BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking on the Commission's Own Motion to Improve Distribution Level Interconnection Rules and Regulations for Certain Classes of Electric Generators and Electric Storage Resources.	R.11-09-011 Filed September 22, 2011

OPENING COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON ADMINISTRATIVE LAW JUDGE'S RULING TO (1) ISSUE WORKING GROUP PAPER ON AUTONOMOUS INVERTER FUNCTIONALITIES (2) SET COMMENT DATES AND WORKSHOP (3) ENTER WORKING PAPER INTO THE RECORD AND (4) ANNOUNCE NEW RULE 21 WORKING GROUP

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

July 31, 2012

TABLE OF CONTENTS

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking on the Commission's Own Motion to Improve Distribution Level Interconnection Rules and Regulations for Certain Classes of Electric Generators and Electric Storage Resources.	R.11-09-011 Filed September 22, 2011

OPENING COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE ON ADMINISTRATIVE LAW JUDGE'S RULING TO (1) ISSUE WORKING GROUP PAPER ON AUTONOMOUS INVERTER FUNCTIONALITIES (2) SET COMMENT DATES AND WORKSHOP (3) ENTER WORKING PAPER INTO THE RECORD AND (4) ANNOUNCE NEW RULE 21 WORKING GROUP

The California Energy Storage Alliance ("CESA")[1] hereby submits these comments on *Administrative Law Judge's Ruling To (1) Issue Working Group Paper On Autonomous Inverter Functionalities (2) Set Comment Dates And Workshop (3) Enter Working Paper Into The Record And (4) Announce New Rule 21 Working Group*, issued September 26, 2012 ("ALJ's Ruling").

I. INTRODUCTION.

CESA's comments focus on the technical and related Commission policy implications of the discussion of the role of energy storage in the working paper entitled, *Candidate DER Capabilities: Recommendations for Updating Technical Requirements in Rule 21* ("Working

[1] The California Energy Storage Alliance consists of 1 Energy Systems, A123 Systems, AES Energy Storage, Alton Energy, American Vanadium, AU Optronics, Beacon Power, Bright Energy Storage, BrightSource Energy, CALMAC, Chevron Energy Solutions, Christenson Electric Inc., Clean Energy Systems Inc., CODA Energy, Deeya Energy, Demand Energy, DN Tanks, Eagle Crest Energy, East Penn Manufacturing Co., Energy Cache, EnerVault, FAFCO Thermal Storage Systems, FIAMM Group, FIAMM Energy Storage Solutions, Flextronics, Foresight Renewable Systems, GE Energy Storage, Green Charge Networks, Greensmith Energy Management Systems, Growing Energy Labs, Gridtential Energy, Halotechnics, Hecate Energy LLC, Hydrogenics, Ice Energy, Innovation Core SEI, Invenergy, KYOCERA Solar, LightSail Energy, NextEra Energy Resources, OCI Company Ltd., Panasonic, Parker Hannifin, PDE Total Energy Solutions, Powertree Services, Primus Power, RedFlow Technologies, RES Americas, S&C Electric Co., Saft America, Samsung SDI, Sharp Labs of America, Silent Power, SolarCity, Stem, Sovereign Energy Storage LLC, Sumitomo Corporation of America, TAS Energy, UniEnergy Technologies, 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

Paper") that was prepared by the "Smart Inverter Working Group".[2] CESA has serious concerns regarding the recommendations identified in the Working Paper and the process by which these recommendations were developed.

As a threshold matter, it important to recognize that the Working Paper in no way reflects a general consensus on the issues it raises. The Working Group that developed the set of recommendations in the Working Paper does not appear to have included adequate representation from the inverter, distributed energy resource ("DER"), or energy storage industries whose businesses would be profoundly affected were the recommendations included in the Working Paper adopted. Accordingly, CESA believes the Working Paper does not provide a reasonable starting point for the discussion of future inverter and energy storage system capabilities and requirements. Instead, a working group with a more representative set of stakeholders from the DER and energy storage industries should be formed and tasked with developing a set of priority use cases and recommendations that reflect a truly consensus position on the direction of future inverter and energy storage requirements.

The Energy Division Workshop held on June 21, 2013, was a useful step, but it did not delve to any depth into issues specific to energy storage that are only now surfacing as substantial impediments to deployment of deployment of DER integrated with energy storage. CESA accordingly recommends that the Energy Division should be directed to hold a second

[2] On February 13, 2013, the Commission announced the formation of the "Smart inverter Technical Working Group" ("Working Group") to explore inverter functionalities. At the Workshop held on June 21, 2013, it was stated by Energy Division staff that the Working Group was tasked with first identifying what advanced inverter capabilities would be beneficial, and that the California Energy Commission supports the effort via technical support. The ALJ's Ruling points out that the authors of the Working Paper are a group of engineers, industry, regulators and advocacy groups that was not established under the auspices of the Commission (p. 2).

Workshop that focuses exclusively on energy storage topics discussed in the Working Paper before Reply Comments are due on August 30, 2013.[3]

A preliminary list of the topics touched on in the Working Paper that should be discussed, at a second Workshop is attached to these comments in the form of extracts from the Working Paper as Appendix A. CESA anticipates that some or all of the topics identified in Appendix A, and perhaps others, may be addressed by opening comments filed by other parties and therefore reserves the right to comment on them in reply comments.

II. THE PROPOSED SCHEDULE AND TESTING PROCESSES IN THE WORKING PAPER ARE UNREALISTIC GIVEN THE EXTENSIVE TIME REQUIRED TO DEVELOP AND TEST NEW STANDARDS.

CESA applauds the Commission's leadership on the subject of interconnection that is recognized on a national basis. However, it will be difficult and costly to have California-specific standards that are inconsistent with national standards. In an ideal world, it would be far better to have California adopt national standards that are already under development. CESA recognizes that while IEEE 1547 and UL 1741 are being revised, those processes take years, and California is seeing, and is likely to see more, problems before IEEE and UL adopt a new national standard.

In the meanwhile, the Commission should take care not to adopt standards or requirements that have unintended consequences. In particular, the testing processes laid out in the Working Paper are unclear and will likely create a great deal of uncertainty for energy storage industry participants. The proposed extensive suite of solutions represents an "everything and the kitchen sink" approach that will likely impose substantial cost and uncertainty on the energy storage industry without sufficiently justifying those costs. The

[3] For example, energy storage functionality is already built into some commercially available inverter equipment, but energy storage equipment manufacturers should not be forced into multiple certifications for the same equipment if California changes its requirements ahead of IEEE and/or UL.

following are just three representative examples of requirements that are either unclear or may have detrimental unintended consequences for project development:

Example 1:

1.5.1 Mandatory Autonomous DER Functions (page 5 + described in greater detail in Table 1, page 15)

4. Provide volt/var control through dynamic reactive power injection through autonomous responses to local voltage measurements.

6. Counteract voltage excursions beyond normal limits by providing dynamic current support

COMMENT: The mandatory "volt/var" and "dynamic current support" functions sound very similar. It should be clarified whether these are in fact different functions, and if so, how they are different.

Example 2:

1.5.2 Mandatory DER Functions Requiring Communications (item 9 on page 6, and described in more detail Table 2, page 19):

9. Limit maximum real power output at the PCC upon a direct command from the utility.

COMMENT*:* Because "limit maximum real power output" is a mandatory function, it should be clarified under what circumstances the power output would be limited. Although examples of "unusual or emergency conditions" and "… to ensure fairness across DER systems" are given, the lack of conditions or limits in Attachment 1 of the Working Paper could mean that this feature could be used in an arbitrary fashion to limit DER output. This potential arbitrary limitation could have detrimental effects on the ability of DER projects to secure project financing.

Example 3:

On pages 24 and 25, the sentences describing the alternatives to the WECC load shedding limits contain errors.

COMMENT: The location of the alternative values to the WECC load shedding limits should be clarified.

III. THE COMMISSION SHOULD REQUIRE FURTHER SPECIFIC VETTING OF ENERGY STORAGE-RELATED ISSUES INCLUDED IN THE WORKING PAPER.

CESA recognizes that the purpose of the Working Paper is to advance development of recommendations for updating Rule 21 in order to enable utilization of DER functions not currently allowed by utilities for inverter interfaced technology and to recommend additional DER capabilities for interconnected renewable DER paired with energy storage systems. CESA also notes that a number of issues discussed in the Working Paper relate specifically to energy storage. At a minimum, these energy storage-related issues include the following:

A. There is Insufficient Basis for Developing Requirements Outside of Existing National Standards Development Processes.

Before committing California to develop an independent set of requirements a strong case needs to be made that the national standards making processes are inadequate. A unique California set of requirements creates challenges for industry as manufacturers are forced to either develop products that meet different standard depending on the market their products are likely to be deployed in, or develop products that meet the most expansive set of requirements within any of the markets they serve. Both of these options are likely to increase costs substantially relative to working through national standards making bodies. Additionally to the degree California moves forward independently, it will need to establish its own processes, which seems likely to create substantial uncertainty for market participants. In contrast, almost by definition, existing processes are well understood by market participants.

There may be reasons for California to move forward independently, for example, if there are pressing issues that need to be addressed in a time frame that cannot be realized via national standards development processes or are unique to California. However, at this point that case has not been made. If the Commission finds that there is sufficient justification for developing standards independently, it will be critical that such standards are well-coordinated with the national standards development process.

B. <u>The Proposed Timeline is Unrealistic.</u>

The timelines proposed are not feasible and need to be substantially modified to reflect the practical realities of any standards development process. Experience suggests that it takes a minimum of 6-18 months to develop new product functionality, plus an additional 3 - 6 months to undergo Nationally Recognized Testing Laboratory ("NRTL") certification testing, plus any additional third-party testing that may be required. These timeframe are in the context of developing to a clearly defined standard. It is simply not reasonable to expect that NRTLs would be able to manage the hundreds of inverter companies that would need to recertify products to any new standard within one to two years, much less by the end of 2013.

As example, during the last update of UL1741 (on which a much smaller industry had many years of input and insight) the NRTL certifying bodies were overwhelmed by the volume of work required in updating existing product certifications. The recommendations in the Working Paper, if adopted, would appear to represent a challenge of orders of magnitude greater than this example. The Commission needs to be realistic about the time and process required.

C. Uses Cases Are Needed.

The utilities have not defined uses cases for when the features described in the Working Paper are needed. It will be questionable if and when they are needed at all if use cases don't exist. It would be helpful for the Commission to require specific examples of the issues in question, and in particular, how widespread such issues are. This is very important as it can take 18+ months to redesign and certify an inverter. It would be particularly helpful for stakeholders to understand the actual technical reasons for requested changes, particularly given the fact that there are many tens of thousands of solar PV systems and hundreds of integrated energy storage systems with these projects already operating successfully in California.

D. Trials Are Needed Before Determining Requirements.

The features described in the Working Paper need to be utilized on a trial basis with a subset of systems to demonstrate that the technology satisfies the use cases before an industry-wide technical requirement is recommended to the Commission. The initial phase of implementation should be permissive rather than mandatory. Going forward, CESA recommends that any resulting changes be accomplished without disrupting the market and market viability of installers, customers and manufacturers. Clear criteria need to be issued far in advance so as to avoid delays in design, finance and interconnection.

E. Cost Implications Should be Considered Before Requirements are Adopted.

In addition to the time and resources required to identify and develop incremental inverter requirements, once new requirements are adopted, there are likely to be significant cost implications that will need to be addressed. For example, certain functions that smart inverters may be capable of providing, such as voltage support, may reduce the output from distributed energy resources, thus adversely affecting project economics. Additionally, the impact of implementing additional requirements are likely to vary by project size and context. For example, imposing additional requirements on existing systems is likely to be far more expensive than if those requirements are applied on a going forward basis only. Similarly, the ability of smaller projects to reasonably absorb any additional costs is likely to be limited compared to larger projects. Careful consideration will be need to be given to all of these issues to ensure that well-intentioned efforts do not come at the cost of market development.

There is a measurable cost required to implement and operate inverters with the features described in the Working Paper. The party that pays for the added cost should be determined, and the Commission should understand how much and how often the utilities are likely to use the features described in the Working Paper. Further, costs and benefits are likely to vary by system size. CESA therefore recommends identification of a minimum project threshold size above which mandated requirements would apply.

F. Performance Should be Measured at the Point of Common Coupling.

Power flows may need to comply with well-defined performance specifications at the point of common coupling ("PCC"), not at the actual inverter. This requirement needs to be clarified and the performance specification should be defined at the PCC. Additionally, controlling power flows at the PCC is very difficult and prohibitively expensive for small DER. The Rule 21 Working Group should be directed to determine an appropriate size below which the power flow controls would apply at the DER output point instead of the PCC. To ensure that equipment meets utility-specific requirements, utilities should test to performance requirements that are uniform among utilities, and based on published standards.

IV. CONCLUSION.

CESA appreciates this opportunity to comment on the ALJ's Ruling and looks forward to working with the Commission and parties to this proceeding going forward.

Respectfully submitted,

Donald C. Liddell
DOUGLASS & LIDDELL

Counsel for the
CALIFORNIA ENERGY STORAGE ALLIANCE

July 31, 2013

APPENDIX A

"1.5.3 Recommended Autonomous DER Functions

It is recommended that the following autonomous DER functions should be recommended for California: . . . 3. Set or schedule the storage of energy for later delivery, indicating time to start charging, charging rate and/or "charge-by" time" (p. 5).

"Facility DER management system (FDEMS) interactions with one or more DER systems. The FDEMS receives software application settings, utility commands, and demand response pricing signals, and then updates DER settings to reflect that information . . . – Additional scenarios include an ISO/RTO managing a large storage device through Automatic Generation Control (AGC) or requesting a specific power factor at the PCC of a wind farm.

– A microgrid scenario would include a FDEMS managing the intentional islanding of the microgrid and then coordinating the generation, storage, and load elements to maintain microgrid stability through the combination of setting autonomous settings for some DER systems and issuing direct commands to other DER systems." (p. 10).

"Table 1: Mandatory autonomous DER functions

"Counteract frequency excursions beyond normal limits by decreasing or increasing real power The DER system reduces real power to counteract frequency excursions beyond normal limits (and vice versa if additional generation or storage is available), particularly for microgrids." (p. 15).

Schedule actual or maximum real power output at specific times The utility establishes (or pre-establishes) a schedule (e.g. on- peak & off- peak) of actual or maximum real power output levels at the ECP or PCC, possibly combining generation, storage, and load management. The reason might be to minimize output during low load conditions while allowing or requiring higher output during peak load time periods." (p. 16).

Set or schedule the storage of energy for later delivery, indicating time to start charging, charging rate and/or "charge by" time. For a DER system that has storage capabilities, such as battery storage or a combined PV + storage system or a fleet of electric vehicles. Preset time- of-charge values can be established. Settings are coordinated between the utility and DER operator." (p. 19).

"3.5 Optional DER Functions

Provide backup power after disconnecting from grid. The DER system, including energy storage and electric vehicles, has the ability to provide real power when the site is disconnected from grid power. (p. 20).

"Provide low cost energy. Utility, REP, or FDEMS determines which DER systems are to generate how much energy over what time period in order to minimize energy costs. Some DER systems, such as PV systems, would provide low cost energy autonomously, while storage systems would need to be managed." (p. 21).

"Issue generation and storage schedules. The DER system provides schedules of expected generation and storage reflecting customer requirements, maintenance, local weather forecasts, etc. (p. 21).

"Provide 'spinning' or operational reserve as bid into market. The DER system provides emergency real power upon command at short notice (seconds or minutes), either through increasing generation or discharging storage devices." (p. 21).