BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to consider policy and implementation refinements to the Energy Storage Procurement Framework and Design Program (D.13-10-040, D.14-10-045) and related Action Plan of the California Energy Storage Roadmap.	R.15-03-011 Filed March 26, 2015

COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON ASSIGNED COMMISSIONER AND ASSIGNED ADMINISTRATIVE LAW JUDGE'S SCOPING MEMO AND RULING

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February 5, 2016

TABLE OF CONTENTS

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In accordance with Rules of Practice and Procedure of the California Public Utilities Commission ("Commission"), the California Energy Storage Alliance ("CESA")[1] hereby submits these comments on the *Assigned Commissioner and Assigned Administrative Law Judge's Scoping Memo and Ruling*, issued by Assigned Commissioner Carla J. Peterman and assigned Administrative Law Judge Julie M. Halligan on January 5, 2016 ("Scoping Memo").

[1] 1 Energy Systems Inc., Advanced Microgrid Solutions, AES Energy Storage, Aquion Energy, Brookfield, CODA Energy, Consolidated Edison Development, Inc., Cumulus Energy Storage, Customized Energy Solutions, Demand Energy, Dynapower Company, LLC, Eagle Crest Energy Company, East Penn Manufacturing Company, Ecoult, ELSYS Inc., Energy Storage Systems, Inc., Enersys, Enphase Energy, EV Grid, GE Energy Storage, Gordon & Rees, Green Charge Networks, Greensmith Energy, Gridtential Energy, Inc., Hitachi Chemical Co., Ice Energy, IMERGY Power Systems, Innovation Core SEI, Inc. (A Sumitomo Electric Company), Invenergy LLC, K&L Gates, LG Chem Power, Inc., LightSail Energy, Lockheed Martin Advanced Energy Storage LLC, LS Power Development, LLC, Mitsubishi Corporation (Americas), NEC Energy Solutions, Inc., NextEra Energy Resources, NRG Solar LLC, OutBack Power Technologies, Panasonic, Parker Hannifin Corporation, Pathfinder, Powertree Services Inc., Primus Power Corporation, Princeton Power Systems, Recurrent Energy, RES Americas Inc., S&C Electric Company, Saft America Inc., Sharp Electronics Corporation, Skylar Capital Management, SolarCity, Sovereign Energy, Stem, SunEdison, SunPower, Toshiba International Corporation, Trimark Associates, Inc., Trina Energy Storage, Tri-Technic, UniEnergy Technologies, Wellhead Electric, Younicos. The views expressed in these Comments are those of CESA, and do not necessarily reflect the views of all of the individual CESA member companies. (http://storagealliance.org).

I. INTRODUCTION.

CESA applauds the Commission for its leadership in facilitating the promising growth of the energy storage industry in California to date. Energy storage technologies can clearly facilitate a reduced greenhouse gas ("GHG") emissions future that also enables a highly reliable electric grid. Ensuring that all energy storage technologies and deployments are encouraged on a nondiscriminatory basis is essential in order to achieve that future.[2]

Through Track 1 of this proceeding, the Commission has taken a very thoughtful and reasoned approach to overseeing the 2014 biennial energy storage procurement cycle managed by the investor-owned utilities ("IOUs") pursuant to Assembly Bill ("AB") 2514, as well as various policy questions surrounding the procurement framework established in D.13-10-040. In the Scoping Memo, the Commission has highlighted the key topics to be examined in Track 2 of this proceeding, namely: a) consideration of energy storage procurement goals; b) eligibility of energy storage technologies; c) multiple-use applications; d) station power; and e) community storage. CESA strongly supports this scope and believes that resolution of these Track 2 subjects is critical to the continued market transformation of the energy storage industry.

CESA also anticipates that additional issues may arise in the course of the proceeding that may be equally important, and the Commission should ensure that it does not foreclose the ability to address such issues in this proceeding.

[2] Although fair and nondiscriminatory competition is required, CESA supports appropriate policy measures that promote promising new technologies based on a full and transparent understanding of any added cost burden that this may place on customers.

II. MARKET TRANSFORMATION SHOULD INFORM TRACK 2 TO FULFILL THE INTENT OF AB 2514 AND ENSURE ENERGY STORAGE BECOMES A *MAINSTREAM* ENERGY RESOURCE TO HELP REALIZE CALIFORNIA'S CLEAN ENERGY GOALS.

The Scoping Memo outlines how the proceeding will consider whether the Commission should revise and/or increase energy storage procurement goals for each IOU and will identify key drivers for this decision. The Scoping Memo also questions whether the Commission should adopt goals beyond 2020 given enactment of Senate Bill ("SB") 350. These important questions should guide discussion on this issue, and CESA recommends that the Commission also consider the goals and intent of the energy storage procurement goals established pursuant to AB 2514. With an eye towards these goals, the Commission can best discuss the revision of procurement goals based both on the policy direction of the state and on the explicit recognition of the strategic role energy storage can play in California's energy future as embodied in AB 2514.

California's journey to a cleaner and reliable energy future requires significant changes to the energy system infrastructure – a market transformation that will result in significant increases in renewable generation as well as other resources that ensure that renewable generation can be used while maintaining grid reliability. AB 2514 was enacted to direct California's electric power system stakeholders to evaluate and consider the many benefits energy storage can provide to California's electric power system, and in particular, the role energy storage can play in "integrating increased amounts of renewable energy resources into the transmission and distribution grid in a manner that minimizes emissions of greenhouse gases." AB 2514 also explicitly stated that "there are significant barriers to obtaining the benefits of energy storage systems, including inadequate evaluation of the use of energy storage to integrate renewable energy resources into the transmission and distribution grid through long-term electricity resource planning, lack of recognition of technological and marketplace advancements, and

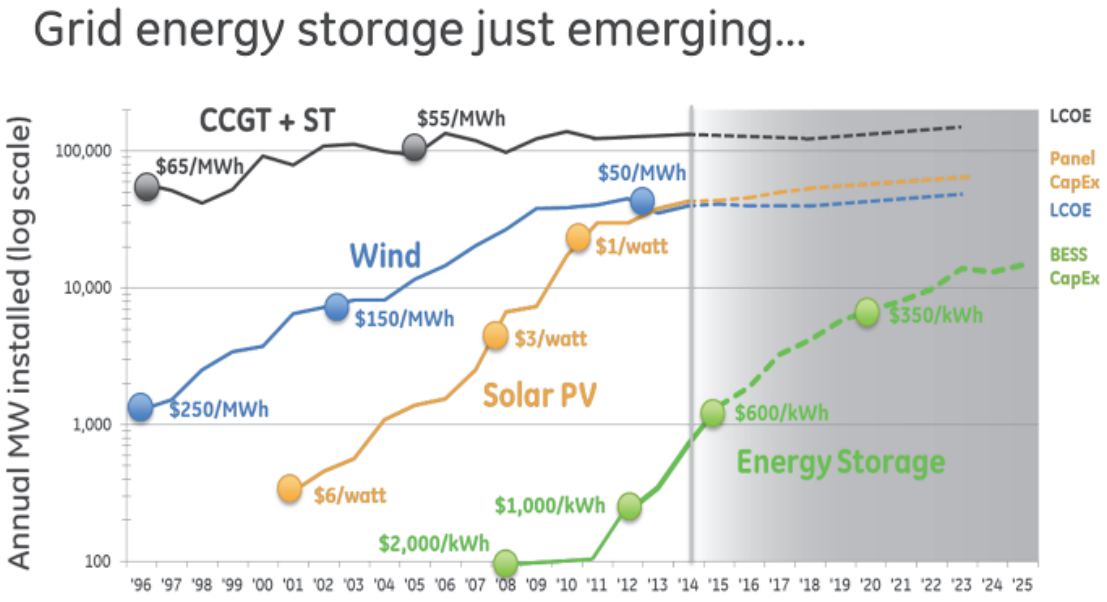
inadequate statutory and regulatory support."[3] The Commission's historic initial storage decision, D.12-08-016, set in motion vital progress and momentum for energy storage in California, and globally. Today, with the benefit of three years of progress under its belt, California now has a base of understanding about energy storage that was unknown at the time of that historic decision:

1. Energy storage is commercially viable and available – as evidenced by the large number of offers received in Southern California Edison's ("SCE's") 2013 Local Capacity Requirements ("LCR") Request for Offers ("RFO") solicitation, the large volume of energy storage Self-Generation Incentive Program ("SGIP") applications, and nearly 5.0 GW of applications in Cluster 8 of the California Independent System Operator's ("CAISO's") interconnection process – with several hundred more megawatts filling the IOUs' Wholesale Distribution Access Tariffs ("WDAT") interconnection queues.[4]
2. Energy storage is cost competitive in certain applications – as evidenced by SCE's 261 MW procurement of in-front-of-the-meter and aggregated behind-the-meter energy storage for local capacity, selected from competitive proposals that included a range of conventional and preferred resources alternatives. It should also be noted that SCE's disclosure in the LCR identified that as much as 800 to 900 MW of energy storage could have been cost effectively procured.
3. Storage procurement goals have been *vital* to this progress.

[3] AB 2514 Section 1, Ch. 469.
http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100AB2514

[4] The CAISO's Cluster 8 application window that closed on April 30, 2015. Source: CAISO Energy Storage Interconnection Queue, December 2015.

Thanks to growth of electric vehicles ("EV") and the Commission's various proceedings involving energy storage, the cost of energy storage is also falling, enabling more applications and use cases to become cost effective. The costs of lithium-ion batteries for EVs, for example, have declined by 14% annually from 2007-2014, and are projected to decline further.[5] To achieve these further declines, (especially for grid-connected applications) energy storage needs to have more deployment to increase confidence in the various ways energy storage can be beneficially deployed and used, as well as to achieve economies of scale and progress along the learning cost curve similar to the solar photovoltaics ("PV") industry, as shown in the graph below.[6] There remains ample opportunity for reductions at the system/application level. In other words, through increased experience, the installation, balance of plant and interconnections costs associated with grid-connected energy storage will fall.



[5] *Rapidly falling costs of battery packs for electric vehicles*. Nature Climate Change. March 2015.
[6] General Electric presentation at Energy Storage North America 2015.

Despite California's tremendous progress and momentum in energy storage deployment, energy storage is not yet part of the *mainstream toolkit*, here in California and elsewhere. The Assigned Commissioner's Ruling ("ACR") issued on June 10, 2013 set "procurement targets for energy storage with the goal of market transformation"[7] and to evaluate and measure the procurement framework along the "progress toward market transformation."[8] The energy storage procurement framework was therefore envisioned to "bring down market barriers, reduce costs, and increase scale of market penetration over time" in order to achieve energy storage market transformation. However, the 2013 ACR goals have not yet been realized beyond a handful of applications and the totality of potential benefits of energy storage for California ratepayers remains out of reach. Energy storage will clearly be a part of the mainstream energy toolkit when all of the following are realized:

- The financial ecosystem including top-tier banks and other financial institutions *routinely* provide debt service to energy storage systems in all grid applications.
- Local permitting authorities throughout the state quickly, uniformly, and *routinely* permit a variety of different types of energy storage technologies in multiple applications.
- The rules and compensation mechanisms for dual- or multiple-use energy storage systems are *routine*, clear, and considered bankable by financial institutions.
- Interconnection is *routine* and constitutes a small portion of the overall cost structure of new systems.

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[7] *Assigned Commissioner's Ruling Proposing Storage Procurement Targets and Mechanisms and Noticing All-Party Meeting*, R.10-12-007, filed June 10, 2013. p. 3.

[8] *Ibid*, p. 20.

- The specifications and requirements of energy storage applications are standardized and *routine* for utility procurement.
- Systems modeling tools and approaches appropriately and *routinely* value the capabilities and benefits of energy storage at every step of system planning.

At present, the use and consideration of energy storage is not yet *routine* in any of these situations, and thus energy storage has not achieved the market transformation goals of AB 2514 or the 2013 ACR. Energy storage systems are still not routinely financeable by major lending institutions due to the industry's limited installation history and unfamiliarity by bankers with revenue streams. Local permitting authorities have separate and different permitting processes that raise costs and create confusion for energy storage developers. Rules and compensation mechanisms for multi-use applications are still under development, as these issues are scoped into Track 2 of this proceeding. The interconnection process is time consuming and interconnection costs are still high, constituting up to 40% of costs for certain applications. The IOUs are currently still experimenting with appropriate specifications for different applications. Finally, energy storage is certainly not being adequately modeled in current load forecasting, production simulation, and transmission planning efforts, particularly energy storage's fast-responding sub-hourly capabilities.

Continued state leadership in the form of higher procurement goals will ensure that storage becomes a *routine* and mainstream component of California's toolkit for a cleaner grid, consistent with AB 2514, SB 350, and the Governor's GHG emission reduction goals. While visionary, the 1.325GW goal is really quite modest relative to the size of the state's electric power system – equivalent to just a couple of fossil plants.

Market transformation of the energy storage industry is also urgent. Aligned with California's current policy and trajectory toward a cleaner grid, energy storage can quickly provide critical integration capacity while also supporting a more affordable and reliable grid. As part of Track 2, CESA recommends that the Commission also discuss and outline measures of market transformation in the energy storage industry to ensure that progress is made toward accomplishing this goal and evaluating whether additional policy measures are needed to ensure energy storage enters the mainstream electric power system planning tool kit as the industry scales and matures.

III. THE COMMISSION CANNOT WAIT FOR THE RESULTS OF INTEGRATED RESOURCE PLANNING TO DETERMINE ENERGY STORAGE PROCUREMENT GOALS.

A higher energy storage procurement goal, in conjunction with strategic programs such as the Self Generation Incentive Program ("SGIP") will deliver the necessary "bridge" to ensure that energy storage is better understood in the state's Integrated Resources Planning ("IRP") process, reflective of the variety of benefits of energy storage systems provide and the diverse array of storage solutions available today and in the future. The state's goals of achieving 50% renewables generation by 2030 and 40% GHG emissions reductions from 1990 levels by 2030 put the state on a trajectory of excessive curtailments before the IRP process can be concluded.[9] Further, the recent net energy metering ("NEM") decision to extend retail rate NEM credits through 2019 coupled with the federal investment tax credit ("ITC") extension through 2022 will likely result in continued *robust growth* in rooftop solar that *cannot be curtailed*.[10] For Q2 2014,

[9] Curtailment is a wasteful cost borne by ratepayers and impedes progress toward California's laws and policies to achieve a cleaner energy future.

[10] As the CAISO has pointed out in its filings in R.13-12-010, unmanaged overgeneration is a grid reliability problem.

the CAISO reported negative prices in about 4% of all intervals due in part to over generation resulting from unscheduled wind and solar generation,[11] which should raise concern as the state has not yet even achieved its 33% RPS. Importantly, while the new Energy Imbalance Market ("EIM") may help with regional balancing, it still will not address the local distribution level reliability challenges that may arise from high penetrations of rooftop solar (and electric vehicles). San Diego can be considered a good test case for this, as certain regions of San Diego Gas & Electric's ("SDG&E's") service territory has already experienced very high local penetration of rooftop solar. To date, there has been 509 MW installed under SDG&E's NEM program (much of which is rooftop solar),[12] constituting approximately 11% of its estimated peak load.[13] Importantly, rooftop solar penetration is quickly approaching the 15% peak capacity that has been quoted as creating major problems for SDG&E's distribution system.[14] Potential CAISO expansion also does not address California's long-standing need to manage its own energy future by having sufficient and appropriate clean energy solutions in state, and reaping the economic benefits associated with new in state clean energy capacity. Energy storage is one of the few solutions that can be deployed quickly and in a regionally targeted way to ensure system reliability in many locations, including dense urban areas. Expanding California's energy storage procurement goal aligns with state policy goals and provides a number of grid benefits.

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[11] *Q2 Report on Market Issues and Performance*. California ISO, Department of Market Monitoring, August 18, 2014. http://www.caiso.com/Documents/2014SecondQuarterReport-MarketIssuesandPerformance-August2014.pdf

[12] SDG&E NEM Dashboard. http://www.sdge.com/clean-energy/net-energy-metering/overview-nem-cap

[13] *How SDG&E is dealing with high penetrations of rooftop solar*. Utility Dive, July 25, 2014. http://www.utilitydive.com/news/how-sdge-is-dealing-with-high-penetrations-of-rooftop-solar/290227/

[14] *SDG&E: If you're not prepared for the change, it's too late*. Utility Dive, February 24, 2015. http://www.utilitydive.com/news/sdge-if-youre-not-prepared-for-the-change-its-too-late/366979/

IV. TRACK 2 SHOULD ESTABLISH A NEW ENERGY STORAGE PROCUREMENT GOAL OF 5 GW INSTALLED BY 2030.

CESA recommends that the Commission establish a new energy storage procurement goal of 5 GW installed by 2030. The Commission is wholly within statutory authority to "determine appropriate targets"[15] as well as within its regulatory authority to adjust procurement goals based on market experience, needs determinations, and evaluation of the overall procurement framework and policies.[16]

The original 1,325 MW goal was originally established despite concerns of the commercial availability and readiness of energy storage technologies. Over the past few years, stakeholders delivered innovative and competitive bids in IOU solicitations and demonstrated that energy storage is not a theoretical resource but a commercially viable asset. In its 2013 LCR RFO, SCE committed to purchasing 261 MW of energy storage – five times greater than the minimum procurement target of 50 MW of energy storage – in a head-to-head competition with other preferred and conventional resources based on performance and value. In the first biennial procurement round in 2014, PG&E and SCE selected 74 MW and 16 MW of energy storage, respectively. It is unlikely that the IOUs would have demonstrated such leadership in procurement of energy storage had the 1.325 GW procurement goal not been in place. At the same time, as discussed in Section I above, energy storage is still not part of the 'mainstream energy toolkit' and thus has not yet achieved "market transformation." Increasing California's procurement goal is necessary to ensuring energy storage's rightful place in California's mainstream energy toolkit – as it will serve to reduce market barriers, reduce costs, achieve scale

[15] AB 2514. http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100AB2514

[16] *Decision Adopting the Energy Storage Procurement Framework and Design Program*, D.13-10-040, issued on October 17, 2013, pp. 26.

and lay the foundation for a diverse and flexible infrastructure base in California that can accommodate ever increasing levels of renewable energy.

Despite having initial commercial viability and cost competitiveness concerns reduced with successful energy storage procurement through the first biennial procurement round in 2014 and SCE's LCR procurement in 2013, a greater deployment and installation history is needed for energy storage technologies and projects to be *routinely* financeable by lenders. New technologies need to have several years of field experience in order to verify energy storage performance as contracted and familiarize financiers with energy storage revenue streams and business models. Capacity contracts with creditworthy counterparties, such as IOUs, are especially helpful in establishing steady revenue streams that can serve as the basis for financing for energy storage projects. For the Commission to achieve its market transformation goals, greater levels of energy storage procurement by the IOUs are needed, which would entail setting higher procurement goals in this proceeding. Procurement goals will encourage the IOUs to continue to consider and demonstrate the capabilities of energy storage technologies in a commercial setting, enabling energy storage to *routinely* compete on a standalone basis for a growing number of applications.

Procurement goals are absolutely necessary for the reasons stated above and represent a bridge to establishing energy storage as an increasingly viable alternative grid technology. Renewable capacity development in California benefited from Renewable Portfolio Standards ("RPS") that functioned as a similar goal-setting exercise requiring a certain share of retail sales to be from renewable energy. Studies have shown that states with an RPS have had substantially

more renewable capacity development as compared to states without an RPS.[17] Furthermore, since the RPS program was first established in 2002, the RPS has been increased three times from 20% by 2010, to 33% 2020, and most recently to 50% by 2050 with the passage of SB 350.[18] The steady increase in the RPS goal has helped create a long-term market signal that allows for effective planning and promotes investor confidence.[19]

Similarly, energy storage procurement goals should steadily ramp up over time to increase investor confidence. Leaving energy storage procurement goals unchanged could just result in a one-off, start-and-stop procurement cycle that would dampen energy storage market growth and investment at a time when California needs it the most. An increase is needed to send the right market signal and ensure California has the right kind of infrastructure in place for a cleaner, more affordable, reliable electric power system. SCE, for example, does not have to procure any more behind-the-meter energy storage, having already met its targets through its 2013 LCR RFO and SGIP projects. By not increasing the behind-the-meter energy storage procurement for SCE, the existing procurement goal will potentially have the unintended consequence of dissuading SCE from continuing its path of leadership in transforming the market and continuing its learning of value streams, procurement frameworks, and operational characteristics of energy storage.

While many factors should inform the establishment of goals, a 5 GW procurement goal seems most appropriate. The 5 GW procurement goal is derived in large part from CESA's

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[17] *Renewable Portfolio Standards in the United States: A Status Update*. Lawrence Berkeley National Laboratory, Presented on November 6, 2013. https://emp.lbl.gov/sites/all/files/rps_summit_nov_2013.pdf

[18] CPUC RPS Program Overview. http://www.cpuc.ca.gov/RPS_Overview/

[19] *Recommended Principles and Best Practices for State Renewable Portfolio Standards*. Clean Energy States Alliance, January 2009. http://www.cesa.org/assets/Uploads/Resources-post-8-16/Principles-Best-Practices-RPS-2.pdf

assessment of key studies. The state regularly plans for over 55,000 MW of capacity needs, but much of the state's planning capacity now comes with lower qualifying capacities, meaning other capacity is needed to ensure reliable grid operations, particularly highly flexible capacity.[20] PLEXOS modeling of a doubling of the 2013 energy storage procurement goal (2.650 GW) already shows significant renewables integration and GHG benefits from under the state's 40% RPS LTPP planning model, enabling several existing gas peakers to go offline.[21] Further insights into frequency response and voltage support show that some expected capacity will go towards resolving these harder-to-model challenges, highlighting a further need for responsive resources like energy storage. CESA based its 5,000 MW goal referencing the following studies:

- The Union of Concerned Scientists ("UCS") showed that renewables curtailment is expected to reach 4.8% of available renewable generation under the 50% RPS, with 80% of this curtailment attributed to downward reserve requirements and regional generation requirements. By deploying 9 GW of non-generation flexibility, which includes 3 GW of energy storage in addition to the 1.325 GW procurement goals, UCS estimates that renewables curtailment can fall to less than 0.1%.[22]
- The National Renewable Energy Laboratory ("NREL") showed that curtailment can be reduced to 0.2% of renewables generation under their "target enhanced flexibility" scenario, which aims to achieve 50% carbon reduction by 2030 and includes 2.2 GW of additional energy storage. By comparison, their conventional

[20] 2014 Long-Term Planning Process (R.13-12-010).

[21] *Modeling Energy Storage in a 40% RPS Scenario: PLEXOS Modeling Scenarios, Inputs, Results, and Takeaways*. California Energy Storage Alliance, July 7, 2015.

[22] *Achieving 50 Percent Renewable Electricity in California: The Role of Non-Fossil Flexibility in a Cleaner Electricity Grid*. Union of Concerned Scientists. August 2015.

flexibility scenario would lead to up to 14% higher carbon emissions and up to 10% of renewables curtailment.[23]

- The CAISO "duck" chart shows a need for 13,000 GWs of ramping capability. Energy storage can effectively ease this problem with less capacity than other resources because energy storage cycling can generally raise the trough while lowering the peak, among other helpful grid-support actions that energy storage can provide.[24]

Finally, by setting a higher energy storage procurement goal, the state will be deploying fast, flexible infrastructure that directly supports existing clean energy and environmental goals. NREL has shown that deployment of the current 1,325 MW procurement goal could lead to $144 million per year in reduced production costs and reduced renewable curtailment by 19% across the Western Electricity Coordinating Council ("WECC") region, assuming a 40% RPS by 2024.[25] CESA has run its PLEXOS production cost model[26] to demonstrate even greater reductions in unit starts, curtailment, and GHG emissions from an even higher goal of 2,650 MW for energy storage procurement – double the current procurement goal. The added flexibility and portfolio diversity delivered a 30% reduction in unit starts and 40% reduction in curtailment and allowed several existing gas peakers to go off line.[27] While the newly announced IRP proceeding

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[23] *Low Carbon Grid Study: Analysis of a 50% Emission Reduction in California*. National Renewable Energy Laboratory. January 2016.

[24] *Fast Facts: What the duck curve tells us about managing a green grid.* California ISO, 2013. https://www.caiso.com/Documents/FlexibleResourcesHelpRenewables_FastFacts.pdf

[25] *Operational Benefits of Meeting California's Energy Storage Targets*. National Renewable Energy Laboratory, December 2015, p. 3.

[26] CESA worked with Energy Exemplar to model two times the 1.325 GW goal using baseline model assumptions from the CAISO's Long-term Procurement Planning ("LTPP") 2014 model with 40% RPS.

[27] *Modeling Energy Storage in a 40% RPS Scenario: PLEXOS Modeling Scenarios, Inputs, Results, and Takeaways*. California Energy Storage Alliance, July 7, 2015.

is intended to consider the impact of SB 350 and develop new procurement frameworks to accommodate higher levels of renewables on the grid, for the reasons stated above, it is unlikely that this modeling effort will incorporate energy storage as a mainstream energy resource or address some of the very urgent and near-term reliability issues that will arise due to high rooftop solar and EV penetration. In the Long-Term Procurement Planning ("LTPP") proceeding, R.13-12-010, the CAISO and other parties clearly presented evidence that there are potentially significant over generation and associated reliability issues that could arise in just a few years. The Commission needs to be open to early action, no regrets decisions that will result in a robust toolkit and appropriate infrastructure that support a variety of future clean energy futures.

V. PROCUREMENT, CONTRACTING, AND COST RECOVERY MECHANISMS SPECIFIC TO LARGE SCALE, LONG DURATION ENERGY STORAGE SHOULD BE EXPLICITLY CONSIDERED IN CALIFORNIA'S ENERGY STORAGE PROCUREMENT FRAMEWORK.

Previously excluded energy storage technologies will be considered in Track 2. The Scoping Memo sets the stage for the Commission and stakeholders to review new information that is available to potentially justify a change in eligibility and/or authorization for procurement in this proceeding. One of those previously excluded technologies has been pumped hydro storage greater than 50 MW. CESA recommends that long duration storage resources, such as greater than 50 MW pumped storage and any other large-scale, long duration storage technologies be added to the existing procurement framework in this proceeding as a fourth "bulk storage" bucket representing a portion of the 5 GW 2030 procurement goal. Such resources can and will play a key role in addressing grid ramping requirements to integrate very large quantities of renewable energy. Specifically, bulk storage facilities such as pumped hydro and underground compressed air require substantial site-specific engineering and procurement -- costs that bulk storage developers cannot commit to unless there is the possibility of a bankable

long-term off-take contract. This development anomaly of certain types of bulk storage highlights why LTPP and all-source RFOs do not readily fit for bulk storage procurement. The bulk storage bucket can be defined by a minimum project size of 200MW and durations of 4 hour or more. Also, as was demonstrated by the ACR, energy storage procurement goals are very effective, and thus far (and primarily because bulk storage resources greater than 50 MW were excluded from the original procurement goal), California has not made measurable progress toward overcoming the barriers to bulk storage procurement.

Establishment of a fourth bucket for bulk storage procurement could readily fit with Track 2 goals and outcomes while also ensuring the state pursues benefits from a diverse portfolio of energy storage solutions. This recommendation is also consistent with guidance from the Agenda Draft of the soon to be issued Integrated Resources Planning ("IRP") OIR which states on page 25: "In addition, as discussed during the December 2, 2015 Workshop on SB 350 which, in part, led to the development of this proceeding, there may be a need for the Commission to evaluate approaches to procurement of certain types of electricity resources that have very long lead times, such as pumped storage or long-line transmission to other states in the West."

In the spirit of enabling competition and ensuring lowest cost for ratepayers, eligibility to compete in the bulk storage bucket should not be technology limited. Based on the scale and scope of potential future curtailment and related potential projects discussed at a Joint-Agency Workshop on Long-Duration Energy Storage,[28] CESA recommends a preliminary bulk storage bucket goal of between 1,000 to 1,500 MW by 2030.

[28] Footnote to joint CEC-CPUC-CAISO workshop in Q4 2015.

VI. POWER-TO-GAS SHOULD NOT BE ELIGIBLE FOR ENERGY STORAGE PROCUREMENT.

The Commission reaffirmed the ineligibility of hydrogen-based power-to-gas ("P2G") in the *Decision on Track 1 Issues* (D.16-01-032) issued on January 28, 2016, but left open the possibility of reconsideration of P2G eligibility in Track 2 of this proceeding. CESA reiterates its position expressed in its reply comments filed on January 11, 2016, that existing infrastructure such as natural gas pipelines cannot be considered a component of an energy storage system. An interpretation to the contrary would fail to comply with the P.U. Code Section 2835(c) definition of eligible energy storage systems in addition to the intent of AB 2514 to disqualify such energy storage systems.

CESA therefore recommends that the Scoping Memo expand the scope of issues regarding technology eligibility and revisit the definitions for eligible energy storage systems. The June 2, 2014 Energy Division Staff Report represents a potential starting point of discussion.[29]

VII. WORKSHOPS ON MULTI-USE APPLICATIONS SHOULD FOCUS ON CROSS-JURISDICTIONAL ISSUES.

Multi-use applications are critical to the market development for energy storage and to providing great value to energy customers who benefit from resources providing multiple services. The Scoping Memo comprehensively notes key questions and issues that need to be addressed to enable multi-use applications. A crucial first step in this effort will involve the identification and common understanding of likely or expected energy storage configurations and use cases. Following this, the Commission should allow for discussion and resolution of regulatory issues, cost recovery issues, and interconnection requirements. Regarding which

[29] *Staff Discussion Paper for Storage Workshop on June 2, 2014.* California Public Utilities Commission.

energy storage configurations and use-cases should be considered in Track 2 of this proceeding, CESA recommends the likely energy storage projects that tee up key questions about jurisdictional overlaps, including projects that: 1) support customer needs and also participate in wholesale markets and especially reflects metering configurations (properly netting meters vs NGOM for example) and interconnection treatment of In-Front-Of-The Meter ("IFOM") applications that bring Distributed Energy Resources ("DERS") to the grid as highlighted by the CAISO's recent Energy Storage and Distributed Energy Resource ("ESDER") plans; 2) support customer needs and also support distribution needs concurrently such as EV Charging and local or transmission demand management and regulation; and 3) support distribution needs and also compete in wholesale markets. These three representative multiple-use applications involve critical questions on metering and settlement, wholesale versus retail rates and interconnection requirements, cost-recovery considerations, consequences of sub-optimal performance, priority of use,[30] and jurisdictional primacy. Moreover, these use cases represent high-value uses for energy storage that provide pathways for improving the overall economics for energy storage. As always, CESA supports the Commission's efforts to coordinate with the CAISO on its related initiatives, such as the ESDER Initiative.

To further support the Commission's formation of multi-use applications, the Rocky Mountain Institute identifies 13 different value streams for energy storage where a single energy storage system could potentially provide multiple services and thereby tap multiple value streams, making energy storage more commercially viable as the "stacked" benefits offset its

[30] Specifically, there are issues related to conflicted dispatch signals for wholesale and distribution services.

present-day high capital costs.[31] Of the benefits listed, the multi-use applications that deserve the most attention in Track 2 are the ones where values may stem from behaviors that occur in different regulatory jurisdictions. For example, there are fewer dispatch or settlement concerns when an energy storage resource provides both frequency regulation and spinning reserve to the CAISO, which resembles generation-only and wholesale-only resources. However, energy storage resources that provide wholesale services as well as distribution-level services to the IOUs lead to concerns for the CAISO in ensuring the availability of energy storage resources to provide a wholesale grid service when called upon. This may occur if an energy storage resource is providing distribution-level congestion relief for the IOU while also committing to supply frequency regulation or demand response in the wholesale market.

CESA recommends that the Commission identify and prioritize these multi-use issues by detailing the process flow and known objections to the most urgent of the cross-jurisdictional use cases, where urgency is determined by how soon the use case will go in to operation at scale in California. At this time, one of the most urgent use cases involves behind-the-meter storage systems providing services to the host customer (such as demand charge management) while participating in the CAISO energy markets though aggregation within the Proxy Demand Resource ("PDR") mechanism.

Systems are executing this use case today in a variety of pilot programs but there remain several significant policy issues to be resolved. The urgency in resolving these policy questions is driven by several factors. First, SCE has contracted 135 MW of behind-the-meter storage systems that will be deployed and executing this use case over the next several years, with the

[31] *The Economics of Battery Energy Storage: How Multi-Use, Customer-Sited Batteries Deliver the Most Services and Value to Customers and the Grid*. Rocky Mountain Institute, October 2015.

initial 10 MW coming online in early 2017. Second, the IOUs recently completed their first Demand Response Auction Mechanism ("DRAM") auctions for 2016 operations and will be conducting the 2017 auction shortly. The Commission has signaled its intention to shift much of California's demand response market to a CAISO-integrated DRAM structure[32] that will also add many megawatts of storage systems to this use case. Finally, on February 3, the CAISO Board of Governors approved modifications to the Proxy Demand Response ("PDR") rules. As noted by CAISO staff[33] as well as PG&E[34] in its comments on the proposal, the modifications necessitate work in Track 2 of this proceeding to resolve issues with the new Meter Generator Output ("MGO") performance evaluation methodology. These MGO issues – including metering jurisdiction, settlement methodology, service account management, and potential compensation "overlap" – should be considered as top priority multi-use issues in Track 2.

Another urgent use case to be prioritized for Track 2 is the anticipated use of distribution-domain energy storage systems for both distribution level services and participation in CAISO markets. Several energy storage projects procured through the 2014 solicitations will fall under this use case, which would presumably be accomplished through the CAISO's Non-Generator Resource ("NGR") mechanism. Because these systems are "in front" of the retail meter, this use case does not have the same issues regarding metering jurisdiction, settlement and service accounts, but does call to question the "primacy" issue identified in the ESDER Initiative. How conflicting signals from the distribution system operator and the wholesale market are handled is likely the highest priority before energy storage systems under this use case begin operations.

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[32] *Decision Addressing the Valuation of Load Modifying Demand Response and Demand Response Cost-Effectiveness Protocols*, D.15-11-042, issued November 19, 2015.

[33] ESDER Initiative Revised Draft Final Proposal, issued December 23, 2015, p. 46.

[34] PG&E Comments on ESDER Initiative Revised Draft Final Proposal, submitted January 14, 2016, p. 3.

VIII. CLEAR DISTINCTIONS SHOULD BE MADE BETWEEN AUXILIARY LOADS AND STATION LOADS.

Fair and reasonable definitions of which energy storage loads are "auxiliary loads" and which are "station loads" is needed. Making these clear distinctions is crucial to fair and non-discriminatory participation by energy storage resources interconnected through WDAT, if not also in other potential configurations. Auxiliary loads are inherent loads of the energy storage system that are critical to the operation of the system, such as HVAC loads that maintain the operating temperature. Thermal management systems on some energy storage devices are essential to operations, akin to a pumps or fans on traditional fossil fuel plants. In this way, these auxiliary loads factor into the efficiency of an energy storage power plant. Whether for safety or as part of maintaining operational capabilities, these non-discretionary and inherent auxiliary loads are *de riguer* and should be measured and billed at wholesale energy rates. Specifically, load that is contemporaneous with the operation of the storage facility (*i.e.*, charging or discharging) should be treated as permitted netting under Section 10.1.3 of the CAISO Tariff. Station load, by contrast, refers to the lighting and HVAC for the facility or station at which the energy storage system is located, usually being provided for the personnel. These loads are discretionary and would not affect the operation of the energy storage system if turned off. CESA understands that such loads can be metered and billed separately.

In the Scoping Memo, the focus is on identifying the rules and guidance to distinguish wholesale charging energy and on discussing the metering requirements and rate implications of the station power treatment for energy storage. These clarifications are important and greatly influence the competitiveness of energy storage systems against other generation sources. Firmly distinguishing between auxiliary and station loads and consistently implementing the distinction across utility procurements statewide is a key step in resolving this matter.

IX. COMMUNITY STORAGE PROVIDES IMPORTANT AND OVERLOOKED BENEFITS FOR CERTAIN CUSTOMER CLASSES.

CESA supports the consideration of distribution-connected community storage as a use case in the Scoping Memo for Track 2. Community storage can provide important benefits for certain customer classes in addition to supporting grid needs at optimal project locations. High-density single family homes, apartments and multi-unit dwellings, and commercial premises with multiple tenants represent clustered customer loads that could benefit from an energy storage installation but are unable to procure due to regulatory barriers limiting energy storage deployment to behind the meter of an individual, who (in the multi-unit case) are challenged by space or socioeconomic limitations. CESA believes that access to energy storage devices and benefits should be extended to all customer classes wherever possible, which could be provided through community storage.

The Scoping Memo aims to explore the status of existing and future projects, as well as the current deployment barriers and policy options to overcome them. CESA recommends the Commission tackle the fundamental question of how to define community storage as the industry may lack sufficient consensus. CESA also supports the Scoping Memo's inclusion of the question of whether third-party ownership of community storage that is located on the utility side of the meter should be considered, and its consideration for full transparency of any cost shifting that underlies the benefits of community storage projects to a limited group of customers.

Furthermore, given the procurement and contracting challenges experienced by community solar, community storage conceivably faces greater challenges due to even more limited developer and financier experience with community storage projects, among other factors. Due to the lack of a clear procurement framework, ownership structure, or cost recovery mechanism in place, CESA supports consideration of a designated community storage goal

(within higher energy storage procurement goal discussed above) that takes account of the unique circumstances and impacts of community storage. Similar to the domain goals that require the IOUs to gain procurement experience and operational familiarity with energy storage systems across different domains, a specified procurement for community storage would ensure that the IOUs further build experience and knowledge with community storage.

X. CONCLUSION.

CESA appreciates the opportunity to submit these comments on the Scoping Memo and looks forward to working with the Commission and stakeholders on Track 2 issues.

Respectfully submitted,

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Date: February 5, 2016