UNITED STATES OF AMERICA
BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION

Review of Generator Interconnection Agreements and Procedures	Docket No. RM16-12-000
American Wind Energy Association	Docket No. RM15-21-000

MOTION TO INTERVENE AND COMMENTS OF THE CALIFORNIA ENERGY STORAGE ALLIANCE

The California Energy Storage Alliance ("CESA") appreciates the opportunity to submit comments in response to the Federal Energy Regulatory Commission's ("FERC's") Request for Comments ("Request").[1] CESA is primarily concerned with California electricity markets and therefore focuses its recommendations on issues that directly impact organized electricity markets of the California Independent System Operator ("CAISO").[2] CESA commends FERC for holding a technical conference that examines electric storage resource interconnection issues. In its Request, FERC poses six post-technical conference questions regarding how existing interconnection rules, studies, and processes apply to electric storage resources and how they can be improved and streamlined.

Electric storage resources are a unique asset class that does not fall under traditional "generation" or "load" categories. In the long-term, it may be appropriate to study the interconnection of electric storage resources under a new set of rules, models, and frameworks,

[1] *Notice Inviting Post-Technical Conference Comments*, Docket No. RM16-12-000 and RM 15-21-000, June 3, 2016 and *Notice of Extension of Time*, June 16, 2016.

[2] CESA generally concurs with the substance of the comments filed by the Energy Storage Association ("ESA") on this date.

given these resources' ability to be controllable, mitigate grid congestion, and integrate renewable generation. Existing interconnection rules, studies, and processes do not entirely capture the capabilities and benefits of electric storage resources. In the interim, existing interconnection rules, studies, and processes can be applied to electric storage resources so long as (i) they account for the full capabilities of these resources, (ii) do not present an unreasonable burden in time and cost, and (iii) are streamlined to the greatest degree possible. At a minimum, interconnection of electric storage resources should be reasonable and non-discriminatory as compared to traditional generators.

To this end, CESA's responds to each of the post-technical conference questions below that highlight where existing interconnection rules, studies, and processes can be improved to facilitate the interconnection of electric storage resources. Overall, CESA supports the work that the CAISO has done to date in facilitating the interconnection of electric storage resources.

I. BACKGROUND.

Founded in 2009, CESA is a non-profit membership-based advocacy group committed to advancing the role of energy storage in the electric power sector through policy, education, outreach, and research. CESA's mission is to make energy storage a mainstream energy resource which accelerates the adoption of renewable energy and promotes a more efficient, reliable, affordable, and secure electric power system. As a technology-neutral group that supports all business models for deployment of energy storage resources, CESA membership includes technology manufacturers, project developers, systems integrators, consulting firms, and other clean-tech industry leaders.

II. COMMUNICATIONS AND CORRESPONDENCE.

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III. MOTION TO INTERVENE IN THIS PROCEEDING.

CESA is a non-profit membership-based advocacy group, membership of which consists of: 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, Mercedes-Benz Research & Development North America, Nature & PeopleFirst, 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. CESA's intervention in this proceeding is in the public interest, and CESA's interests will not be adequately reflected by any other party. CESA therefore respectfully requests that this motion to intervene be granted.

IV. COMMENTS.

CESA recognizes the CAISO's interest and concern in ensuring transmission and system reliability through its interconnection processes and understands that the interconnection process is essentially a technical study to ensure grid reliability. Understandably, the CAISO studies 'worst case' impacts of interconnecting resources to determine whether network upgrades are needed to address transmission congestion issues. At the same time, CESA requests that FERC and the CAISO recognize the operational capabilities of energy storage to be controllable and dispatchable, which should be reflected in interconnection rules, studies, and processes. Today's electric storage resources are equipped with system management solutions and advanced algorithms that allow it to respond intelligently to market and dispatch signals. Many worst-case impacts can therefore be avoided and/or mitigated by operational constraints and parameters placed on interconnecting electric storage resources. Wherever feasible, network upgrades should not be the default solution for transmission grid congestion issues raised as potential risks in interconnection studies. Rather, the CAISO should recognize the capabilities of electric storage resources to be controllable and establish operational parameters in interconnection agreements to guide resource operations in order to avoid these worst-case impacts and thereby avoid costly network upgrades. To this end, while CESA supports the CAISO in establishing technology-neutral interconnection study and related requirements, the FERC and the CAISO

should recognize that electric storage resources are characterized by unique differences from other generation resources that typically interconnect to the transmission grid.

In addition, while ensuring the importance of grid reliability and safety, CESA recommends that FERC and the CAISO consider ways to streamline the interconnection process and avoid duplicative interconnection studies wherever possible. The Cluster Study Process under the Generator Interconnection and Deliverability Allocation Procedure ("GIDAP") can be unduly burdensome and costly, costing at least $50,000 and lasting at least two years. Even though CESA offers several key recommendations to improve and streamline the interconnection process, CESA supports the Cluster Study Process as an efficient means to study transmission-level interconnection for electric storage resources. Starting in March 2014, CESA worked closely with the CAISO on the Energy Storage Interconnection Initiative, which was launched to explore electric storage resource interconnection. CESA appreciates the progress made in the Energy Storage Interconnection Initiative and supports the CAISO's important role in this progress, but reiterate some of CESA's suggested improvements from that Initiative in these comments.

Furthermore, as electric storage resources are aggregated to participate in wholesale markets, CESA recommends that the interconnection process not hinder multiple-use applications, which improve the utilization of these resources and allow multiple grid services to be provided from the same resources.

1. Are changes to the pro forma Small Generator Interconnection Procedures or pro forma Large Generator Interconnection Procedures necessary to facilitate the interconnection of electric storage resources? Similarly, are changes to the pro forma Small Generator Interconnection Agreement or pro forma Large Generator Interconnection Agreement necessary? If so, please describe those changes and explain how the changes should be prioritized.

CESA's recommended changes to the *pro forma* generator interconnection procedures and agreements are reflected in CESA's responses to questions 3 through 6, below. Overall, CESA supports *pro forma* generator interconnection procedures and agreements that recognize the operational characteristics of electric storage resources. In other words, these procedures and agreements should take into account the capabilities of electric storage resources to be able to flexibly charge and discharge, respond quickly to signals, be intelligently aggregated, and most importantly, be controllable to mitigate and/or avoid charge and discharge that congest the transmission grid or destabilize transmission grid voltage and frequency.[3]

2. What is the appropriate process to interconnect an electric storage resource as transmission equipment: the generator interconnection process, the transmission planning process, or some other process? Why? If some other process is appropriate, please describe how that process would interact with existing processes resources.

Electric storage resources have the potential as reliability solutions to transmission-level overloads that defer or avoid the need for conventional generation infrastructure or 'wires' solutions – *i.e.*, additional transmission lines. These non-transmission alternatives ("NTAs") have the added benefit over traditional infrastructure solutions of: (a) reduced environmental impacts (*e.g.*, avoiding infrastructure siting concerns of traditional solutions); (b) relatively quick design and construction for some technologies; (c) flexibility to be developed incrementally and developed using existing infrastructure (*e.g.*, co-locating with existing electrical infrastructure); (d) providing reliability advantages by siting non-wires alternatives in diverse geographic

[3] *See Midcontinent Independent System Operator, Inc.* 155 FERC ¶61, 2011 (2016).

locations; and (e) providing 'optionality' to address local grid reliability challenges (*e.g.*, local grid reliability risks in the West Los Angeles Basin due to the current moratorium on the Aliso Canyon gas storage facility).

CESA is encouraged to see that the CAISO has been proactive in studying the potential to meet transmission grid needs through NTAs instead of conventional solutions. The CAISO explored this topic in a September 2013 study that sought to develop methodologies to select 'preferred resources' such as demand response or energy storage in the CAISO's Transmission Plan that would avoid a transmission or generation solution.[4] In its Board-approved 2015-2016 Transmission Plan, the CAISO also suggested an opening to NTAs and a willingness to work with other state agencies to apply the proposed NTA methodology from the September 2013 study; however the CAISO also stated that NTAs could only be considered in situations where a transmission solutions would not be needed for some time, allowing for the vetting and studying of the viability of NTAs.[5] CESA is encouraged by the CAISO's consideration of NTAs and hopes to continue its collaboration on this matter.

As the CAISO explores opportunities for NTAs to meet identified transmission grid reliability needs, it will also need to clarify the interconnection process for electric storage resources that also serve as NTA solutions. The CAISO's Transmission Planning Process and the subsequent selection of projects for rate-based cost recovery through the Transmission Access Charge ("TAC") do not include an interconnection study process, which is typically unnecessary for transmission solutions that do not export or consume electricity, but merely

[4] *Consideration of alternatives to transmission or conventional generation to address local needs in the transmission planning process*. CAISO Issue Paper published on September 4, 2013. http://www.caiso.com/Documents/Paper-Non-ConventionalAlternatives-2013-2014TransmissionPlanningProcess.pdf

[5] *2015-2016 Transmission Plan*. CAISO Board approved on March 28, 2016, p. 39. https://www.caiso.com/Documents/Board-Approved2015-2016TransmissionPlan.pdf

deliver it through its 'wires.' For electric storage resources that will be used as transmission equipment only, a similar non-requirement for interconnection study should apply, thereby treating such limited-use electric storage resources like any other transmission infrastructure asset. Electric storage resources dedicated for such an infrastructure deferral or avoidance use case does not present any transmission grid reliability issues and only serves to improve the grid by managing congestion and providing frequency and voltage support.

For electric storage resources that serve as an NTA but also participate in CAISO's markets, an interconnection study process may be appropriate. The CAISO should first demonstrate whether a GIDAP interconnection process is necessary, and if so, whether and which additional studies are needed. CESA understands that, for NTAs to recover costs through TACs, electric storage resources would need to always meet identified transmission grid reliability needs for which it is deferring or avoiding a transmission or generation solution. Regardless of the market function that it is providing, electric storage resources should meet its primary reliability purpose while not exacerbating problematic transmission grid conditions. To ensure this, electric storage resources aiming to qualify as an NTA may need to undergo a GIDAP interconnection study process. If the CAISO deems it necessary to do so, binding terms could be included in the interconnection agreement that prioritizes its reliability functions over any market functions.

When considering electric storage resources as NTAs, however, the more important consideration is the loss of benefits from not fully utilizing their capacity. Technically speaking, electric storage resources are fully capable of providing both market services and serving as a transmission asset. Failing to utilize electric storage resources when not providing its transmission grid reliability function would represent a waste of capacity and lead to an

overbuild of generation capacity. The greater challenge is in quantifying the specific non-monetized transmission grid benefits of NTAs such as electric storage to ratepayers and in fairly and appropriately allocating its costs. In addition, by requiring that NTAs like electric storage be 'price takers' in the market (*e.g.*, through Reliability Must-Run contracts), concerns about market price distortion or suppression could be addressed. Thus, in CESA's view, interconnection of electric storage resources as NTAs is less important as compared to determining the appropriate cost allocation methodology. However, if the CAISO deems interconnection to be necessary for these dual-use NTAs, CESA believes that these issues could be readily resolved through binding operational limits that fix use-case priorities.

3. Do current interconnection studies adequately account for the operational characteristics of electric storage resources? If not, what could the Commission do to improve interconnection studies for electric storage resources?

During the May 13, 2016 technical conference, the represented independent system operators ("ISO") and regional transmission organizations ("RTO") stated that, while there is still much to learn about the capabilities of electric storage resources, existing interconnection procedures and *pro forma* interconnection agreements are sufficient to accommodate electric storage resources. Similarly, in 2014, the CAISO's Energy Storage Interconnection Initiative ultimately concluded that there would not need to be any changes to the GIDAP to accommodate electric storage resources. CESA supports these determinations as long as the interconnection procedures reflect the full operational capabilities of electric storage resources while being consistent with the interconnection procedures for generators, particularly as it relates to the determination of Full Capacity Deliverability Status.

In the CAISO's Balancing Area, whether generation resources qualify for Resource Adequacy ("RA") capacity payments are determined by a Deliverability Assessment during the

GIDAP study process. It examines the maximum discharge capabilities of generation resources in 'worst-case' conditions – *i.e.*, maximum megawatt discharge during peak and off-peak periods. This Deliverability Assessment applies to all generation resources, including electric storage resources. CESA agrees that such a Deliverability Assessment should be conducted for electric storage resources to qualify for RA capacity payments consistent with other traditional generation resources. However, CESA disagrees with deliverability studies being conducted for the charging of electric storage resources as a condition for qualifying for RA capacity payments. Unlike traditional generation resources that have no fuel availability requirements, the CAISO subjects electric storage resources to a 'charging deliverability' study under which the CAISO studies the maximum megawatt charge during peak and off-peak periods to determine whether these incremental charging requirements drive the need for congestion management and thereby require network upgrades.

With advanced controls and algorithms, electric storage resources have the flexibility in the rate and timing of their charging mode. Deliverability Assessments are conducted to determine *discharge* capabilities to receive RA status, and therefore 'worst case' charging studies of electric storage resources would be inconsistent with generation resources (leading to electric storage resources to look more expensive than, for example, a natural gas plant) and be irrelevant for determining deliverability. It should be incumbent on electric storage developers to use their advanced controls and algorithms to ensure that there are sufficient hours available to fully charge its resources seeking interconnection to achieve Full Capacity Deliverability Status. Furthermore, given that charging can impact transmission congestion and grid reliability, developers should be given the alternative opportunity to set operational constraints to prevent

'worst case' impacts from the resource's charging behavior, rather than having automatically triggering the need for network upgrades.

In addition to Full Capacity Deliverability Status interconnection process, which looks at 'peak deliverability', CESA believes that a Flexible Capacity Deliverability Status interconnection process should be established to determine whether resources can meet flexible capacity needs. Currently, in the Flexible Resource Adequacy Criteria and Must Offer Obligation ("FRACMOO") Phase 2 Initiative at the CAISO and the Resource Adequacy proceeding at the California Public Utilities Commission ("CPUC"), stakeholders are working together to refine flexible capacity product definitions and are reforming market rules to guide investment and market participation behavior to meet identified flexible capacity needs. As California advances toward its 50% Renewable Portfolio Standard ("RPS") goal by 2030, flexible capacity needs will increase and therefore CESA foresees the need to develop a Flexible Capacity Deliverability Status interconnection process to ensure that interconnecting flexible RA resources are able to meet ramping needs during partial peak periods. Currently, no such interconnection process exists, but CESA finds that such an interconnection process is necessary to ensure the delivery of flexible capacity resources.[6] The new Flexible Capacity Deliverability Status would be separate from Full Capacity Deliverability Status and be tied to different interconnection study processes. CESA envisions that an interconnecting resource seeking deliverability could seek one or both of Flexible Capacity Deliverability Status and Full Capacity Deliverability Status.

Finally, very few electric storage resources interconnect as an Energy-Only resource under the GIDAP's Cluster Study Process, likely because resources seek long-term capacity

[6] Again, CESA reiterates that Flexible Capacity Deliverability Status interconnection studies should only look at the discharge (not charge) capabilities to meet these ramping needs.

payments to interconnect as a Deliverability resource. CESA finds that this is less of an interconnection problem and more of a market rules problem for Ancillary Services. CESA is therefore focusing in other CAISO initiatives to work on those market design issues.

4. Should an interconnection customer be allowed to limit the requested level of interconnection service at a point of interconnection that includes multiple energy production devices, which may include electric storage resources, to a level that is lower than the cumulative rated capacity of all the resources at that point of interconnection? What is the best way for an interconnection customer and a transmission provider and/or owner to establish the operational limit? What safeguards, if any, are needed to ensure that the interconnection customer does not exceed the level of interconnection service in its interconnection agreement?

Yes, CESA believes that customers should be allowed to limit the level of interconnection service below the cumulative rated capacity of all resources at that point of interconnection. In certain cases, such as renewables capacity firming, combined resources at a point of interconnection may decide to never discharge beyond the full rated capacity of the renewables generator, even though the combined capacity of a renewables generator and its paired electric storage resource exceeds that number. Safeguards such as verifiable controls and algorithms can be put in place to cap the level of discharge at the point of interconnection. Thus, there is no need to require power relays and other physical equipment given the electric storage resources' controls and algorithms, as well as the equipment already in place (*e.g.*, reclosers) by utilities that could be used to interrupt service in a contingency or grid reliability event.

During the technical conference, represented ISOs and RTOs argued that electric storage resources (whether or not it is combined with generation resource) should be studied for what they are physically capable of injecting into the grid, which may exceed the 'interconnection right' to the grid. However, CESA recommends that the CAISO look at expected use of the interconnecting resource(s) at the point of interconnection because controls and algorithms are in

place to prevent maximum capacity injection beyond the agreed-upon 'interconnection right.' CESA strongly advises against precluding various use cases just because resources are physically capable without taking into account how these concerning technical capabilities can be operationally restricted.

5. Are there potential ways to streamline the interconnection process for the addition of electric storage resources to existing facilities when (a) the electric storage resource will be using existing interconnection service; and (b) the electric storage resource will be requesting new interconnection service?

If an electric storage resource is using existing interconnection service, there should not be further interconnection studies since the CAISO has already studied the generation output to the grid. If the CAISO has already studied a facility for 100 MW of output and the facility has 20 MW of spare interconnection capacity, it should make no difference if excess interconnection capacity is met by additional generation or electric storage. CESA has found no major issues with the CAISO's Material Modification Assessment ("MMA") process to accommodate such requests to modify projects in the queue, which typically takes around 45 days. In this regard, CESA agrees with the remarks by the CAISO and Pacific Gas & Electric Company ("PG&E") in support of the existing MMA process in ensuring safety and reliability while also preserving flexibility to accommodate requests to change projects.

Likewise, for electric storage additions that will not exceed the output to the grid of the existing facility's interconnection capacity (*e.g.*, to firm up renewable generation), even as the cumulative capacity of the combined resources exceed the existing interconnection service, the MMA process should accommodate the request for new interconnection service. For example, if the CAISO has already studied a facility for 100 MW of output and the facility wishes to add 5 MW of electric storage but agrees to discharge limits of 100 MW at the point of interconnection, the electric storage addition does not present transmission grid reliability concerns to the CAISO.

The controllability and dispatchability of energy storage as well as operational constraints in the interconnection agreement should ease any concerns.

However, for new electric storage additions that are beyond the existing interconnection service in terms of cumulative capacity and are likely to exceed the output of the existing interconnection service, a more comprehensive interconnection study process may be necessary. To support a more streamlined interconnection process, the capacity thresholds under the MMA process should be examined to better define 'material changes' and allow for new electric storage additions beyond the output of the existing interconnection service. CESA finds no particular reason for the CAISO's specified capacity threshold for studying interconnection of resource additions to existing interconnected resources.

6. What are the primary obstacles for interconnecting standalone or aggregated distribution-level electric storage resources that want to participate in the RTO and ISO markets, and what are some potential solutions that address these obstacles?

CESA's primary concern with the interconnection of standalone or aggregated distribution-level electric storage resources is that they are not subject to a blanket interconnection requirement as sub-resources within an aggregation. As a condition of wholesale market participation, several California utilities (including PG&E at the technical conference) have argued that a separate interconnection process should be established for aggregated electric storage resources – *i.e.*, under the Wholesale Distribution Access Tariff ("WDAT"). However, the WDAT interconnection process can be unduly burdensome and unnecessary for electric storage sub-resources within an aggregation that have already been studied for 'worst-case' impacts under California's Electric Tariff Rule 21 retail-level interconnection process. These resources should not be subject to duplicative interconnection studies. Furthermore, individual electric storage sites interconnect on different timelines and

interconnect under Electric Tariff Rule 21without the initial intention to be part of an aggregation. CESA is encouraged to see that FERC and the CAISO reaffirmed CESA's position in determining that "it would be unduly discriminatory to require all distributed energy resources to interconnect through a WDAT when the WDAT interconnection rules do not apply to some distributed energy resources."[7]

In certain cases, distribution-level electric storage resources may be required to interconnect under the GIDAP Cluster Study Process, which is designed for large-scale projects that are able to absorb the significant costs involved. As with the WDAT case, distribution-level electric storage resources should not have to undergo duplicative interconnection study processes since many of these resources already interconnect under Electric Tariff Rule 21. To add, customer acquisition timelines do not align with the deliverability studies of the Cluster Study Process. Again, CESA finds that the Cluster Study Process is both unnecessary for distribution-level electric storage resources.

CESA finds the current suite of interconnection processes to be ill-suited for the size and scope of distribution-level electric storage resources, which have also already undergone interconnection study and review under Electric Tariff Rule 21. Rather, CESA recommends that the CAISO work with the CPUC to define a fast-track or lower-intensity interconnection (such as a WDAT 'lite') process that bypasses WDAT interconnection review under a certain capacity threshold or within certain operational constraints. The appropriate studies would need to be conducted to set such a threshold. In addition, the WDAT 'lite' should import the study results of Electric Tariff Rule 21 to expedite interconnection review and identify and avoid areas that have already been studied.

[7] 155 FERC ¶ 61, 229. *Order Accepting Proposed Tariff Revisions Subject to Condition*, Docket No. ER16-1085-000, p. 21.

V. CONCLUSION

The comments and responses to the questions presented in this proceeding should inform FERC to guide the ISOs and RTOs in making tariff changes to better account for the operational characteristics of electric storage resources that ensures a reasonable, consistent, and streamlined interconnection review and study process. CESA looks forward to working with FERC to ensure that appropriate interconnection rules, studies, and processes are in place to enable robust electric storage participation in wholesale markets while ensuring a safe and reliable transmission grid.

Respectfully submitted,

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June 30, 2016

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of ***Motion to Intervene and Comments of the California Energy Storage Alliance*** on all parties of record in proceedings ***RM16-12-000 and RM15-21-000*** by serving an electronic copy on their email addresses of record and by mailing a properly addressed copy by first-class mail with postage prepaid to each party for whom an email address is not available.

Executed on June 30, 2016, at Calabasas, California.

Michelle Dangott

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