians as they charge their vehicles, while keeping California on track to meet its greenhouse gas and air pollutant emission reduction goals.

II. Considering the directive in *Senate Bill 350 (De Leon, 2015)* to develop an Integrated Resource Planning Process, should the Commission adopt ESP targets beyond 2020 at this time? If so, what factors should the Commission consider in adopting future targets, and what is an appropriate target?

The Commission should adopt energy storage targets out to 2026 at this time, and should base the total procurement target from 2014 to 2026 on existing research, which shows a need for an additional 3,000 MW of energy storage. This research includes the KEMA study described above, as well as a 2015 study by the Union of Concerned Scientists ("UCS") and 2014 study by Energy and Environmental Economics ("E3"). Adding 3,000 MW of energy storage to the existing 1,325 MW energy storage procurement target would increase grid reliability in California, and assist the state in meeting its climate policy goals as well as federal clean air standards.

Establishing a procurement target of 3,000 MW would produce critical system benefits, particularly as California increases the amount of electricity coming from renewable resources.

[12] Executive Order B-6-2012. March 23, 2012. https://www.gov.ca.gov/news.php?id=17472.

UCS modeled the future energy system, with 50% of the state's electricity supply coming from renewable energy in 2024. In the model, UCS explored how flexibility needs can be met with energy storage, advanced demand response, and net electricity exports. The baseline of the model included the 1,325 MW of energy storage to be procured by the current Commission mandate. UCS then added 1 GW of each of those three resources to the model, to evaluate how additional flexibility resources would affect curtailment needs. UCS repeated this action twice more, modeling the grid impacts of 2 GW of each resource and 3 GW of each resource. The study found that with an additional 3 GW of each of the three resources, "renewable curtailment falls to less than 0.1 percent."[13]

Adding 3 GW, or 3,000 MW, to the energy storage resources that already exist on the grid would provide critical grid reliability support that would nearly eliminate the need for renewable curtailment, when deployed in concert with the other flexibility resources modeled. California's future energy grid will include a variety of preferred resources, such as advanced demand response, which was modeled by UCS along with energy storage, and net electricity exports. Net electricity exports are also providing system benefits, as the California Independent System Operator works more closely with other balancing authorities in the West through the year-old Energy Imbalance Market.[14] Based on this modeling, the additional 3,000 MW energy storage procurement target provides the best option for creating a stable, low-carbon energy grid. Sierra Club recommends that the Commission add 3,000 MW of energy storage to the existing procurement target.

[13] James H. Nelson, Laura M. Wisland. 2015. Achieving 50 Percent Renewable Electricity in California: The Role of Non-Fossil Flexibility in a Cleaner Electricity Grid. Union of Concerned Scientists, p. 27.
[14] California Independent System Operator. Energy Imbalance Market Overview. http://www.caiso.com/informed/Pages/EIMOverview/Default.aspx.

Sierra Club bases its energy storage procurement target recommendation on the study conducted by UCS, because it is more recent than the KEMA study and includes the latest and most ambitious energy goals and standards. However, the findings in the KEMA study as well as the E3 study support significant increases in the energy storage target to meet 2030 climate policy goals. The E3 study found that adding energy storage capacity of 50,000 MWh to the system could reduce renewable overgeneration from 9% to 4%.[15] The study specifically found that energy storage capacity of 50,000 MWh would translate to enough energy storage to store up to 5,000 MW of energy or "enough energy to discharge at 4,000 MW for 11 hours while accounting for losses."[16] Three different research reports have identified a need for additional energy storage capacity that should be addressed by increasing energy storage procurement targets.

Sierra Club suggests that the Commission apply the 4,325 MW total energy storage procurement target to biennial procurement cycles out to 2026. The same considerations about the state's climate and air pollution standards described above should be considered when determining the length of the procurement period and the amount of additional energy storage procurement necessary. Adding three more procurement cycles – 2022, 2024, and 2026 – is reasonable considering that increased energy storage procurement is needed to meet 2030 climate goals, as modeled by UCS.

Another factor to consider is the strength of the energy storage market as demonstrated by SCE's first procurement cycle.[17] As SCE writes in its report on the 2014 procurement cycle, "SCE has procured a total of 307.33 megawatts ("MW") of energy storage through existing

[15] Energy and Environmental Economics. January 2014. Investigating a Higher Renewables Portfolio Standard in California, p. 123.
[16] *Id.*
[17] *See* Southern California Edison. January 4, 2016. Report of Southern California Edison Company (U 338-E) Demonstrating Compliance with Energy Storage System Procurement Targets and Policies, p. 1.

programs and approved projects…which more than satisfies SCE's 2014 procurement goals established by the Commission."[18] PG&E met its 2014 procurement target, noting that "PG&E's 2014 [energy storage] [request for offers] was extremely robust."[19] SDG&E also succeeded in meeting the 2014 targets: "SDG&E's existing and in progress storage projects met or exceeded the established 2014 targets in each domain."[20] Creating energy storage procurement targets in 2013 was transformative for the energy storage industry and beneficial for the state's electric grid, in much the same way that the state's renewable portfolio standard was transformative for the renewable energy sector. Both the energy storage target and the renewable portfolio standard have significantly benefited California's grid and helped the state reduce air pollution and mitigate the impacts of climate change.[21] The Commission should continue supporting this nascent energy storage market by increasing the energy storage procurement targets driving the transformation. The results of the 2014 procurement cycle demonstrate that increasing the energy storage procurement target by 3,000 MW and extending the procurement period to 2026 would be a sound policy choice.

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[18] Southern California Edison. January 4, 2016. Report of Southern California Edison Company (U 338-E) Demonstrating Compliance with Energy Storage System Procurement Targets and Policies, p. 1.

[19] Pacific Gas & Electric Company. December 1, 2015. Application of Pacific Gas and Electric Company (U 39 E) for Approval of Agreements Resulting from its 2014-2015 Energy Storage Solicitation and Related Cost Recovery, p. 2.

[20] San Diego Gas & Electric. December 1, 2015. SDG&E's 2014 Energy Storage Distribution Reliability/Power Quality Request for Proposal Seeking a 4 MW Energy Storage System: Post-Solicitation Report, p. 5

[21] *See* Ryan Wiser, Galen Barbose, Jenny Heeter, Trieu Mai, Lori Bird, Mark Bolinger, Alberta Carpenter, Garvin Heath, David Keyser, Jordan Macknick, Andrew Mills, and Dev Millstein. 2016. A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards. Lawrence Berkeley National Laboratory and National Renewable Energy Laboratory. NREL/TP-6A20-65005. http://www.nrel.gov/docs/fy16osti/65005.pdf; Ian Clover. January 28, 2016. "Solar-plus-storage to become $8bn market by 2026, says Lux Research." *PV Magazine*. Retrieved from http://www.pv-magazine.com/news/details/beitrag/solar-plus-storage-to-become-8bn-market-by-2026--says-lux-research_100022986/#ixzz3yfgzpYj6 ("Growing policy support for storage will also play a role in driving wider adoption of battery technology, as evidenced already in Germany, where a subsidy for storage has meant a 35% growth rate in solar+battery systems. Japan has recently launched a similar scheme that covers two-thirds of the installation costs for any lithium-ion battery that is 1 kWh or larger, while in California there is a state-wide mandate to have 1.3 GW of storage capacity installed by 2020. ")

CONCLUSION

For the foregoing reasons, we recommend that the Commission lengthen the energy storage procurement period to 2026 and increase the energy storage procurement target to a total of 4,325 MW. Sierra Club requests that the Commission consider the importance of the state meeting its own climate and clean energy goals, in addition to federal clean air standards. These goals are necessary to protect the health of all Californians, particularly low-income communities and communities of color, as well as California's priceless natural resources.

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Respectfully submitted,

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