BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Integrate and Refine Procurement Policies and Consider Long-Term Procurement Plans	R.13-12-010 (Filed December 19, 2013)

POST-WORKSHOP COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE

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The California Energy Storage Alliance ("CESA")[1] respectfully submits these post-workshop comments in response to the December 19, 2013, *Ruling Establishing a Comment period Regarding Workshop Material* sent to the service list in R.12-03-014 by Administrative Law Judge David Gamson ("Ruling"), and the California Public Utilities Commission's ("Commission's") R.13-12-010, *Order Instituting Rulemaking* filed on December 19, 2013 ("2014 LTPP OIR").

[1] The California Energy Storage Alliance consists of 1 Energy Systems, A123 Energy Solutions, AES Energy Storage, Alton Energy, American Vanadium, AU Optronics, Beacon Power, Bosch Energy Storage Solutions, Bright Energy Storage, BrightSource Energy, CALMAC, ChargePoint, Chevron Energy Solutions, Christenson Electric Inc., Clean Energy Systems Inc., CODA Energy, Deeya Energy, DN Tanks, Duke Energy, Eagle Crest Energy, EaglePicher, East Penn Manufacturing Co., Ecoult, Energy Cache, EnerSys, EnerVault, EVGrid, FAFCO Thermal Storage Systems, FIAMM Group, FIAMM Energy Storage Solutions, Flextronics, Foresight Renewable Systems, GE Energy Storage, Green Charge Networks, Greensmith Energy Management Systems, Growing Energy Labs, Gridtential Energy, Halotechnics, Hecate Energy LLC, Hydrogenics, Ice Energy, Innovation Core SEI, Invenergy, K&L Gates LLP, KYOCERA Solar, LightSail Energy, LG Chem Ltd., NextEra Energy Resources, NRG Energy, OCI Company Ltd., OutBack Power Technologies, Panasonic, Paramount Energy West, Parker Hannifin, PDE Total Energy Solutions, Powertree Services, Primus Power, RedFlow Technologies, RES Americas, S&C Electric Co., Saft America, Samsung SDI, Sharp Labs of America, Silent Power, SolarCity, Sovereign Energy Storage LLC, Stem, Stoel Rives LLP, Sumitomo Corporation of America, TAS Energy, Tri-Technic, UniEnergy Technologies, Xtreme Power, and Wellhead Electric Co. 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 hereby submits these post-workshop comments on the proposed joint CPUC-CEC-CAISO planning assumptions, scenarios, and renewable portfolios introduced jointly by the staff of the Commission in collaboration with the California Energy Commission ("CEC") and the California Independent System Operator ("CAISO"), to be used in the 2014 CPUC LTPP and 2014-15 CAISO TPP cycle on December 18, 2013.[2] CESA's comments focus on demand and managed demand assumptions that are related to transmission, distribution and customer-connected energy storage, largely informed by the Commission's decision concluding its energy storage rulemaking proceeding (D.13-10-040).[3] Assuring reasonable treatment of all forms of energy storage in the trajectory scenarios (including pumped hydro energy storage) is, of course, the specific topic of greatest concern to CESA at this time.[4]

II. THE PLANNING PROCESS DISCUSSED AT THE WORKSHOP AND DESCRIBED IN THE WORKSHOP MATERIALS SHOULD NOT EXCLUDE PUMPED HYDRO ENERGY STORAGE.

CESA recognizes and appreciates the intention of the CPUC, CAISO, and CEC to incorporate energy storage into the 2014 long term procurement planning ("LTPP") modeling assumptions as an important step forward from the 2012 LTPP planning assumptions, which excluded modeling energy storage entirely. However, only 700 MW of transmission-side energy storage has been built into the current proposed modeling assumptions. This figure is based only on D.13-10-040, and thus expressly excludes the possibility of pumped hydro energy storage

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[2] Word document describing joint Planning Assumptions and Scenarios for use in LTPP and the CAISO's TPP, Excel document summarizing Planning Scenarios, and Excel document summarizing preliminary RPS portfolios ("Workshop Materials").

[3] *Order Instituting Rulemaking Pursuant to Assembly Bill 2514 to Consider the Adoption of Procurement Targets for Viable and Cost-Effective Energy Storage Systems, filed December 16, 2010 ("Storage Rulemaking"); Decision Adopting Energy Storage Procurement Framework*, issued October 17, 2013.

[4] *See*, Section 4.1.8 of *Planning Assumptions and Scenarios for use in the CPUC 2014 Long-Term Procurement Plan Proceeding and CAISO 2014-15 Transmission Planning Process* (Attachment 2014 LTPPAS 12-24-2013 – Draft 1/3/2014) ("Planning Assumptions") (p. 11).

projects over 50 MW in size, which are an important cost-effective and viable resource for California going forward. CESA anticipates that as much as 3,000 MW of new pumped hydro energy storage can be online by 2020-2022 timeframe based on existing projects in the Federal Energy Regulatory Commission ("FERC") licensing queue.

Although the Commission has not yet mandated any procurement of large pumped hydro energy storage projects, it has recognized the value of such projects and has "strongly encourage[d] 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." (D. 13-10-040, p. 36.) The first step in creating a reality in which the utilities can effectively procure these resources is to lay the appropriate foundation in the planning assumptions and scenarios. This will allow the CAISO and Commission to make decisions informed by studies that model the beneficial relationship of high renewable energy plus bulk energy storage.

Otherwise, the assumptions and scenarios adopted by the Commission in each LTPP cycle run the risk of becoming a self-fulfilling prophecy. If the Commission and the CAISO do not consider a possible reality in which large-scale pumped hydro energy storage comes online in the next 10 or 20 years, and facilitate the transmission and other investments needed to accommodate such critical resource, the agencies are considerably more likely to make decisions regarding generation procurement and transmission development that further ostracize large energy storage solutions from resource planning.[5]

[5] *See*, CAISO 2013-2014 Transmission Planning Stakeholder Process.

III. RESPONSES TO SPECIFIC QUESTIONS POSED BY THE COMMISSION'S ENERGY DIVISION AT THE WORKSHOP.

CESA provides the following responses to the specific questions discussed at the Workshop:[6]

1. Is the current range of scenarios sufficient to cover current policy issues facing the CPUC?

CESA's Response:

Before discussing the full range of scenarios, CESA recommends that the Commission and the CAISO first prioritize the 40% Renewables Portfolio Standard ("RPS") scenario. This is a reasonable assumption given the planning horizons of 2024 and 2034, and the likely expansion of the RPS within those planning horizons. In addition, a 50% RPS scenario should be added as a sensitivity case. Given the number of uncertainties in the coming decades (*i.e*. Diablo Canyon's continued operation, conventional fuel availability and prices, legislative actions), a 50% RPS scenario is not outside the realm of possibility.

Given current efforts in the SONGS/Track 4 and LCR/Track 1 to utilize preferred resources to address operational concerns, another prioritization should include an expanded preferred resources scenario. This proceeding initiated by the 2014 LTPP OIR, and other active proceedings at the Commission, are very likely to lead to expanded preferred resources, and some have already begun that process.

Regarding the range of scenarios presented, CESA recommends that modeling should include zero, low, mid, and high-energy storage deployment schemes within the scenarios (*e.g*. 40% RPS) to better show the impact of energy storage. Simply having three scenarios (zero, mid, and high) would also be reasonable depending on modeling complexities. In this three-scenario case, for example, the "mid" scenario would represent levels required by D.13-10-040,

[6] *See*, Workshop Materials, "Key Technical Question for Parties in Response to December 18th, 2013 Workshop on Planning Assumptions and Scenarios for use in the CPUC 2014 Long Term Procurement Plan Proceeding and the CAISO 2014-2015 Transmission Planning Process".

and the "high" scenario would represent D.13-10-040 levels past 2020 plus large pumped hydro and other expanded resources.

Scenarios should also include sensitivities for specified levels of energy storage penetration at different grade levels, especially distribution versus transmission penetration. There are a few very important reasons for these recommendations. First, there is a risk that existing models are not adequate to calculate the true value of energy storage, so a "no-energy storage" scenario would investigate where energy storage is a best fit to remedy grid deficiencies before a model is applied to energy storage.[7]

Addressing Section 4.1.8 of the Planning Assumptions,[8] the current scenario tool includes low, mid, and high cases for storage only look at if transmission connected is counted for the low case (default case), transmission + distribution for mid, and transmission + distribution + customer sited (all categories) for the high case. As stated in CESA's response to Question Number 7 below, potentially all siting of energy storage should be modeled as the default case. This would be significant adjustment to the approach proposed in Section 4.1.8 of the Planning Assumptions, "For the purposes of the planning assumptions, there is no expectation that distribution and customer sited storage will be deployed and operated in a manner that provides capacity value at times of system stress, nor is there any information about where these resources will be deployed. Therefore, the 625 MW energy storage target described above will only be modeled in zonal production cost simulations but will not count as capacity in power flow studies."[9] First, CESA disagrees with this opinion because the distribution-sited use case modeling utilizing EPRI's *Cost-Effectiveness Modeling Report* during the course of the Storage Rulemaking showed significant value for capacity. Second, since distribution-sited energy

[7] *See, e.g.*, EPRI's *Cost-Effectiveness Modeling Report* (June 2013).
[8] Planning Assumptions, (p. 11).
[9] *Id.* (p. 11).

storage will be procured by the utilities, cost-effective procurement would site the systems in areas of greatest need, maximizing capacity value among other benefits as seen in EPRI's modeling work produced in the Storage Rulemaking. This siting could also be informed by the results of "zero storage" scenario, which would identify the areas of greatest need, with a second scenario modeled with energy storage included in these areas of need. Third, as another proxy for capacity value, distribution-sited and customer sited energy storage should be modeled in a manner similar to that of dispatchable demand response ("DR").

In the chart below, CESA present a hypothetical set of assumptions for each case – which could be adjusted for purposes of analysis as the Commission sees fit.

Energy Storage Proposed Scenarios	**Storage Tech/Siting Mix (MW in 2020)**	**RPS Assumption**	**Notes**
Zero	Transmission: 0 Distribution: 0 Customer-Sited: 0	40% with 50% RPS sensitivity	• Limit current modeling deficiencies/distortions of the true value of storage by manually selecting best fits for storage to solve grid deficiencies
Low	Transmission: 700 Distribution: 213 Customer-Sited: 0	40% with 50% RPS sensitivity	• Assume 50% capacity value for distribution connected storage
Mid	Transmission: 700 Distribution: 213 Customer-Sited: 100	40% with 50% RPS sensitivity	• Assume 50% capacity value for distribution and customer-sited storage
High	Transmission: 700 (+ 3,000 MW planned large pumped storage) Distribution: 425 Customer-Sited: 200 Also include a similar trajectory past 2020	40% with 50% RPS sensitivity	• Assume 100% capacity value for distribution and customer-sited storage

Gradually increasing levels of energy storage penetration may also better illustrate optimal deployment levels. One of these scenarios could feasibly be bundled into the expanded preferred resources scenario. Working with the Commission' staff and the parties, several of these additional energy storage scenarios listed above could be mapped to the appropriate existing scenarios, in order to keep the number of scenarios to a reasonable number for modeling.

2. Are there any technical errors in the proposed scenarios, scenario tool, or RPS Calculator? For any identified errors, please be very specific in your comments including the location of the error and the correct value, including the source for the revised value. If appropriate, please provide a revised spreadsheet showing any corrected values. Some example questions to consider in identifying factual errors are:

    a. Are any resources counted twice or inappropriately left out of the analysis?

    b. Are any numbers cited in the proposed scenarios or spreadsheets inaccurate relative to the intended sources?

    c. Are there any errors in the renewable generation project data in the 33% RPS Calculator?

CESA's Response:

There appear to be no technical errors in the proposed scenarios in terms of resource distribution or counting. However, the treatment and modeling of distribution and customer-sited energy storage is not accurate. CESA addresses this point in its responses to Questions Number 6 and Number 7 below.

3. Should Diablo Canyon be assumed online or retired in the Trajectory case?

CESA's Response:

CESA expresses no opinion on this question at this time, but reserves the right to address the question in reply comments.

4. Is the treatment of energy storage for capacity value reasonable?

CESA's Response:

In Section 4.2.4 of the Planning Assumptions, the Commission's staff states: "Unlike demand-side storage, locations can be reasonably projected for transmission-connected storage, as these resources will likely interconnect to the system near transmission substations. Moreover, transmission-connected energy storage will likely be operated in a manner that adds to system and local reliability. Therefore, the 700 MW storage target described above will serve as the default assumption to be modeled in all planning studies."[10] While the transmission-connected energy storage assumptions treat the capacity value of storage in a reasonable manner based on D.13-10-040 (target year 2020 assuming linear growth from zero in 2016), the distribution-connected and customer-sited assumption of zero capacity value is not reasonable. As noted in CESA's response to Question Number 1 above, in modeling conducted in the Storage Rulemaking, significant value for capacity was identified for distribution-sited use cases. Additionally, customer-sited also have potential capacity value using dispatchable DR as a proxy. As discussed in CESA's response to Question Number 7 below, CESA strongly urges the Commission to consider capacity value for both distribution-connected and customer-sited energy storage in a manner similar to dispatchable DR.

5. For existing resources that do not have announced retirement dates, Staff may assume a resource retires based on facility age. Facility age is calculated from Commercial Online Date, but the COD may not be available for some resources. If no COD is available, is it reasonable to assume the resource does not retire within the planning horizon? If not, please provide an alternate methodology and justification from a public data source as needed.

CESA's Response:

CESA expresses no opinion on this question at this time.

6. How should the capacity value of energy storage, demand response, and demand side resources (PV, CHP) be allocated to small geographic regions and/or busbars

[10] Planning Assumptions, p. 13.

and how should the capacity value be adjusted to account for locational and operational characteristics uncertainty?

CESA's Response:

Capacity value for energy storage in smaller geographic regions, energy storage should be treated in a manner similar to dispatchable DR. Where there is local capacity requirement ("LCR") need found in these geographic regions, utilities can procure energy storage for distribution-sited projects. This will limit locational uncertainty, given specific siting in the context of utility procurement to meet LCR need.

Regarding operational characteristics, the table set forth above in CESA's response to Question Number 1 provides 0%, 50%, and 100% capacity value scenarios, is a straightforward way to approach this uncertainty. Additionally, modeling in the Storage Rulemaking indicated that the highest-value distribution-connected applications were in the 2-4 discharge duration periods, which could qualify for a discounted capacity value. This would reasonably lend itself to cost-effective utility procurement of their distribution-sited storage assets mix to include significant quantities of 2 to 4 hour discharge duration periods.

7. Decision (D.13-10-040) established storage goals for each of three categories – transmission, distribution, and customer-side of the meter, but does not specify the function(s) to be provided. Should storage modeling be focused on deep multi-hour cycling to support operational flexibility or rapid cycling for ancillary services? How should the production profile of each category of storage identified in the CPUC Storage Target Decision be modeled – as a fixed profile or as a dispatchable resource?

CESA's Response:

While D.13-10-040 did not specify the functions to be provided by energy storage resources in each "bucket," the record in the Storage Rulemaking informs the functions that can be provided by those energy storage resources. These functions included capacity, frequency regulation, transmission and distribution upgrade deferral, and ramping. For modeling purposes, several sub-categories were used, each of which had unique physical, locational, and operational characteristics. These sub-categories were modeled as being able to provide a certain mix of grid functions, with each resource having the capability to provide multiple functions as needed (*i.e.* a distribution-level battery array can provide peak capacity or frequency regulation – at times separately, and at times concurrently). Further, while some sub-categories had fixed load profiles for modeling purposes, others (*e.g.* utility-controlled behind-the-meter) were considered dispatchable.

Similarly, to the greatest extent possible, LTPP modeling and analysis should generate a realistic mix of deep-cycle energy and ancillary services provided by energy storage, as well as a realistic mix of fixed profile and dispatchable resources. These can further be broken down by procurement target category, consistent with the modeling assumptions used in D.13-10-040. For example, it is reasonable to treat most utility-controlled resources as dispatchable. This would include most resources in the distribution-level and transmission-level categories, as well as utility-controlled behind-the-meter resources.

Specifically, supply-side assumptions should treat dispatchable customer-sited and distribution-level energy storage similarly to dispatchable DR. From a net load standpoint, dispatchable energy storage is virtually identical to dispatchable DR, and can be appropriately modeled as such. When modeled this way, energy storage resources will also be able to fully capture value provided to the system, as well as realistic market participation. For example, dispatchable energy storage resources will be able to receive resource adequacy ("RA") value and participate in the CAISO's markets. Given recent changes in policy direction, dispatch profiles should appropriately reflect these market dynamics.

8. Should incremental small PV and small CHP on the customer side of the meter be modeled as demand-side load reduction or supply side generation? How should the production profile of each resource type by modeled? Should the same modeling convention be used in all 2014 LTPP and 2014-15 TPP studies or may specific studies make this decision in a manner best suited to the topic being studied?

CESA's Response:

CESA expresses no opinion on this question at this time, but reserves the right to respond in reply comments.

9. Is the forecast of incremental small PV (beyond what is embedded within the IEPR forecast) on the demand side reasonable? If not, please provide an alternate forecast and justification from a public data source as needed.

CESA's Response:

CESA expresses no opinion on this question at this time, but reserves the right to respond in reply comments.

10. Is the forecast of incremental CHP on the demand side and the supply side reasonable for the scenarios that include those forecasts? If not, please provide an alternate forecast and justification from a public data source as needed.

CESA's Response:

The forecast appears to be reasonable.

IV. CONCLUSION.

CESA thanks the Commission for this opportunity to provide comments on the Workshop Materials that were distributed on December 18, 2013, to parties, CAISO inform parties and interested stakeholders concerning the assumptions, scenarios, and renewable portfolios, and provide an opportunity for questions and feedback.

Respectfully submitted,

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