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.	Rulemaking 12-03-014 Filed March 12, 2012

COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENT ON WORKSHOP TOPICS

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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.	Rulemaking 12-03-014 Filed March 22, 2012

COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENT ON WORKSHOP TOPICS

The California Energy Storage Alliance ("CESA")[1] hereby submits these comments pursuant to the *Administrative Law Judge's Ruling Seeking Comment on Workshop Topics*, issued September 14, 2012 ("ALJ's Ruling").

I. INTRODUCTION.

CESA submits these comments in the form of responses to the specific questions posed for discussion in the ALJ's Ruling, based on the presentations discussed at the Workshop held by the Commission's Energy Division Staff on September 7, 2012.[2] CESA will also elaborate in its Reply Brief to be filed in this proceeding on certain key points that are made in its responses here which will, among other things, address related information and arguments presented by parties

[1] The California Energy Storage Alliance consists of A123 Systems, Beacon Power LLC, Bright Energy Storage Technologies, CALMAC, Chevron Energy Solutions, Deeya Energy, East Penn Manufacturing Co., Energy Cache, EnerVault, Fluidic Energy, GE Energy Storage, Green Charge Networks, Greensmith Energy Management Systems, Growing Energy Labs, HDR Engineering, Ice Energy, Kelvin Storage Technologies, LG Chem, LightSail Energy, Panasonic, Primus Power, Prudent Energy, RedFlow Technologies, RES Americas, Saft America, Samsung SDI, Seeo, Sharp Labs of America, Silent Power, Stem, Sumitomo Electric, Sumitomo Corporation of America, SunEdison, SunVerge, TAS Energy, and Xtreme Power. 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

[2] The Energy Division Staff stated the purpose of the Workshop to be as follows: "This workshop will explore the definition and valuation of energy products and resources that can meet Local Capacity Requirements and System Need, including resources such as storage, demand response, and distributed generation alongside conventional generation." (CPUC Presentation, p. 4).

in their Opening Briefs. Most importantly for present purposes, as requested, CESA attaches a composite critique of the most recent long-term Requests for Offers ("RFOs") for system resources issued by the Investor Owned Utilities ("IOUs") that is submitted for consideration by the Commission as a "Model All-Source RFO" (Appendix A).[3] CESA urges the Commission to direct the IOUs to use Appendix A as a blue print for All-Source RFOs that will clearly signal to potential bidders that energy storage resources can participate in the solicitation process to meet the Local Capacity Requirement ("LCR") as well as system need, and will be not only seriously considered, but also be fairly evaluated in light of their unique resource attributes and advantages as "preferred resources".[4] This approach should efficiently lead to a new procurement method that could be ready for immediate issuance by the IOUs, once the Commission issues a final decision in Track I of this proceeding.

With the benefit of constructive comments filed by interested parties, and anticipated strong Energy Division Staff support, the Model All-Source RFO can be refined and ready in time to (i) help the IOUs satisfy the immediate need to fill the 2013 LCR to be determined in Track 1 of this proceeding, and also (ii) realize the benefit of the practical experience gained with its first use to refine the approach for use for procurement of system resources that will be the subject of Track 2 of this proceeding. CESA urges the Commission to direct the IOUs to use the Model All-Source RFO as an important new LCR procurement method as soon as possible. At the same time, CESA supports the immediate use of other resource procurement approaches

[3] The Model All-Source RFO is a composite of ways to address issues common to the following representative RFOs that are itemized in the introduction: (a) SCE's 2006 New Gen RFO, (b) PG&E's 2008 All-Source Long-Term RFO, and (c) SDG&E's 2009 RFO.

[4] CESA recommends that the Commission clarify the relationship between California's "Loading Order" and the category of "preferred resources" referred to by the Commission and parties thus far in this proceeding as soon as possible. CESA will elaborate on the reasons for this recommendation in response to the *Megawatt Storage Farms – Motion Regarding the Loading Order and Energy Storage*, filed October 5, 2012.

in parallel with development and use of the new All-Source RFO.[5] This multiple method procurement approach should be well within the procurement authority of the IOUs that exists today; and it will maximize the potential for near-term evaluation, selection, and deployment of energy storage resources as quickly as possible. As discussed below, the IOUs should be authorized by the Commission to use every reasonable and fair procurement method available to them, including the All-Source RFO.

II. CESA'S RESPONSES TO THE QUESTIONS POSED IN THE ALJ'S RULING.

Question Number 1.

What changes should be made to the rules governing the Investor Owned Utilities ("IOUs") procurement processes that would allow all resources to compete fairly in meeting identified needs?

CESA's Response:

The Commission does not need to make any significant changes to the procurement rules that are in place today in order to allow all qualified resources to compete to enable the IOUs timely meet the LCR... CESA's view is that the All-Source RFO, as well as most or all of the other candidate procurement approaches that have been identified by parties thus far can be implemented now without any Commission-directed changes procurement rule changes. The Commission should definitely re-examine, and probably overhaul, the procurement rules that will provide the framework of guidance to the IOUs in Track 2 of this proceeding in order to deal realistically with the paradigm shift from a peak-focused LCR and system resource need to a flexibility-focused LCR and system need. At this time the Commission need only direct the

[5] CESA agrees in essence with the presentation of possible procurement approaches presented by Southern California Edison ("SCE") (SCE Presentation, p. 15), but advocates for all of the listed alternatives to be implemented now rather than considered as alternative or sequential approaches.

IOUs to meet the 2013 LCR by means of an optimum mix of identified potential procurement methods and submit the results to the Commission for approval in an Application.

Just as certainly, however, the Commission should make a number of changes to its resource adequacy ("RA") rules to remove or mitigate barriers that unduly restrict the ability of the IOUs to select energy storage solutions to meet RA requirements. Net Qualifying Capacity ("NQC") standards and firm delivery counting rules and conventions should be completely revamped at the next opportunity in the RA proceeding. CESA accordingly urges the Commission to issue scoping and schedule guidance for the RA proceeding as quickly as possible so that the needed enhancements to the RA program can be carried over to this proceeding. Such an effort in the RA proceeding will certainly inform Track 2, and may also provide helpful initial guidance to the utilities than can be worked into their ongoing procurement activity undertaken in this Track 1.

The Commission and parties are, of course, well aware that there are limits to the Commission's jurisdiction that mandate seamless collaboration with the California Independent System Operator ("CAISO") for both RA and LTPP to be as effective as they should be. The CAISO has been very proactive in advocating for a far greater degree of system flexibility than was ever contemplated by its existing tariffs. This advocacy has extended to consideration of new approaches to LCR that are unprecedented, but are seen as necessary to meet the new reality of grid operations and planning.

Question Number 2.

What amendments, if any, would be necessary to the most recent long-term Request for Offers issued by PG&E, SDG&E, and SCE to ensure that all resources are eligible to compete in meeting future RFOs?

CESA's Response:

CESA hereby submits the Model Long-Term RFO, attached as Appendix A, to these comments, for consideration by the Commission. Appendix A represents CESA's recommendations for improvements to the most recent long-term all-source RFOs. It is based on a composite of the recent long-term all-source RFOs (or their nearest equivalents) referenced in the preamble. Energy Storage should be included, fairly evaluated, and seriously considered as a category of resource from which the IOUs should consider requesting offers for procurement. The most salient recommended changes are highlighted as follows:

1. Eligible resources: "Energy storage" should explicitly be included as a category of resource from which a utility will consider offers. Because even very small storage systems can be easily aggregated and networked from multiple sites, the minimum offer size for including the total capacity of aggregated distributed installations should be 1 MW.

2. Delivery Term: Energy storage projects can be developed and constructed in significantly less time that conventional generation because of reduced siting, permitting, environmental and litigation risks, thus the RFO process should recognize this reduced risk profile and award preference accordingly, particularly when commercial online dates can be phased over time to best fit market requirements..

3. Product Operational Flexibility: Currently, the ability to reduce curtailment of renewable generation is not currently considered in the current IOU RFO's. Energy storage projects have this ability by operating as a load resource when charging. Additionally, the IOUs' preference for dispatchable resources can be met with energy storage due to its capability of ramping to full output in less than a minute while being synchronized and available to respond to dispatch instructions without minimum generation or emission limit constraints. Preference should be stated for dispatchable resources with operational flexibility.

4. Market Valuation- Energy, Capacity and Ancillary Services: Current IOU RFO's do not appropriately value energy storage resources that have the potential to offer significant ancillary services due to their vast flexibility range (200% of their rated capacity) , high number of service hours (always synchronized with no minimum generation) and fast ramp rates. For a fair evaluation, it's important that market projections of ancillary service value account for the value delivered, as is being incorporated into the CAISO's tariff through the implementation of FERC Order No. 755.

5. Market Valuation- GHG: The operational flexibility of energy storage resources helps in achieving emissions reduction goals by utilizing California's existing fossil fleet much more efficiently and hence should be valued commensurately.

6. Market Valuation- Transmission System: RFO bid evaluation should recognize the reduced congestions risk and upgrade costs that energy storage resources can help avoid due to their ability to be sited locally within transmission-constrained areas. Additionally, optimized siting and interconnection of energy storage resources presents the potential to reduce transmission losses and improves overall system efficiency.

7. Portfolio Fit: Most IOUs use a system-wide modeling for scenario comparison in their procurement process; hence a similar approach should be considered for resource acquisition, as energy storage resources enhance the overall utility portfolio in several ways, including, for example, improving integration of intermittent renewable resources, enabling incumbent generators to operate more efficiently, reducing transmission system line losses and increasing overall system efficiency and reliability.

Question Number 3.

What specific characteristics or attributes must any resource -- including demand-side, energy storage, or distributed -- provide in order to meet future procurement needs?

CESA's Response:

CESA agrees with the list of characteristics or attributes that were listed and discussed in the testimony of the CAISO's witnesses, and summarized by SCE as follows:

> "CAISO LTPP witnesses identified the technical requirements that must be considered for LCR resources
>
> – Availability to respond to calls
>
> – Frequency of calls
>
> – Number of continuous hours of operation required
>
> – Response time
>
> – Certainty of resource response to "dispatch" instructions
>
> – Voltage Support
>
> – Ability to provide ancillary services, ramping, and load following
>
> – Located in the local area" (SCE Presentation, p. 11).

Question Number 4.

What are the pros and cons of various procurement methods with regard to: 1) local procurement considered in Track 1 of LTPP and 2) operational flexibility and general system procurement considered in Track 2 of LTPP?

CESA's Response:

CESA's view is that SCE has identified the universe of realistic procurement methods. The question of whether or not the IOUs should be subject to a mandate to procure a certain amount of energy storage is, of course, the subject of the Commissions Energy Storage Rulemaking (R.10-12-007) but that is an entirely different question than whether or not the IOUs should be directed to use set asides for procurement of LCR at this time. In fact, CESA agrees with PG&E's Opening Brief on the subject of set asides:

> "While the California Cogeneration Council and the California Energy Storage Association may be arguing for combined heat and power and storage set-asides, respectively, no set-asides should be created in Track 1. Set-asides increase costs for ratepayers and should be avoided. The actual selection of resources to meet a forward procurement requirement should be done through a competitive procurement process that enables all resources and all technologies, including combined heat and power and storage, to compete on an equal footing." (p. 1; and see p. 6). "PG&E has no objection to consideration of energy storage as one of the alternatives available to the meet the local capacity need identified in Track 1." (p. 8). "Specifically with respect to the topic of Track 1, whether there is a need for local capacity to ensure continued reliable operation of the system, all resources, including storage, should be allowed to compete to meet the identified resource need." (p. 9).

A novel approach suggested by the California Cogeneration Council ("CCC") in their Opening Brief is to simply graft a location adder onto the pricing terms of resources that are solicited under a handful of disparate existing procurement programs with nothing more:

> "In recent years, the Commission has devoted a great deal of effort to developing procedures and contracts designed specifically for the procurement of preferred resources. These processes are tailored specifically to each type of preferred resource. The CCC recommends that the Commission should use these existing mechanisms as the basis for the procurement of resources in these local areas, with modifications as needed to focus preferred resource procurement in the locations and at the times where they are needed to meet LCR needs. One of these modifications may be to pay a reasonable, market-based premium for preferred resources that meet local capacity needs, compared to the prices for these resources where there is no LCR need. Such a premium would be reasonable given that these resources would meet two important needs – first, advancing the state's preferred resource goals and, second, avoiding the need for conventional capacity to meet local capacity needs. The CCC does not recommend that the Commission attempt to use an all-source request for offers (RFO) to procure preferred resources: the geographically distributed, small-scale attributes of preferred resources make them unsuited to all-source RFOs." (pp. 2-3).

The difficulty is that this approach is easy to state but essentially impossible to implement since the cluster of existing programs referred to: (a) are all significantly different from each other, (b) lack any coordination in timing of execution in relation to each other, (c) would each need to be modified in their own particular way to suit the intended purpose of meeting LCR, (d) take too long to accomplish change, and (e) leave unanswered the question of how to rank

among the programs if it were possible to arrive at apples to apples comparisons. This approach would, of course, also entirely exclude energy storage from the ability to compete.

An approach advocated for by GenOn in its Opening Brief focuses entirely on the length of time required to build new fossil generation and concludes:

> "GenOn's preferred method of procurement is through the use of competitive solicitations. However, GenOn is sensitive to the concerns regarding perceived market power expressed by both SCE and TURN. On that basis, GenOn also supports the use of cost-based, bilaterally negotiated contracts authorized under California Assembly Bill 1576 as a vehicle for procuring new generation." (p. 13).

This view completely ignores the existence of preferred (or any new) resources as an option and, would be far and away the most costly approach possible. Again, this approach would exclude participation by energy storage.

Rather than conflating numerous separate existing programs, as proposed by the CAC, or essentially resorting to sole source procurement, as proposed by GenOn, another conceptual possibility would be a single procurement vehicle that includes within it one or more set asides for preferred resources. This would be possible, but competition among preferred resources could very well lead to deadlock as to what the right percentages of each resource ought to be. As SCE notes in its presentation: "Storage technology has not been specifically identified as a preferred resource, but its operational characteristics warrant consideration as part of "least cost-best fit" procurement solutions" (SCE Presentation, page 13).[6]

Question Number 5.

What, if any, changes would need to be made to the most recent long term RFO issued by PG&E, SDG&E, and SCE to allow for incremental capacity associated with retrofits to existing generation to compete to meet Local Capacity Requirements?

[6] [Note: describe differing opinions in Opening Briefs].

CESA's Response:

In many cases, the lowest cost of electricity to meet Local Capacity Requirements can come from retrofits to existing units, particularly in resource constrained areas. CESA's comments above regarding an all-source RFO will create an opportunity and a reason for developers bidding new conventional gas generation to bid their project coupled with energy storage of the kind described in detail at the workshop as it would recognize the flexibility benefits associated with energy storage that are not currently recognized (and therefore not currently bid). [7]

However, *retrofits* to existing assets utilizing energy storage technology, such as generation-sited thermal storage, are prevented from participating in the RFO process because facilities currently under contract would be required to re-open/re-negotiate their existing contract in order to be compensated for the increased output from to energy storage. This risk is a non-starter for developers of existing projects.

In order to allow energy storage retrofits to existing conventional gas assets to be considered under an RFO to meet LCR needs, the RFO must specifically state that a separate contract will be entered into between the IOU and the bidder for the incremental MWs added through the energy storage investment. This contract would then run in parallel with (or overlay alongside) the facility's existing contract for power generated by its gas turbine.

Question Number 6.

How could a demand side program be authorized through this LCR procurement process that delivers an on-line date and a duration that is comparable to conventional generation?

[7] TAS Energy Presentation

***CESA's Response**:*

Through the successful implementation of the Self Generation Incentive Program and Permanent Load Shifting, behind the meter energy storage systems are being deployed throughout California primarily to reduce peak demand for end customers. The value proposition for such customers is to reduce peak demand charges and offset high on peak energy charges with energy purchased during non-peak times. Because energy storage systems are highly modular, scalable and can easily be remotely aggregated and controlled, it is easy to imagine how this growing fleet of dispatchable capacity could be used to serve California's LCR requirements … provided that system owners and developers had the financial incentives and necessary contracts in place to do so. Further, adding additional capacity and capability to pre-existing systems will likely be more cost effective than a new system of the same size purely dedicated to LCR requirements, due to the system's ability to amortize fixed installation costs over a larger number of services. It is for this reason that CESA's proposed Model All Source RFO recommends that the minimum offer size, including the total capacity of aggregated distributed installations should be 1 MW.

III. CONCLUSION.

CESA appreciates this opportunity to provide these comments.

Respectfully submitted,

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October 9, 2012

APPENDIX A

CESA
CALIFORNIA ENERGY STORAGE ALLIANCE

RFO Comments

The following RFO suggestions are based on a review of past procurement by California IOUs that resulted in proposed transactions with new gas-fired peaking generation.

RFO	Proposed Transaction(s)
SCE 2006 New Gen RFO	CPV Sentinel 728MW (8 x LMS100), 10 years
PG&E 2008 All Source Long-Term RFO	Mariposa Energy Center 200 MW (4 x LM6000), Calpine Los Esteros 109 MW (Bottoming cycle added to 180 MW peaking plant), GWF Tracy 145 MW (Bottoming cycle added to 169 MW peaking plant), Marsh Landing 719 MW CC, Oakley Generating Station 586 MW CC
SDG&E 2009 RFO	Pio Pico 305MW (3 x LMS100), 20 years

We have provided comments on the goals, requirements and evaluation process of one RFO. These comments are meant to provide constructive suggestions as to how utility RFO's, in general, could be amended and made more effective by enabling and clearly signaling to potential bidders that energy storage resources can participate and will be not only seriously considered, but also fairly evaluated in light of their unique attributes and advantages.

RFO Element	Comments
Resources Renewable Resources, Distributed Generation, Qualifying Facilities, Repowering and New Conventional Generation are listed as types of resources from which the utility will consider offers.	"Energy Storage" should be included as a category of resource from which a utility will consider offers. Energy storage systems may be composed of a single facility or a networked group of distributed installations. Minimum offer size (including total capacity of aggregated distributed installations) should be 1 MW. Energy Storage systems with durations of 4 hours or less should be explicitly allowed to bid and be considered as capacity. Systems that can deliver longer duration storage should be valued accordingly.
Delivery Term – COD The utility sought online dates seven years after the date the RFO was issued, with a preference for earlier CODs.	Energy storage projects can be developed and constructed in significantly less time than conventional generation due to the reduced siting, permitting, environmental and litigation risks. The RFO evaluation should recognize the limited risk profile and award preference accordingly.

Delivery Term – Contract Length PPA contracts with conventional generation facilities are required not to exceed ten years because D.06-07-029 limits the term of the cost allocation mechanism for PPAs with non-renewable generation facilities.	In order to reduce project financing costs, energy storage resources should be entitled to the longest term available to the generating resource it is associated with. If standalone, non-fossil Energy Storage resources should have the maximum term allowed for RPS-eligible generation.
Products - Operational Flexibility A preference is stated for dispatchable resources with operational flexibility. Specifically, the utility states a preference for: - Resources capable of multiple starts and stops per day (e.g. > 300/year). - Resources with short startup time to full operation (e.g. < 30 minutes). - Resources that can turn down to a low minimum output level relative to their maximum output - Resources with a fast ramp rate (e.g. 7%/minute) - Resources that can provide AGC, and other ancillary services, especially in enough hours to be effectively utilized. Fewer operational limitations due to emissions constraints.	The superior operational flexibility of energy storage technologies should be recognized and awarded preference accordingly in RFO evaluation. Many are capable of ramping to full output in less than a second. This capability is available in all hours because an energy storage resource can be synchronized and available to respond to dispatch instructions without minimum generation or emissions constraints. In the terms of the RFO: - > 300 starts per *day.* - < 1 minute to full operation. - 0 MW minimum output level. - 100%/minute ramp rate. - AGC and other ancillary services utilizing 200% of contracted capacity (e.g. 200 MW flexible range for a 100 MW resource) in all hours. Additionally, Energy Storage projects have the ability to reduce curtailment of Renewable generation when operating as load resources during charging. This attribute is not currently considered and will grow in value as California RPS targets are pursued.

PPA/Tolling Agreements PPA offers are accepted. For gas-fired facilities, a tolling structure is preferred.	The utility should note that energy storage offers would also be preferred under a fuel conversion (tolling) structure with electricity as the fuel. Energy storage resources should be able to offer a "conversion rate", analogous to a conventional gas-fired resource's heat rate, which is measured as the ratio between energy injected at the energy delivery point to the energy withdrawn at the fuel delivery point.
PPA/Tolling Agreements RFO participants offering a PPA other than a gas tolling structure should mark up the draft PPA.	It is positive that the utility anticipates resources that may offer structures other than gas tolling agreements. A markup of the PPA to reflect an electricity tolling structure should not be penalized in the RFO evaluation. For projects that include retrofitting existing assets to improve the existing assets' operating capacity, provision shall be made for a separate contract to run in parallel with the existing operating contract.
Eligibility – Site Control RFO participants must demonstrate site control by no later than eight weeks after notification of shortlisting.	The site control requirements should be reduced for energy storage resources that face shorter permitting and construction timelines than conventional or renewable generation facilities. Energy storage resource siting is not subject to such constraints as fuel supply or air permits, and is much more flexible, and easier to install as a result. A wide variety of sites are eligible for energy storage facility development. In many cases, distributed resources can be aggregated to provide flexible capacity without a single storage facility. An energy storage offer should be able to propose a number of alternate sites, one or more of which it proposes to control according to a project schedule that is consistent with achieving interconnection and COD. A lack of

	site control should not be unduly penalized in the context of Project Viability in RFO evaluation given the siting flexibility of energy storage resources.
Eligibility – Interconnection RFO participants are required to initiate interconnection procedures no later than one week after shortlisting.	The required timeline for initiation of interconnection procedures should be determined according to a project schedule that is consistent with achieving COD, and therefore may not need to be within one week of shortlisting.
Eligibility – Useful Life Facilities must be constructed with equipment that has a useful life of 30 years or greater.	As with all conventional generation resource technologies, energy storage resources may perform regular investments in maintenance to meet capacity, availability and conversion rate commitments. Some energy storage technologies, like conventional thermal and renewable generation technologies, will face degradation in their performance over time. This does not mean that they are not able to meet contracted capacity commitments over the delivery term. The "cycle life" issue as it relates to energy storage resources offering capacity under a tolling agreement is a commercial issue, not a technical issue. The evaluation of Useful Life should be on plant or system life and not equipment or component life, as all types of resources include parts that are not expected to last 30 years.
Eligibility – Gas Supply RFO participants offering gas-fired resources must initiate an application for gas service.	Energy storage resources do not require gas service. The RFO evaluation should recognize the limited risk profile and award preference accordingly.

Evaluation of Offers	Comments
Market Valuation – Energy, Capacity and Ancillary Services An offer's benefits are the market value of the energy, capacity and ancillary services offered, including risks and uncertainties of the costs and benefits.	RFOs need to appropriately value the products that storage resources offer. For example, energy storage resources have the potential to offer significant ancillary services value due to their wide flexible range (200% of contracted capacity), high number of service hours (always synchronized, no minimum generation) and fast ramp rates. For a fair evaluation, it is important that market projections of ancillary service value account for the value delivered, as is being incorporated into CAISO regulation compensation through the implementation of FERC Order No. 755. Projections of system ancillary service needs and value should be performed consistent with alternate evaluation scenarios, including the increased ancillary service requirements of high renewable penetration as the California RPS targets are pursued.
Market Valuation - Planning Flexibility	Many Energy Storage resources have the capacity to be installed in phases rather than as a single block. Often, each phase can be installed in less than a year. A phased approach to Commercial Online Dates (CODs) can thus provide tremendous value to utilities by enabling capacity to be installed only when the market requires it. RFOs should recognize and fairly compensate approaches that allow for multiple CODs and/or shifting of the CODs to best fit the market.

Market Valuation – Operating Flexibility Option valuation models are used to quantify the benefits of operating flexibility.	In addition to the performance benefits of energy storage resources enumerated above, which include the increased number of hours online and capability for frequent and fast ramping, the overall flexible dispatch range of energy storage resources must be taken into account in the evaluation. For example, a 100 MW energy storage resource provides 200 MW of dispatchable range. A 100 MW gas-fired combustion turbine will only provide 80 MW of flexible range, and only during the hours in which the unit is online. Those hours will either be limited by the gas-fired unit's relatively few hours of economic dispatch, or if they are not they will result in significant out-of-merit generation fuel costs.
Market Valuation – GHG The costs attributed to GHG emissions are included.	The CPUC has in the past directed utilities to procure fast-starting and fast-ramping units to adjust for ramps created by intermittent renewable resources in a GHG constrained portfolio. The superior operational flexibility of energy storage resources that helps in achieving emissions reduction goals should be awarded preference in the RFO evaluation. Further, the GHG emissions reductions of storage resources should be valued appropriately.
Market Valuation – Transmission System Network upgrade costs and congestion risk are considered.	Energy storage resources can be sited locally within transmission-constrained areas. The RFO evaluation should recognize the reduced congestion risk and upgrade costs and award preference accordingly. Additionally, optimized siting and interconnection presents the potential to reduce transmission losses and improve system efficiency. A system-level evaluation of transmission impacts should be considered in the RFO evaluation process.

Portfolio Fit The offer's features are evaluated in the context of the utility's portfolio, including temporal, locational and fuel diversity aspects.	Most utilities use system-wide modeling for scenario comparison in their IRP process – a similar approach should be considered for resource acquisition. Energy storage resources enhance the overall utility portfolio in several ways: 1. Improving integration of intermittent renewable resources, including reduced curtailment; 2, Enabling incumbent generators to operate more efficiently due to reduced starts and reduced out-of-merit and part-load operation; 3. Dampening the potential impact to customers of natural gas price volatility; 4. Reducing transmission system losses; 5. Increasing system reliability through operational flexibility of energy storage resources. 6. Allowing peak demand to be met by low-emission off-peak hydro, nuclear, combined cycle or wind resources;
Credit	Energy storage resource offers should be held to the same industry-standard credit requirements of conventional generation resources.
Participant Qualification	Energy storage developer, EPC and O&M experience is inherently limited to date, but should still be evaluated in the context of the available deployment data.
Project Viability Resource financing and completion risk are evaluated.	Energy storage resources will face significantly reduced EPC complexity as compared to conventional thermal generation resources. The RFO evaluation should recognize the limited risk profile and award preference accordingly.

Technical Reliability The type of technology and equipment are evaluated, as well as the following: Heat rate, capacity, availability, forced outage rates, O&M costs, start-up times/costs.	Many energy storage resources are comprised of modular and/or distributed architectures, which will show a significant availability benefit. Most maintenance procedures can be performed without taking a significant proportion of the resource's capacity out of service. Similarly, forced outages due to equipment failure are modularly contained, significantly reducing the "shaft risk" contributed toward LOLP by an energy storage resource. The RFO evaluation should recognize the limited risk profile and award preference accordingly.
Environmental Leadership Local pollution exposure and community impact will be assessed.	Most energy storage resources will have no direct emissions and no or very little water usage. The RFO evaluation should recognize the minimal impact to the local community and award preference accordingly. A similar methodology to GHG emissions costs should be undertaken for the consumption of the scarce California water resource.
Conformance The RFO evaluation may impute an additional amount to a participant's offer price to reflect modifications to the non-price terms and conditions.	A markup of the PPA to reflect an electricity tolling structure should not be penalized in the RFO evaluation.

The California Energy Storage Alliance consists of A123 Systems, Beacon Power, Bright Energy Storage Technologies, CALMAC, Chevron Energy Solutions, Deeya Energy, East Penn Manufacturing Co., Energy Cache, EnerVault, Fluidic Energy, GE Energy Storage, Green Charge Networks, Greensmith Energy Management Systems, Growing Energy Labs, HDR Engineering, Ice Energy, Kelvin Storage Technologies, LG Chem, LightSail Energy, Panasonic, Primus Power, Prudent Energy, RedFlow Technologies, RES Americas, Saft America, Samsung SDI, Seeo, Sharp Labs of America, Silent Power, Stem, Sumitomo Electric, Sumitomo Corporation of America, SunEdison, SunVerge, TAS Energy, and Xtreme Power. 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