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.	Rulemaking 15-03-011 (Filed March 26, 2015)

COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON THE ADMINISTRATIVE LAW JUDGE'S RULING NOTICING WORKSHOP, JOINTLY LED BY THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR AND THE CALIFORNIA PUBLIC UTILITIES COMMISSION AND SETTING A COMMENT SCHEDULE

Donald C. Liddell
DOUGLASS & LIDDELL
2928 2nd Avenue
San Diego, California 92103
Telephone: (619) 993-9096
Facsimile: (619) 296-4662
Email: liddell@energyattorney.com

Counsel for the
CALIFORNIA ENERGY STORAGE ALLIANCE

May 13, 2016

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.	Rulemaking 15-03-011 (Filed March 26, 2015)

COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON THE ADMINISTRATIVE LAW JUDGE'S RULING NOTICING WORKSHOP, JOINTLY LED BY THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR AND THE CALIFORNIA PUBLIC UTILITIES COMMISSION AND SETTING A COMMENT SCHEDULE

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 *Administrative Law Judge's Ruling Noticing Workshop, Jointly Led by the California Independent System Operator and the California Public Utilities Commission and Setting a Comment Schedule*, filed on April 22, 2016 ("Ruling").

I. INTRODUCTION.

CESA appreciates the opportunity to comment on the Issue Paper attached to the Ruling, and the May 2 and May 3, 2016, workshops jointly held by the Commission and the California

[1] 1 Energy Systems Inc., Adara Power, Advanced Microgrid Solutions, AES Energy Storage, Amber Kinetics, Aquion Energy, Bright Energy Storage Technologies, Brookfield, California Environmental Associates, Consolidated Edison Development, Inc., Cumulus Energy Storage, Customized Energy Solutions, Demand Energy, Eagle Crest Energy Company, East Penn Manufacturing Company, Ecoult, Electric Motor Werks, Inc., ElectrIQ Power, ELSYS Inc., Enphase Energy, GE Energy Storage, Geli, Gordon & Rees, Green Charge Networks, Greensmith Energy, Gridscape Solutions, Gridtential Energy, Inc., Hitachi Chemical Co., Ice Energy, Innovation Core SEI, Inc. (A Sumitomo Electric Company), Invenergy LLC, Johnson Controls, K&L Gates, LG Chem Power, Inc., Lockheed Martin Advanced Energy Storage LLC, LS Power Development, LLC, NEC Energy Solutions, Inc., NextEra Energy Resources, NGK Insulators, Ltd., NRG Energy LLC, OutBack Power Technologies, Parker Hannifin Corporation, Powertree Services Inc., Qnovo, Recurrent Energy, RES Americas Inc., Saft America Inc., Samsung SDI, Sharp Electronics Corporation, Skylar Capital Management, SolarCity, Sovereign Energy, Stem, SunPower Corporation, Sunrun, Swell Energy, 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).

Independent System Operator ("CAISO") on the topics of station power and multiple-use applications ("MUA") of energy storage systems. Due to the importance of developing a common understanding and workable framework on these two issues, CESA continues to actively participate in the CAISO's Energy Storage and Distributed Energy Resources ("ESDER") initiative, similarly focusing on these and other energy storage-related matters.

Energy storage is a relatively new resource class that requires a forward-looking perspective in developing rules and regulations around station power and MUAs. Historical approaches and precedents may be inappropriate and inadequate, failing to direct energy storage project deployments and uses in line with basic principles that seek to establish a clear and beneficial role for storage resources in supporting key grid, customer, and environmental benefits.[2] Rules, plans, and procurement concepts developed in this proceeding remain critical to clarifying and expanding the role of energy storage in integrating higher penetrations of renewable resources, diversifying the energy portfolio, and improving reliability, while also lowering greenhouse gas ("GHG") emissions, lowering production costs to the benefit of ratepayers, and expanding choices and toolkits for grid managers, operators, and customers.

Furthermore, energy storage can provide much needed local and system-level resource diversity and reliability benefits for all ratepayers. MUAs are particularly effective because they can be strategically sited and targeted to specific regions and grid-support use cases. For example, energy storage is one of only a handful of resources that can be quickly deployed to help address the reliability challenges created by the methane leak at Aliso Canyon natural gas storage facility. In short, the great modularity, speed of deployment, and flexibility in use enables energy storage to provide risk-mitigating insurance and *optionality* benefits to grid operations that are hard to quantify.

II. CESA'S RESPONSE TO QUESTIONS ON MULTIPLE-USE APPLICATIONS.

The ability to provide multiple services from a single energy storage installation or an aggregation of energy storage installation allows ratepayers and grid operators to realize the full value of energy storage. With compensation for each of these "stacked" services, energy storage systems become significantly more useful and economical while avoiding over-builds of infrastructure – *e.g.*, single-use devices serving a distribution need. CESA therefore supports the vision and problem

[2] *Decision Adopting Energy Storage Procurement Framework and Design Program*, D.13-10-040, issued on October 17, 2013, pp. 9-10.

statement jointly developed by the Commission and the CAISO,[3] which adequately captures the importance of enabling MUAs and the need to resolve market and regulatory barriers related to MUAs.

As CESA works with the Commission, the CAISO, and the utilities in resolving MUA-related issues, it will be important to set the market participation rules and incentives as well as the performance requirements for specific grid services needed to allow energy storage providers to optimize their technologies and operational characteristics. Rather than specifying or prohibiting specific business models or solutions, CESA urges the utilities to focus on articulating specific needs and defining standard products, incentives, and performance requirements that allow energy storage providers to innovate and compete to provide an appropriate and optimized solution. With these in place, industry innovation will be further unleashed and energy storage providers can fully manage their resources to safely and responsibly meet multiple service obligations – *e.g.*, grid service and end-use customer obligations.

In the following sections, CESA provides its response for each of the five use cases identified in the issue paper.

<u>Question 1</u>: ***What are the distribution system services and revenue opportunities that currently exist for energy storage?***

Energy storage resources can provide a number of services to the distribution system. CESA broadly defines "distribution system services" as the array of services and tools needed to safely and reliably deliver power through the distribution grid, typically referring to Commission-jurisdictional distribution grids, the configurations of which may be utility-specific – *i.e.*, radial distribution circuits below 230kV on the SCE grid. These services include: managing and maintaining proper voltage levels through reactive power provisioning, ensuring adequate power quality, deferring or avoiding upgrades and providing reliable service and delivery of power.

CESA's responses focus on the regulatory and market-related issues of providing distribution services. Studies have shown that the physical and technological capabilities of energy storage resources coupled with appropriate inverters and operating systems can provide the physical and electrical services needed to provide an array of services, including distribution services. To this end, the Rocky Mountain Institute ("RMI") provides a list of 13 grid, market, and customer services (shown

[3] *Joint Workshop on Multiple-Use Applications and Station Power for Energy Storage: CPUC Rulemaking 15-03-011 and CAISO ESDER 2 Stakeholder Initiative Issue Paper*, published on April 22, 2016, p. 12.

in Table 1 below) that could be provided by a single energy storage system device that should be used as a starting point for discussion of MUAs in this proceeding.[4]

Table 1: RMI's 13 Services Provided by Battery Energy Storage

		Point of Interconnection		
Stakeholder	**Services**	**Transmission**	**Distribution**	**Behind-the-Meter**
ISO/RTO Services	Energy Arbitrage	X	X	X
	Frequency Regulation	X	X	X
	Spin / Non-Spin Reserve	X	X	X
	Voltage Support	X	X	X
	Black Start	X	X	X
Utility Services	Resource Adequacy	X	X	X
	Distribution Deferral		X	X
	Transmission Congestion Relief	X	X	X
	Transmission Deferral	X	X	X
Customer Services	Time-of-Use Bill Management			X
	Increased PV Self-Consumption			X
	Demand Charge Reduction			X
	Backup Power			X

Source: RMI

With an eye towards the MUAs detailed in the Issue Paper, Table 2 illustrates how energy storage devices support the deliverability of power today by providing an array of distribution services, including voltage support through reactive power-capable inverters, islanding applications for distribution system operations, shifting load on the system for various other reasons (*e.g.*, maintenance, stepping voltage levels up or down), integrating intermittency from renewables, and more. These services can be provided by either a behind-the-meter ("BTM") or in-front-of-the-meter ("IFOM") interconnection.

As shown in Table 2, there are a number of projects configured and operating to provide MUA #1, #2, and #3, and increasingly with MUA #5 as utilities begin to value and procure these services. Energy storage providers' algorithms and control systems are currently able to manage multiple obligations and incentives at the transmission, distribution, and retail levels. For BTM systems, energy storage systems have initially focused on providing retail customer services such as time-of-use ("TOU") bill management while expanding their capability to provide distribution grid services and wholesale market services, for example, by providing Resource Adequacy ("RA") capacity in the CAISO's markets. The progress made in ESDER Phase 1 to enhance the Non-Generator Resource ("NGR") and Proxy Demand Response ("PDR") models have increased the opportunities for energy

[4] *The Economics of Battery Energy Storage: How Multi-Use, Customer-Sited Batteries Deliver the Most Services and Value to Customers and the Grid*. The Rocky Mountain Institute, published on October 2015, p. 6. http://www.rmi.org/Content/Files/RMI-TheEconomicsOfBatteryEnergyStorage-FullReport-FINAL.pdf

storage participate in the wholesale market, while providing various reliability services to the distribution grid (for IFOM or BTM systems) or providing bill management to end-use customers (for BTM systems) from the same asset.

Table 2: Example Projects with Some Distribution Grid Services by MUA Use Case

POI	MUA Use Cases	Example Projects	Retail Customer Services	Distribution Grid Services	Wholesale Market/Capacity Services
IFOM	1	UC San Diego CPV Firming – Maxwell Technologies 28kW Ultracapacitor		Voltage support	Frequency regulation, ramping
	1	PG&E Yerba Buena BESS		Islanding/backup	Frequency regulation
BTM	2	Green Charge Applications	Bill management	Utility DR (CBP)	
	3	Green Charge Networks MVLA High School District – Los Altos HS	Bill management		Demand Response
	3	Scripps Ranch Community Center BESS	Bill management		Non-spinning reserve
	5	Stem 85 MW Western LA Basin	Bill management	Local capacity, distribution deferral	Resource Adequacy (assumed)
	5	AMS 50 MW Western LA Basin	Bill management	Voltage support, low-voltage ride-through, islanding[5]	Resource Adequacy, (assumed)

Source: CESA review of DOE Global Energy Storage Database

Currently, CESA is unaware of an example of MUA #4 in which a BTM installation supports the distribution grid and participates in the wholesale market, but does not at all support the customer. However, CESA recommends the Commission keep MUA #4 open as a possibility to allow for business model innovation, while focusing more attention in this proceeding on the other four MUA use cases that are viable and/or operational today. Feasibly, CESA can envision a new business model under MUA #4 where a savvy energy customer located in a site constrained area would want to generate additional revenues by providing grid services from energy storage systems that do not serve on-site load.

Revenue opportunities for energy storage resources providing distribution services remain undeveloped or in development. These services can be provided by differently situated energy storage resources. For example, an energy storage resource could be deployed, owned, and ratebased by the utility as part of its distribution toolkit, which CESA understands are rare cases. The value of the specific distribution service is not clear, but the business requirements of the utility to provide reliable distribution service through its network of infrastructure can direct the deployment of storage in this case. Costs for the resource are recovered with an earned rate of return through a General Rate Case proceeding. Alternatively, utility-directed, distribution-domain energy storage solicitations allow

[5] Once quantified, this project can provide these distribution systems without significant changes to operations.

energy storage companies to develop bids to contract with utilities to provide distribution services. SDG&E's 2014 Distribution Reliability/Power Quality RFP illustrates this type of structure.

For third-party owned energy storage resources providing utility distribution services, the performance requirements and value remain unclear. Especially for customer-sited MUAs, ongoing efforts through the Distribution Resources Plan ("DRP") and Integrated Distributed Energy Resources ("IDER") proceedings are further establishing the performance requirements for the provision of these services.

CESA recommends further steps be taken to clarify the value and performance requirements of energy storage providing distribution services. In addition to the DRP and IDER work, utility-directed distribution planning with energy storage should also be expanded to clarify the roles and compensation levels for distribution services. These efforts and deployments should build familiarity and capability with all of the recognized MUAs. Progress on MUA #1 and #3 are expanding, but all MUAs should be further developed through utility-directed actions or through clear market signals for would-be providers of distribution services.

<u>Question 2</u>: ***What wholesale, distribution, and customer services can storage provide now and in the next 2-3 years?***

CESA interprets this question to focus on near-term regulatory and market constructs that do, may, or will exist in California. This question builds on the focus of Question 1 and the provision of distribution services in MUAs. CESA believes that a number of specific additional services can be provided within the next two to three years. A list of these additional services is provided below:

Table 3: Future Distribution System Services Provided for Each MUA Use Case

Retail Customer Services	Distribution Grid Services	Wholesale Market Services
• Solar self-consumption • Backup power with low-voltage ride-through	• Distribution Upgrade Deferral • Voltage support/optimization • Islanding or maintenance support • Low-voltage ride-through	• Frequency regulation • Frequency response • Spinning/non-spinning reserve • Reactive power supply

Solar self-consumption: With all Net Energy Metering ("NEM") customers being defaulted to TOU rates in 2018 and with the NEM tariff being reviewed for potential reforms in 2019, CESA envisions rooftop solar self-consumption being a more prevalent retail customer service in the future. These energy storage systems may also participate in providing wholesale and distribution grid services as well if compensation for these systems is sufficient enough to balance the use of the device solely for self-consumption.

Ride-through and backup power: With easier access to energy storage resources, ride-through power and back-up applications are expected to increase. Ride-through refers to the act of stabilizing voltage and frequency such that inverter-based resources do not inappropriately trip-off. Safety concerns should influence low-voltage ride-through applications. In concert with microgrids, low-voltage ride-through and islanding capability may play larger roles.

Distribution deferral: With the ongoing DRP and IDER proceedings aiming to determine locational and avoided cost values for distribution deferral provided by distributed energy resources ("DER") such as energy storage, CESA believes that an MUA use case that involves distribution deferral will be available within several years and has a clear regulatory pathway to have energy storage deliver these services. Distribution deferral can apply to many distribution services where equipment replacements or upgrades are delayed or avoided. The more commonly referenced projects involve deferrals of reconductoring lines and upgrades and replacements of older/smaller transformers with newer/larger ones. Relatedly, Commissioner Florio's proposal to set IOU incentives to deploy DERs for distribution deferral represents an important step in customer-sited MUAs that may provide distribution system services.[6]

Voltage support: The utility distribution 'tool-kit' includes an array of devices to manage voltage on the distribution system, including capacitors. Energy storage devices have the capability to provide reactive power where appropriately configured and, due to their capability to provide additional services, are likely to be considered for voltage support roles both in stand-alone configurations and in MUAs. In some cases, a small reactive-power capable energy storage project could delay upgrades to distribution grid infrastructure.

Frequency regulation: Energy storage can provide frequency regulation service when participating through some CAISO 'models' – *e.g.*, the Non-Generator Resource. Expansion of this capability will occur if other participation models like the PDR model are modified to allow for the provision of frequency regulation. Some of this work is underway in ESDER Phase 2.

---

[6] *Assigned Commissioner's Ruling Introducing a Draft Regulatory Incentives Proposal for Discussion and Comment*, R.14-10-003, issued on April 4, 2016.

Frequency response: The North American Electric Reliability Corporation ("NERC") recently established frequency response obligations through BAL-003-1 standard, which has pushed the CAISO to be on a path toward considering a market mechanism with compensation for providers of primary frequency response.[7]

Spinning reserve clarifications: Energy storage has the capability to provide spinning reserve but tariff language specifying the need for resource 'synchronization' may inappropriately prohibit energy storage or inverter-based resources from providing this service.

Reactive power supply: The CAISO is working to update interconnection rules to allow for the provision of reactive power from energy storage serving in market/generation roles.[8] Presumably, MUAs could also provide this service although the locational nature of reactive power supply (as termed on the wholesale system) may preclude an interconnection-directed approach for customer-sited energy storage projects.

Question 3*:** ***To what extent are multiple-use storage applications permitted under current rules? Identify regulatory and market barriers and rules, their limitations and possible modifications that would enable a use case to deliver and be compensated for multiple services?

A number of regulatory and market barriers to energy storage MUAs currently exist. CESA lists these barriers by MUA and provides a prioritization structure for resolving these barriers in Table 4 below.

Table 4: MUA Barriers & Limitations

Barrier Type	Barrier Details	Possible Modifications	MUA(s)	Priority
Distribution Service Roles	Unclear distribution service performance requirements	Clarify performance requirements in tariffs	1, 2, 3, 4, 5	High
Interconnection	SCE's preference for full WDAT interconnection for sub-resources in aggregation	Allow LRAs to determine appropriate interconnection standards; develop WDAT fast track process and/or single fast-track WDAT for entire aggregation	2, 3, 5	High
Interconnection	Unclear/no rules for storage additions to plants or for repowers with storage instead of conventional generation	Allow additions of energy storage to plants through new interconnection bypass screens so long as output limits remain in place if key criteria	1	High

[7] *CAISO Frequency Response Draft Final Proposal*, published on February 4, 2016, p. 24. https://www.caiso.com/Documents/DraftFinalProposal_FrequencyResponse.pdf

[8] *CAISO Reactive Power Financial Compensation Draft Final Proposal*, published on November 12, 2015, p. 3. https://www.caiso.com/Documents/DraftFinalProposal-ReactivePowerRequirements-FinancialCompensation.pdf

		are met; develop interconnection rules for repowers that use storage to replace conventional generation		
Market Participation Rules	Unavailability of PDR to provide frequency regulation	Allow for dual participation; develop baseline methodologies for frequent dispatch energy storage	1, 2, 3, 4, 5	High
Measurement	PDR's 10-in-10 baseline measurement	Implement MGO methodology	1, 2, 3, 4, 5	High
Procurement	Some utility procurements do not allow MUA or customer-sited resources to bid	Encourage all-source bids and all types of storage offers, including customer-sited MUAs	2, 3, 4, 5	High
Program/Market Participation Rules	Rules preventing dual or multiple program participation	Resolve overlap issues during settlement	1, 2, 3, 4, 5	High
Resource Adequacy	No fuel diversification requirements or long-term planning 'option' concepts	Reform capacity planning rules and establish option values for projects deployable in faster time periods	1, 2, 3, 4, 5	High
Resource Adequacy	No guarantee/valuation of downward flexibility in fleet planning due to assumed sufficiency of downward flexibility	Establish a Flex Down RA product with clear must-offer obligations	1, 2, 3, 4, 5	High
Retail Tariff Limitations	Tariffs provide insufficient detail on what services are needed	Update tariffs to better reflect and incent useful actions from MUAs	1, 2, 3, 4, 5	High
Frequency Response	No market compensation structure exists for primary frequency response	Develop an in-market solution for primary frequency response to reserve this capacity service and compensate at opportunity cost	1, 2, 3, 4, 5	Medium
Market Participation Rules	NGR 24/7 model and SOC limits	Develop opt-in, opt-out NGR model; allow third parties to manage SOC; specify scenarios where 24/7 market participation is not necessary	1, 2, 3, 4, 5	Medium
Station Power	Potential retail rates for efficiency losses and non-discretionary loads for MUAs	Allow consideration of wholesale rates with appropriate controls or metering	1, 4	High

Below, CESA elaborates on some of the key MUA barriers from the table above.

Unclear distribution service performance requirements: In MUAs, resources need to know within reason what performance requirements they must or could seek to meet. Distribution system services have historically been utility directed, often through the deployment of a single device (*e.g.*, capacity). For MUA resources, clarifications must be developed on the services and performance requirements to address a distribution service need. These requirements should be clear and reasonable; for instance, the requirements should not be set unreasonable and unnecessarily high. In its 2014 Distribution Reliability/Power Quality RFP, SDG&E noted that it had required an overly high level of cycling capability from energy storage, driving up costs from bidders.[9] In hindsight, this performance requirement was likely unreasonably high and should be adjusted as SDG&E reruns the RFO.

NGR 24/7 model and state of charge ("SOC") limits: Energy storage resources may choose participation in the CAISO market through the NGR or PDR models. For MUAs, there may be periods where the resource is not contractually required to participate in CAISO markets, and so these resources should have the capability to operate (*e.g.*, as a retail resource) outside of the CAISO market without a CAISO market settlement. The current NGR rules, however, disallow a resource from coming in and out of the market. This is inappropriate and may dissuade MUAs from using the NGR model. Moreover, RA rules and related Must-offer Obligations ("MOO"), in addition to market-price signals for energy and ancillary services, should direct market participation. The 24-hour in-market requirement should be addressed because it seems to be less focused on market efficiency and more on system capabilities. Relatedly, the rules for State-of-Charge ("SOC") limits in the NGR model can also be restrictive to MUAs. By changing or relaxing undue SOC limitations or requirements, scheduling coordinators in MUAs can optimize and manage their market participation obligations against other requirements.

Unavailability of PDRs to provide Frequency Regulation: The PDR construct does not currently allow for the provision of frequency regulation services from PDR resources. This limitation likely excludes some potential suppliers from providing PDR. This outcome is less efficient and may also be detrimental to the business cases of some energy storage MUAs.

PDR's 10-in-10 baseline measurement: Baselines are "appropriate" for loads in a traditional demand response ("DR") application because they estimate "normal" load patterns. However, baselines are not appropriate for advanced energy storage systems because its effect on the load is not equivalent to "normal" load patterns. When metering is available, prior activity of an energy storage facility should not be used for performance evaluation. As discussed in ESDER Phase 1, overly conservative baseline approaches may reduce the capacity and spot-market services capability deemed available from PDRs. Alternative or less conservative baselines, more direct metering, or other solutions should ensure these accounting conventions do not overly limit and waste capability from

---

[9] *SDG&E's 2014 Energy Storage Distribution Reliability/Power Quality Request for Proposal Seeking a 4 MW Energy Storage System: Post-Solicitation Report*, submitted on December 1, 2015, pp. 1-2, 1-3.

energy storage in PDR configurations. The CAISO's current Metered Generator Output ("MGO") model (which uses a baseline) represents a starting point from which to pursue further ideas. CESA appreciates the CAISO's work on this matter to date. . The Commission should build upon past baseline work to expeditiously resolve and clarify any questions regarding the MGO meter requirements.

Rules preventing dual or multiple program/market participation: Contracts and program/market rules often prohibit energy storage resources from accessing multiple value streams. For example, energy storage resources providing direct DR to the CAISO via Rule 24 are often not allowed to participate in the IOUs' Base Interruptible Program ("BIP") as well. Similarly, PDR participants are barred from providing frequency regulation services as well. These rules prevent energy storage providers from pursuing MUAs that are beneficial to the grid, and CESA believes that dual participation rules should be governed by performance requirements and market incentives.

Tariffs provide insufficient detail on what services are needed: MUAs need price signals to understand system or other needs. Many retail rates offer limited insight into system needs and instead generalize system needs in ways that may disincentivize actions for MUAs. Better time-granularity, data transparency, and separation of system needs (*e.g.*, distribution deferral vs. energy vs. capacity values) could be clarified through updated tariff designs that better inform and guide the optimization and operation of MUAs.

Question 4*:** ***Are there any concerns of overlap between wholesale, distribution, and retail services that must be addressed? Which of these services are currently compensated? Does each service provide incremental value? Are there double payment concerns that must be addressed? How should costs and benefits of the same resource serving across the grid be tracked and allocated?

Each of the customer and grid services identified in Question 1 and 2 should be compensated if the two or more services are demonstrated to provide distinct and incremental value to each entity (*i.e.*, customer, distribution utility, or the CAISO) and where the action is not otherwise already reflected in energy prices, plans, etc.

CESA believes the double payment concerns typically arise in instances where unique and incremental *market*-directed actions are not occurring and so the grid or system effects of an action is negligible or is already reflected in market prices, plans, *etc*. Double payment concerns for providing services in *other* jurisdictions, such as distribution services or customer services, remain valuable and warrant compensation so long as the services are provided and regardless if such actions simultaneously seek to provide services in other functional jurisdictions.

To illustrate a legitimate double payment concern, consider how a utility energy marketing group procures to meet the loads of a customer that has used an energy storage device for a long time in a daily TOU rate management application. The customer load shape to which the utility is procuring reflects the operation of the energy storage device and so the market price similarly reflects the role of the energy storage resource. Given that the market price effects are already represented and that the customer's actions are not new, incremental, and unique, energy payments to the customer for wholesale market might be unwarranted. If, however, the utility wants to *rely* on the customer's continued use of the energy storage device such that the utility's RA procurement is lessened/affected, the utility should seeks ways to contract with the storage resource to earn some form of a capacity contract from the utility, requiring the device to be in used in ways that guarantee the capacity (reduction) benefits.

This example differs from utility actions to direct the placement of new MUA capacity, as was the case with SCE's Local Capacity Requirements ("LCR") contracts pursuant to D.13-02-015 and D.14-03-004. In this case, the deployment of BTM storage resources was directed as part of the utilities' planning and RA efforts. To guarantee the solutions operated to provide services as needed, the utility compensates these resources. So long as the resources comply with these utility obligations, the capability to simultaneously offer demand charge reduction or other customer services is incidental and should be allowed. The provisioning of these customer services may happen simultaneously with the same dispatch or with additional, deeper, or different dispatches. In either case, the value provided warrants compensation. As a general rule, any incremental, unique, and not otherwise represented dispatch for market services warrant payments for each service, along with any other service being simultaneously met.

In any assessment of the MUAs, clear price signals and performance obligations are helpful. Demand charge rules use a multi-month look-back upon which to determine demand charge levels. This cost calculation provides clear guidance to customers seeking to manage their electrical bills. Likewise, RA MOOs provide clear performance directives and potential cost consequences for any failures to provide adequate RA service.

The main concerns for MUAs are thus a clear set of rules, not questions of 'primacy' or utility cost recovery. 'Primacy' concerns stem from traditional utility planning efforts where grid components may have been planned for only a single use. As such, performance requirements or incentives are less applicable. In conjunction with work in other proceedings and with the CAISO, the Commission should leverage this proceeding to move beyond these more traditional utility planning approaches. Meanwhile, utility cost recovery concerns need to be addressed through retail rate designs. Utilities should anticipate that customers will respond to rate structures and should develop rates that provide clear incentives. Cost recovery concerns, however, should not be used to prohibit MUAs so long as MUA resources deliver on any service obligations or goals.

The second and more complex situation is one in which an energy storage resource provides different services from the same kilowatt-hours of energy. For example, if a resource discharges energy to serve customer load and reduce demand charges, it may also coincidentally optimize the resource to deliver energy and ancillary services capabilities consistent with RA requirements. Distinct and incremental values are being provided to different markets in this case: demand charge reduction lowers the electricity bill for customers (*i.e.*, end-use benefit) while frequency regulation up improves the reliability of the grid (*i.e.*, system benefit). Some would argue that customer peak load reduction represents a system benefit as well, considering demand charges are intended to signal to customers to reduce demand during system peak load periods. Even then, CESA views a difference in system benefits for the two services provided from the same kilowatt-hours of energy: demand management reduces system costs from serving peak loads (*e.g.*, firing up expensive peaker gas plants) and avoids overbuilding capacity, while frequency regulation up preserves grid reliability from short-term frequency deviations (*e.g.*, due to renewables intermittency). Therefore, if the same kilowatt-hours of energy can provide distinct and incremental values to different markets, then CESA supports the separate compensation for each service. CESA disagrees with PG&E's argument that an energy storage device should not receive compensation for an action it would have taken regardless of the additional application,[10] and CESA also disagrees with SCE that argues that resources should not receive payments from the CAISO when it is serving customer load (*e.g.*, retail peak shaving) and not exporting to the grid.[11]

---

[10] *Yerba Buena Energy Storage Pilot Project and Supply Side Pilot*, presented on May 3, 2016 at the CAISO/CPUC Multiple-Use Applications Workshop, p. 17.

[11] *U.S. Department of Defense Los Angeles Air Force Base: Vehicle-to-Grid Pilot Overview*, presented on May 3, 2016 at the CAISO/CPUC Multiple-Use Applications Workshop, p. 7.

Finally, overly conservative rate structures should be avoided. SCE's approach in its vehicle-to-grid pilot with the Los Angeles Air Force Base is illustrative for this point and highlights both useful and problematic rate approaches. SCE's approach appropriately allows wholesale market payments for incremental services delivered in response to grid signals and needs, but may inappropriately limit the capability of the plug-in electric vehicle ("PEV") load to provide demand charge management as SCE accounts for energy storage as being IFOM. If the resource is bid and dispatched in ways that simultaneously lower demand charges as measured at the retail meter, CESA believes these demand charge reductions are valid customer-side benefits which should flow to the customer. CESA finds that SCE's netting process fails to reflect the distinct and incremental values being provided to EV chargers along with the wholesale market.[12] By "deeming" a BTM resource as IFOM, potential BTM benefits may be lost. Alternatively, IFOM resources have their own pros and cons and can be pursued directly, rather than through portraying BTM resources as IFOM.

<u>Question 5</u>: ***Are there any interconnection concerns that must be addressed?***

Customer-sited and distribution-connected energy storage resources are interconnected under Rule 21 tariff, and exporting energy storage resources participating in the wholesale market are interconnected under the Wholesale Distribution Access Tariff ("WDAT"). Given this framework, several interconnection-related concerns should be addressed.

First, innovative ways to reduce or reduce or avoid the WDAT burden, e.g. to fast track WDAT and Rule 21 processes where appropriate, are needed. The Commission should direct its jurisdictional utilities as to when the Commission views a potential fast track WDAT as appropriate, and the CAISO and Utility-Distribution Companies should explore whether lower-intensity study and deliverability allocation methods can be developed for FERC approval.[13] Parties might should evaluate a fast track or lower intensity WDAT process in certain cases, or find that it could remain under Rule 21 as is the case for DR programs. The Commission and CAISO should consider the following questions:

- Is the interconnection process required to address worker/grid safety?
- Is the interconnection process required in order to create contracts to allow for the use of the distribution grid in exporting electrons to the wholesale system?

---

[12] *Ibid*, p. 6.

[13] CESA understands that WDATs are FERC-jurisdictional. Direction from the CPUC should inform IOU actions.

- Is the interconnection process required for purposes of studying system operations and upgrades?
- Is the interconnection process required for assessing or establishing RA deliverability?
- Or is the interconnection process used for other purposes, and if so, what are they?

CESA expects this elucidation and breakdown of discrete functions of the interconnection processes could inform the development of alternative approaches. The creation of less expensive processes may particularly affect the economic viability of MUA #3 and #5, where aggregations are especially likely.

CESA believes non-exporting BTM energy storage resources should not require a WDAT. These resources function as load from a system perspective. For NEM-metered customers with energy storage, a more nuanced approach is needed. In these cases, WDATs should be optional, or energy storage exports up to the amount authorized for the NEM interconnection should be accommodated through the existing studies and interconnections and without concerns over deliverability.

In future cases where concerns exist about how exporting BTM MUAs could affect the deliverability status of other resources, CESA recommends the use of screens and pre-determined criteria for automatically exempting resources from the WDAT process. In cases where some criteria prompt a further assessment of deliverability impacts, a WDAT 'lite' process should be developed. Already established rules for RA Deliverability for Distributed Generation, a CAISO initiative, should be used to inform these exercises. Only in cases where BTM resources clearly show the need for a full WDAT process should the full WDAT process be required. Especially for BTM sub-resources that represent small amounts of load, CESA believes that requiring a WDAT interconnection to participate in the wholesale market may deter MUA #3 and #5.

CESA welcomes further input on the concept of a "WDAT lite." Generally, the WDAT lite or "WDAT fast track" could both be considered. Additionally, an interconnection process for aggregations of resources (as a single WDAT) could be developed. The WDAT lite or WDAT fast track option could import the study results from the Rule 21 interconnection study process and agreement to streamline review and avoid duplicative efforts. Alternatively, within a certain cap, exemptions to the WDAT interconnection process could be made for aggregated resources under some megawatt capacity. The appropriate studies would need to be conducted to set such a threshold. Overall, these rules and ideas should be further developed in the ESDER or a Phase 2 Metering and Telemetry initiative to determine which are applicable to Distributed Energy Resource Provider

("DERP") applications, and to ensure that these efforts do not disrupt deliverability for those who have paid for deliverability under WDAT.

Greater clarity is also needed for energy storage for 'repowers' and for energy storage additions to generation plants. Current rules do not contemplate how the replacement of an existing conventional generator at a site with a lesser amount of storage could be a 'repower'. This gap in rules is a clear barrier to energy storage deployments. Similarly, processes and rules are needed for where and how a developer could add storage, presumably to an existing renewable site (*e.g.*, to firm up the renewable output). If the output with the energy storage addition never exceeds the take-away capacity at the site, it is unclear which interconnection issues still need to be addressed. CESA recommends these issues be addressed quickly.

***Question 6*: Have metering and sub-metering issues, pertinent to both behind-the-meter and in-front-of-the-meter storage, been addressed in the CAISO's Expanding Metering and Telemetry Options and ESDER initiatives? Are there any metering concerns that must be addressed?**

Metering approaches should provide options to entities seeking to interconnect, operate, and participate in grid, customer, or market functions. CESA thus suggests several approaches to metering configurations.

First, the MGO method recently developed by the CAISO is a step forward, but additional metering questions still need to be addressed. The CAISO's Expanding Metering & Telemetry initiative recommended that scheduling coordinators are responsible for ensuring revenue-grade meters as established by the Local Regulatory Authority ("LRA").[14] CESA recommends that the Commission adopt the ANSI C12.2 standard, which is revenue grade and is commonly used in the industry. The standard specifies more accurate metering performance and influence limits for 0.2% and 0.5% accuracy meters. Likewise, in many cases, the industry is already deploying systems with revenue-grade metering. As long as these meters meet the appropriate standards, customers should have the option to procure meters that comply with Commission and CAISO standards from the supplier of their choice. Requiring additional and redundant metering only increases costs and creates further market barriers. Utility metering should only be required for customers in need of such devices and have no other option.

---

[14] *CAISO Expanding Metering and Telemetry Options Phase 2: Distributed Energy Resource Provider Draft Final Proposal*, published on June 2015.

The Commission should also explicitly direct IOUs to accommodate the innovative metering arrangements proposed by Powertree. This structure provides detailed insights into the retail and wholesale functions of the customer-sited MUA and so addresses many key challenges of MUA metering. The process also highlights a potential double-payment issue as noted by Powertree. Precedent for this metering configuration exists. PG&E's Yerba Buena pilot appears to use an essentially similar configuration,[15] and the Virtual Net-Energy Metering (NEMV) and Community NEM configurations both tablulate exports onto the grid as In-Front-of-the-Meter deliveries through physical and accounting conventions. The concept of customer-sited wholesale IFOM projects may help to accelerate energy storage deployments, and CESA understands that SCE has already accepted applications for interconnection under this configuration.[16]

<u>Question 7</u>: ***Are there any dispatch priority concerns that must be addressed? How should conflicting real-time needs be managed?***

CESA believes that third parties should be allowed to manage the risks as specified by rules, financial penalties, and financial incentives/awards. With this framework in place, it should be incumbent on third-party providers to solve this optimization problem that weighs the needs and interests of end-use customers versus different grid service needs from the utility and/or CAISO. To illustrate, if a BTM system receives a dispatch signal during a demand charge period, the energy storage provider would need to optimize its storage dispatch for these two conflicting services given the rewards/penalties available and obligations required, which may entail responding to the dispatch signal for a portion of its capacity while delivering some but not the full peak customer load reduction. The weighting of these opportunity costs would be determined by third parties' intelligent optimization solutions. Certain services will understandably have higher or more strict performance expectations, befitting the services' role in reliable grid operations.

Dispatch priorities cast as "primacy issues" reflect a more traditional utility mindset where one resource serves only one function. In this older utility-controlled model, the concept of a single 'master' control scheme was applicable. Given the utilization and system efficiency benefits of MUAs, however, the system should shift to more clearly direct the services needed to maintain operations and to provide appropriate market signals for the provision of these services. Primacy

[15] PG&E Presentation on 5/3/16, slide 14.
[16] Statements by Stacey Reineccius of Powertree, Inc.

concerns or dispatch priorities are not applicable in this regard, notwithstanding important safety considerations that may be identified.

<u>Question 8</u>: ***For each regulatory and/or market barrier and/or issue, what is the logical CPUC or CAISO regulatory proceeding to address and resolve the issue?***

For the MUA barriers highlighted in Question 3, CESA proposes the appropriate Commission or CAISO proceeding to address and resolve the issue in Table 5 below.

Table 5: Suggested Regulatory Proceeding to Address MUA Barriers & Limitations

Barrier Type	Barrier Details	Likely Forum for Resolution
Distribution Service Roles	Unclear distribution service performance requirements	<u>CPUC</u>: DRP/IDER and maybe other proceedings
Interconnection	SCE's preference for full WDAT interconnection for sub-resources in an aggregation	<u>CAISO</u>: Develop screens for WDAT 'lite' <u>CPUC</u>: Further develop energy storage fast-track interconnections in Rule 21 successor proceeding
Interconnection	Unclear/no rules for storage additions to plants or for repowers with storage instead of conventional generation	<u>CAISO</u>: Develop new interconnection bypass screens to allow additions of storage to IFOM plants so long as output limits remain in place if key criteria are met; develop interconnection rules for repowers that use storage to replace conventional generation
Market Participation Rules	NGR 24/7 model and SOC limits	<u>CAISO</u>: Address NGR reforms in ESDER Phase 2
Market Participation Rules	Unavailability of PDR to provide Frequency Regulation	<u>CAISO</u>: Expand PDR capability to provide frequency regulation ESDER Phase 2
Measurement	PDR's 10-in10 baseline measurement	<u>CAISO</u>: Develop MGO and alternative baselines in ESDER Phase 2 Working Groups
Primary Frequency Response	No market compensation structure for primary frequency response exists	<u>CAISO</u>: Rules should apply to PDRs where applicable
Program/Market Participation Rules	Rules preventing dual or multiple program/market participation	<u>CPUC</u>: Authorize MUAs 1-5 for its jurisdictional utilities in Storage OIR Track 2
Resource Adequacy	No fuel diversification requirements	<u>CPUC</u>: Establish rules to guarantee fleet effectiveness for grid operations in RA proceeding
Retail Tariff Limitations	Tariffs provide insufficient detail on what services are needed	<u>CPUC</u>: Update tariffs to better reflect and incent useful actions from MUAs
Station Power	Potential retail rates for efficiency losses and non-discretionary loads in MUAs	<u>CPUC</u>: Direct jurisdictional utilities to charge efficiency losses and non-discretionary loads for IFOM resources at wholesale rates in Storage OIR Track 2

III. CESA'S RESPONSE TO QUESTIONS FOR STATION POWER.

Resolving the distinction between wholesale charging energy and station power is important to ensure fair accounting and rate treatment of different loads in energy storage systems. Station power costs, if applied unreasonably, can be detrimental to the economics of energy storage resources and potentially have a major impact on the relative competitiveness of various energy storage technology subclasses. CESA is concerned that unfairly disadvantaging certain storage technologies compared with others of similar gross efficiency may lead to energy storage procurement outcomes that are sub-optimal for all California ratepayers.

CESA understands that the topic of station power is inherently jurisdictional, with the Federal Energy Regulatory Commission ("FERC") concluding that "state-jurisdictional retail sales of station power are properly the subject of state tariffs,"[17] while subjecting "a sale of electric energy to any person for resale" at the FERC-jurisdictional wholesale rate. The state has been empowered by the courts to direct tariffs for station power that explicitly authorize the measurement of loads that are critical to generation and commitment, which should correctly receive wholesale rate treatment. Therefore, given the goals of Assembly Bill ("AB") 2514 to transform the energy storage market and to support the grid in renewables integration, CESA believes that the Commission and CAISO must resolve the station power issue for energy storage quickly and equitably without discrimination as compared to traditional generation resources.

<u>Question 1</u>: ***What loads related to energy storage must be considered that are not clearly addressed in existing station power provisions? Considering these, what principles should apply to determine whether they should be categorized as station power versus wholesale consumption for resale?***

Clear definitions are needed to distinguish station power loads from auxiliary loads. Currently, the CAISO tariff[18] defines station power as all the energy used (loads) by the generation facility, which includes loads that are essential for operations (*e.g.*, thermal regulation, pumps, compressors, SCADA equipment), but also incidental or non-essential loads (*e.g.*, lighting, security systems, coffee pots, offices). The tariff language above also makes explicit exclusions for energy used to power synchronous condensers, for pumping at a pumped storage facility, during a black start procedure, and to charge an energy storage device for resale. With energy storage, the CAISO tariff does not clearly

---

[17] *Duke Energy Moss Landing v. CAISO*, 132 FERC 61,183 at p. 2 (2010).

[18] CAISO tariff Appendix A.

delineate the different loads within an energy storage system to differentiate between efficiency losses, non-discretionary auxiliary loads, and discretionary station loads. Some utilities, meanwhile, have defined certain loads (such as thermal management systems for battery energy storage) that should be considered efficiency losses as discretionary station loads, as evidenced in their *pro forma* Energy Storage Agreements.[19] Without a clear-cut standard for what loads constitute station power when energy storage systems are charging or idle, CESA has seen utilities negotiate station power treatment for each project.

To delineate the different loads associated with an energy storage system, CESA proposes a framework that differentiates the loads as those that are unavoidable to the "production" or "conversion" of energy drawn from the grid (efficiency losses), those that integral to the *optimal* "production" or "conversion" of energy drawn from the grid (non-discretionary auxiliary loads), and those that are end-use loads that have no bearing on the "production" or "conversion" of energy drawn from the grid. The below table summarizes CESA's proposed categorization of different energy storage plant loads.

Table 2: CESA's Proposed Categorization of Energy Storage Loads

Efficiency Losses	Non-Discretionary Auxiliary Loads	Discretionary Station Loads
• Resistive losses • Self-discharge (standby) • Pumps (flow batteries) • Power conversion system • Transformer	• Battery management system controller • Thermal regulation • Vacuum (flywheels)	• IT & communications • Lighting • Ventilation • Safety

Efficiency losses: Examples of efficiency losses include resistive losses from transferring electricity through wires, transformer losses from stepping down voltage levels, inverter losses from

[19] PG&E *pro forma* Energy Storage Agreement, Section 7.1a: "The Electric Revenue Meter must measure all Charging Energy and must not measure Station Use. "***'Station Use' means the electrical load of the Project's auxiliary equipment that is*** necessary ***for operation of the Project*** as set forth in Appendix II. ***The auxiliary equipment includes, but is not limited, to forced and induced draft fans, air conditioner systems, heating systems, cooling towers, plant lighting and control systems, any heating or cooling equipment necessary*** to keep energy storage componentry within their normal operating temperatures, any motors or pumps required for moving material within the energy storage system, and any other electrical loads required for the Energy Storage Services.

SCE pro forma Energy Storage Agreement, Appendix A: "'***Station Use' means the electrical load of the Project's auxiliary equipment that are necessary for operation of the Storage Unit(s)*** as set forth in Section 1.02. ***The auxiliary equipment includes, but is not limited, to forced and induced draft fans, air conditioner systems, cooling towers, plant lighting, and control systems.***"

converting AC-to-DC, and pumps for flow batteries that are required to pump ions through a membrane held between two electrodes. These are all inherent loads that factor into the direct production or conversion of energy to be stored in the energy storage unit with the intent of reselling later to provide various grid services. If these loads are turned off, the energy storage device could no longer operate. In reality, these loads cannot be turned off while the energy storage device is in operation. CESA therefore believes that efficiency losses should unambiguously be subject to wholesale rates.

Furthermore, idle losses should also be similarly categorized as efficiency losses since the energy storage device remains "on" or on standby mode to be available to the grid operator and be ready to respond to system instructions. In its idle state, energy storage resources charge minimally from the grid to be on standby and could be characterized as "in-market" due to its ability to quickly and accurately respond to grid needs and signals. In addition, contrary to SCE's recommendation to treat idle loads from inverter and transformer losses as end-use loads charged at retail rates, these idle loads do not provide any useful function and should not be treated any differently than line losses.

Auxiliary loads: Auxiliary loads are non-discretionary loads that are essential to optimal roundtrip efficiencies and that are different from energy consumed via efficiency losses. CESA's views of auxiliary loads are provided in its response to Question 2.

Station loads: Discretionary station loads are those that are not part of the energy storage device operation, such as lighting for the facility and HVAC for personnel. These loads do not affect the throughput of the device and could be turned off without physically affecting the operation of the device. CESA believes that these station loads, when properly defined, should be appropriately charged retail rates.

Given this categorization of loads, CESA recommends that the Commission take two paths to achieve wholesale rate treatment for these efficiency losses and non-discretionary auxiliary loads – netting and separate load metering.

Netting: One path to address this station power issue is to implement netting. Historically, station power rules have focused on netting of load against generation outputs, and short-term netting is currently permitted by the CAISO for auxiliary load equipment connected to the generating unit as long as the unit is online and is producing sufficient output to serve the entire auxiliary load. For energy storage resources, netting would require efficiency losses and non-discretionary loads to be netted from the energy storage plant's output during some interval and settled at wholesale rates. This netting period may need further definition, but broader intervals will work more effectively for energy storage. This is especially true for standby or commitment loads of energy storage where the unit may be committed and incurring standby loads without ever generating energy to the grid against which netting can occur. In these cases, a broad netting period will allow the appropriate avoidance of retail charges for this wholesale function. For CAISO participation, some of these costs are recoverable through commitment cost recovery rules. The appeal of this solution is that it would not require energy storage plants to have to list every load. This path would require CPUC determinations regarding netting, given recent court findings that netting and related station power matters are retail jurisdictional.

Separate load metering: Alternatively, with a new relatively new asset class like energy storage, a second path is to institute a new comprehensive set of rules for energy storage resources. Using the load categories above, energy storage providers should have the option to meter their auxiliary loads (*e.g.*, thermal regulation systems for battery storage) and treat them at wholesale rates. The Commission, as the retail rate authority, could establish that certain loads for energy storage resources are not to be treated as retail loads, if adequately measurable and directly applicable to operations of an energy storage resource. Since energy storage is such a very broad technology class, this solution may require more changes to the definitions and tariff language, but CESA believes that it should be an option provided to the energy storage provider that is willing to separately meter their auxiliary loads rather than use netting.

Question 2*:** ***Should battery temperature regulation be considered part of charging (similar to efficiency loss) and subject to a wholesale rate, or should it be considered consumption/station power subject to a retail rate (where consumption exceeds output in an interval)? If the latter, how should temperature regulation be accounted for or metered?

Critical thermal management loads are often seen in battery energy storage. Similarly, vacuum loads exist for flywheels. Both loads are critical to the systems operation and efficiency. Absent a cooling system, a battery storage project will not be able to maintain the operating temperature it requires to remain in continuous operation (due to the energy lost as heat when dispatched during both charging and discharging). For flywheels, vacuums are needed to minimize drag on the rotor to maximize efficiency and minimize standby losses. To safely operate energy storage devices, ensure that the devices lasts for its designed lifetime, and optimize performance in providing grid services, CESA argues that these auxiliary loads are in a different way unavoidable and non-discretionary.

After all, these energy storage systems would not be procured if they were operated in an unsafe manner or not optimized to provide the greatest benefit to ratepayers and the grid. For these reasons, CESA recommends that auxiliary loads also be treated at wholesale rates. Energy storage projects, if IFOM or operating under MUA #4, need the option to directly meter these loads for wholesale rate treatment, or to use netting or other approaches to equivalently achieve wholesale rate treatment for these loads.

Question 3: ***Do station power rules apply to BTM storage and do they differ from IFOM storage?***

BTM energy storage resources are designed to offer customer support services (*e.g.*, TOU management, demand charge reduction) in addition to other services (*e.g.*, grid services). Some of the energy drawn from the grid that is used to charge the energy storage device that is not intended for resale into the wholesale market or to the distribution utility, but rather to the customer load, should be billed at retail. Because of this focus on customer services, BTM energy storage resources should charge under retail rates. In other words, CESA advocates for the application of its recommended station power rules to IFOM energy storage, but not to BTM energy storage, aside from MUA #4. With a focus on customer-sited projects that explicitly provides no benefit to the customer, MUA #4 projects thus warrant wholesale charging treatment for auxiliary loads.

IV. CESA'S RESPONSE TO QUESTIONS FOR STATION POWER IN SINGLE-USE VERSUS MULTIPLE-USE APPLICATIONS.

CESA understands that clear guidelines and divisions for the application of wholesale versus retail rates are important. Such rules should work to leverage the capabilities of MUAs while reasonably executing the Commission's preferences and decisions for station power. The Commission has broad jurisdiction to assess and determine the design and application of retail rates. Historical approaches may not be applicable and the Commission should use its authority to direct station power rules befitting the State's forward-looking energy goals.

Question 1: ***Does the consideration of station power differ depending on whether the storage facility is in a single-use application (i.e., only participating in the wholesale market) or in a multiple-use application (i.e., MUA use cases 1, 3, 4, 5)?***

For some MUAs, station power rules may differ from rules for single-use applications. For instance, while CESA agrees that retail rates apply to retail usage, the rate treatment for energy expended from a BTM MUA to provide voltage support for the distribution service remains unclear. CESA likens the energy used for this service to system (line) losses. MUAs need adequate compensation for providing services. In these cases, a performance measurement system may be needed in order to develop a new and designated rate treatment. A likely solution would be to allow for settlement systems to back out or net away some retail loads so those retail charges can be converted to wholesale. SCE's PEV pilot provides a reasonable starting place for these accounting steps. By reviewing each MUA, these rules can become clearer:

- **MUA #1:** In this case, all loads aside from discretionary 'coffee pot' loads should be treated at wholesale. This rate treatment should be accommodated through the developer's choice to either explicitly meter efficiency losses or non-discretionary auxiliary loads or through netting-type accounting methods.

- **MUA #2:** For retail services, all loads should be treated as retail. For *some* distribution service loads, however, CESA recommends considerations of rules to allow for the wholesale treatment in some cases (*e.g.*, for providing voltage support). For conventional upgrade deferral, the full MUA can be metered at retail. To CESA, this highlights how distribution deferral requirements need clear performance requirements and categorizations.

- **MUA #3:** For this MUA, accounting approaches may be needed to avoid 'buying at retail and selling at wholesale' concerns. Since the likely function of a BTM system providing wholesale services is to also provide customer bill management, retail rates are generally applicable for station power loads, so long as 'netting' approaches are used to avoid 'buying at retail and selling at wholesale' hurdles. SCE's PEV pilot provides examples for this netting structure.

- **MUA #4:** This application provides no retail service or benefit. Accordingly, station power rules should establish that fuel, efficiency losses, and non-discretionary loads are treated at wholesale. Only 'coffee pot' discretionary loads are treated at retail.

- **MUA #5:** Rules for MUA #5 should follow rules for MUA #2 and MUA #3, since MUA #5 encompasses these earlier two MUAs.

***Question 2*: Is the difference simply a metering consideration?**

CESA believes metering configurations should be authorized but that other solutions should be developed too. Developers can then choose what performance measurement and station power measurement approach makes sense. Netting approaches can reasonably account for behaviors and treatments of loads and therefore can provide a less expensive yet workable option for some customers, particularly in aggregations. For many PDR configurations and historical DR performance measurement, baselines have been used to establish counterfactual load levels. Similarly, the netting approach can involve reasonable assumptions by which to determine how loads can be apportioned between wholesale and retail.

V. **CONCLUSION**.

CESA appreciates the opportunity to submit these comments on the May 2 and May 3, 2016 Workshops and the Issue Paper. CESA looks forward to working with the Commission and the CAISO in resolving these important station power and multiple-use application issues.

Respectfully submitted,

Donald C. Liddell
DOUGLASS & LIDDELL

Counsel for the
CALIFORNIA ENERGY STORAGE ALLIANCE

Date: May 13, 2016