

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**



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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.

Rulemaking 11-09-011
Filed September 22, 2011

**COMMENTS TO THE STAFF PROPOSAL ON ISSUES, PRIORITIES AND
RECOMMENDATIONS FOR ENERGY STORAGE INTERCONNECTION BY STEM,
INC.**

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September 12, 2014

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**COMMENTS TO THE STAFF PROPOSAL ON ISSUES, PRIORITIES AND
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INC.**

In accordance with the Rules of Practice and Procedure of the California Public Utilities Commission (“Commission”), Stem, Inc. (“Stem”, or the “Company”) respectfully submits these comments.

I. DESCRIPTION OF STEM, INC.

Stem is a developer, owner, and operator of grid-connected advanced energy storage systems. Stem was founded in 2009 in California and has a portfolio of projects in operation around the state. Stem systems install and interconnect at customer sites behind the utility meter and uses advanced analytics to charge and discharge the storage devices for optimal economic benefit. Working within the existing regulatory framework, the Company has successfully scheduled and cleared aggregated resources at multiple sites into the CAISO.

II. COMMENTS ON FAST TRACK INTERCONNECTION FOR NON-EXPORTING ENERGY STORAGE

Currently, the interconnection of both exporting and non-exporting systems are governed by Rule 21, yet there are significant technical differences between systems that reverse the direction of current on the system and simple load modification. Stem acknowledges that there may be use cases now, or in the future, where the export of power from a customer sited energy

storage system could provide system benefit. In that event, resources should update their interconnection agreements and follow the required study processes. Additionally, Stem agrees with the utilities requirement that NEM resources must be studied carefully to ensure the safety and reliability of the distribution system since these resources change the direction of current on all or part of a distribution circuit. This study requires utility resources for each interconnection application and each installation impact varies depending on the distribution circuit.

Stem believes that the safety and reliability concerns associated with non-exporting systems can be quickly assessed and encourages the Commission to consider an abbreviated, low cost interconnection process for non-exporting systems. By ensuring compliance with established UL, IEEE, and National Electric Code standards, as well as ensuring the site service rating and transformer are adequate to support a non-exporting installation, the reliability of non-exporting systems can be quickly confirmed. This process can be accomplished rapidly and without detailed studies of each site and each distribution circuit.

The non-exporting nature of systems can also be confirmed by the existing Advanced Metering Infrastructure that have already been underwritten by California ratepayers.

If the Commission chooses to incentivize load-responsive¹, non-exporting resources through reduced interconnection fees and a streamlined process, then customers who adopt these systems will be better equipped to manage their demand in response to changes in utility tariffs, DR signals and tariffs. Enabling customers to manage their demand will provide utilities with less volatile and more predictable loads without erratic injections of current. Stable and predictable loads improve distribution system planning efforts and ultimately reduce system cost, a benefit that will be shared by all ratepayers.

¹ Stem defines load-responsive storage as storage that changes output based on the customer load as measured in real time. An alternative method for controlling storage would be putting systems on a timer, during which time customer load will and the storage systems could export power onto the distribution system.

III. STEM'S RECOMMENDATION FOR INTERCONNECTION PROCESSES

Stem believes the interconnection fees and study process for NEM and non-exporting systems should be commensurate with the interconnection impact and effort required to ensure safety and reliability. The first screen in this process should be whether a system will or will not export power onto the distribution system.

Interconnection fees should be proportional to study effort and potential system impact.

Interconnection fees should be proportional to gross system size and size relative to customer load. In an extreme case today, currently under Rule 21, 1 watt of non-exporting power electronic generation and 1 megawatt of exporting rotating equipment are subject to the same process and fees. This non-progressive fee structure promotes large, exporting systems which further exacerbates the issue of customer access and limited participation.

Exporting distributed generation and energy storage system interconnection:

Exporting systems should require a *distribution study* and *appropriate equipment standards*. Distribution system capacity to support exporting resources is fundamentally limited due to voltage regulation, system protection, and reverse power flow considerations. Each exporting system must be considered in this light and should be studied by the distribution utility to determine system accommodation on each circuit. Inherent distribution system limitations create an uneven playing field for ratepayers. Customers who apply early and who are fortunate enough to be located at a point in the system that can support exporting power may interconnect and export. Other customers will not be so fortunate and are disenfranchised from participating

in distributed and renewable generate. The impact of distributed generation saturation and the unequal treatment of customers is currently playing out in Hawaii².

Non-exporting distributed generation and energy storage interconnection:

Non-exporting systems should require only *utility notification* and *appropriate equipment standards*. By limiting a system's ability to export power, these non-exporting systems have no adverse effects on voltage regulation, and, in fact, voltage regulation will be improved by limiting customer load volatility. Additionally, these systems will not cause reverse power flow or backfeeding and will not create unintentional islanding on the distribution system. There are no circuit penetration issues with non-exporting resources: accordingly all customers can participate equally. Co-located sites with PV and storage can easily be sized to avoid exporting and reduce the system effects of NEM. In addition, lower non-exporting fees support the installation of "right-sized" PV applications versus the current tendency to build PV systems as large as possible irrespective of load.

Fault studies based on equipment specifications and standards should certainly still be considered for non-exporting systems, particularly rotating machines. Verifying fault requirements can easily be achieved through equipment selection, not individual study for each interconnection. Basic distribution transformer connection configuration reviews (delta-wye, etc.) and generation equipment information should be sufficient fault analysis, particularly for power electronic based non-exporting systems.

Confirmation of non-exporting status should be verified by existing assets

The Advanced Metering Infrastructure that California ratepayers have underwritten and California IOUs have installed can confirm whether or not a customer is exporting power. In the

² <http://www.civilbeat.com/articles/2013/10/25/20228-changing-rules-unethical-sellers-create-solar-horror-story-for-some-users/>

unlikely event that a distributed generator interconnects under Rule 21 as a non-exporting resource, but is found to have violated that agreement per the retail meter, existing California law should be used to remedy the situation.

IV. CONCLUSION.

Stem is pleased that the Commission continues to review and refine the interconnection process to ensure safe and fair access for customers who wish to participate in the power system. Stem believes the interconnection process should show a greater distinction between exporting and non-exporting resources, rather than create technology specific rules.

September 12, 2014 in Millbrae, CA

Respectfully submitted,



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