

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

Order Instituting Rulemaking Regarding
Policies, Procedures and Rules for the
California Solar Initiative, the Self-
Generation Incentive Program and Other
Distributed Generation Issues.

Rulemaking 12-11-005

**OPENING COMMENTS OF SUNVERGE ENERGY, INC. ON THE
ASSIGNED COMMISSIONER'S RULING REGARDING THE
INTERCONNECTION OF ENERGY STORAGE SYSTEMS PAIRED
WITH RENEWABLE GENERATORS ELIGIBLE FOR NET ENERGY
METERING**

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I. SUMMARY

Sunverge Energy, Inc. (“Sunverge”) hereby provides the following comments pursuant to the directions within the *Assigned Commissioner’s Ruling Regarding the Interconnection of Energy Storage Systems Paired with Renewable Generators Eligible for Net Energy Metering* (“ACR”) issued October 17, 2013 by Assigned Commissioner Peevey. To summarize our comments:

- 1) As the leading California manufacturer of solar integrated storage systems (SIS) and the first storage system, let alone the first single inverter solar/storage system to interconnect within the California Center for Sustainable Energy’s (CCSE) Self-Generation Incentive

Program (SGIP) territory, we appreciate the commissions efforts to work toward removing barriers to adoption of energy storage interconnected in parallel with the grid. We support the proposed exemption of interconnection fees, standby charges, and distribution upgrade costs for storage paired with renewable energy that meet the requirements outlined in the adopted seventh edition of the CEC RPS Eligibility Commission Guidebook (Guidebook).

- 2) With respect to the ACR questions pertaining to single inverter integrated systems, while we agree with the allowance of non-time price varying tariff customers to install storage eligible for NEM, we oppose suggestions to qualify systems based on capacity or estimated production. Alternatively, we propose a method by which NEM credits are derated during the annual true-up period based on the amount of percentage of storage system dispatched energy derived from the renewable generation source, which explicitly discounts grid-charged power.

- 3) We strongly oppose size capacity limitations based on paired renewable capacity. Our product line is based on 4.5kW and 6.0kW inverter capacities with 2-20kWh battery configurations and should not be penalized for installing less than our inverter's rated capacity in solar under the assumption that our system is not designed for backup power. On the contrary, our system is designed to serve a typical home or business's backup power needs, whereas the solar

generation capacity is suited based on economic and usage drivers.

- 4) Sunverge applauds the allowance of more time with regards to the impending SGIP reservation expiration dates of affected storage reservations, but requests the extension be at least 120 days from ACR approval; which is on par with the time each conditionally reserved project has spent in limbo since utilities notified us in June of 2013.

II. MAKE GUIDEBOOK ELIGIBLE STORAGE PAIRED WITH RENEWABLES EXEMPT FROM INTERCONNECTION FEES, STANDBY CHARGES, AND DISTRIBUTION UPGRADE COSTS

By qualifying storage paired with renewables as exempt from interconnection fees, standby charges, and distribution upgrade costs, the Commission reinforces the message that storage integrated with renewables behind a customer meter is considered to provide the highest operational value when connecting renewables to the grid because of the ability to manage loads where they exist and smooth power quality issues related to intermittent renewables. Apart from the inherent operational benefits of tying storage with renewables, these exemptions are essential to the storage economic value proposition at a time when the nascent market is ramping up and hardware costs reflect developing business models. We support the commission's decision to hold eligible storage paired with renewables as exempt from the same costs as stand-alone solar.

III. SUNVERGE COMMENTS ON ACR QUESTIONS REGARDING NGOM REQUIREMENTS FOR SINGLE INVERTER SYSTEMS

The below responses address the ACR questions regarding NGOM single inverter systems based on our experience manufacturing and deploying the Sunverge SIS system in California and abroad. The Sunverge SIS pairs solar power generation with high performance lithium-ion batteries behind a single 4.5kW or 6.0kW inverter to optimize the value of renewable energy by leveraging the practical advantages of distributed generation, energy storage, and the internet cloud. Our business model delivers value to multiple groups and has the potential to alleviate a wide array of grid operational challenges faced by utilities, regulators, and developers; especially when integrated with renewable energy behind the meter. Therefore, we appreciate the opportunity to offer comments that reflect our mutually beneficial goals.

A. FOR SINGLE INVERTER SYSTEMS THAT DO NOT ALLOW NGOM, SHOULD THE COMMISSION CONSIDER ESTIMATED NEM GENERATION AS A MEANS TO LIMIT NEM EXPORT CREDITS DURING PEAK PERIODS?

No, because generic production limits would over credit underperforming systems and under credit high performing systems unless some ongoing estimate adjustment was applied based on actual system production while the battery was non-operational; a challenging and potential costly approach. More specifically, one only has to look at how production estimates derived by the California Solar Initiative calculator compare to the actual production of systems receiving performance-based incentives to understand the impact of complex estimations.

B. SHOULD THE COMMISSION CONSIDER A THRESHOLD STORAGE CAPACITY BELOW WHICH AN NGOM IS NOT REQUIRED FOR THE NEM GENERATOR? IF SO, WHAT IS AN APPROPRIATE THRESHOLD AND SHOULD THE THRESHOLD BE BASED ON ABSOLUTE CAPACITY OR IN RELATION TO CUSTOMER LOAD AND THE NEM GENERATOR?

No, the commission should not consider a threshold storage capacity below which NGOM is not required. Setting threshold limits has the potential, depending on the methods and reasoning by which those thresholds are set, to create market pressure against storage and solar system capacities that might otherwise provide benefits beyond the established threshold capacity's capabilities. The market is still developing and there is a wide area of possible applications and system configurations. Additionally, single inverter systems such as the Sunverge SIS are frequently paired with renewable generation that is smaller in capacity than the rated inverter (such as 3kW of solar connected to our 4.5kW inverter) based on the customer profile and optimization of customer value. Requiring a specific amount of renewable capacity with each system constrains our ability to optimize system costs against value.

C. BECAUSE STORAGE DEVICES INCREASE TOTAL CONSUMPTION, CUSTOMERS ON NON-TIME VARYING RATES HAVE NO FINANCIAL INCENTIVE TO EXPORT ENERGY FOR NEM CREDIT, SHOULD NGOM BE REQUIRED FOR CUSTOMER WHO ARE NOT ON A TIME-VARYING RATE?

Customers who are not on a time-varying rate should be eligible to install storage that is directly connected and/or integrated with renewables and be explicitly eligible for the NEM tariff with no additional storage

specific metering requirements. That includes all customer segments who are eligible for a non-time varying rate.

IV. SUNVERGE PROPOSED REQUIREMENTS FOR CUSTOMERS WITH TIME-VARYING RATES AND NEM ELIGIBLE SINGLE INVERTER SYSTEMS: USE STORAGE SYSTEM DAS TO DETERMINE ANNUAL FACTOR BY WHICH NEM CREDIT EXPORTS ARE PRORATED DURING ANNUAL TRUE-UP PROCESS

For NEM eligible storage systems integrated with renewables on the DC side of a single inverter, a simple approach to discounting possible non-renewable energy from NEM credits is to measure the total (grid) energy drawn into the system with the total energy dispatched by the system on an annual basis to determine a derate factor that would then be applied during the annual NEM true-up period to site NGOM NEM credits. The point of storage measurement is at or near the point where the inverter interconnects with the grid such that all AC energy into and out of the inverter can be measured directly. More specifically, the mathematical calculation is:

$$\frac{(\text{Annual Energy Dispatched to Grid} - \text{Annual Energy from Grid})}{\text{Annual Energy Dispatched to Grid}} = \% \text{ Derate Factor}$$

$$\text{Adjusted Annual NEM Credits} = (\text{Annual NGOM Export Credits} * \% \text{ Derate Factor})$$

The data acquisition system (DAS) should be capable of reporting kWh energy imported and exported by the inverter to an internet accessible data repository where utilities and customers alike can access and download the data in an appropriate format from which the derate factor can be calculated. For storage systems paired with renewables behind a single inverter with capacity that is 10kW (AC) or less regardless of the quantity of inverters installed behind the billing meter, non-utility (5%) grade system integrated metering is both cost effective and appropriate for such small-scale applications. If greater accuracy is desired for renewable storage systems connected to a single inverter greater than 10 kW, a separate utility NGOM can be used per inverter to determine the derate factor. Multiple derate factors can be multiplied together to determine a single factor per billing meter.

Additionally, storage systems continuously consume some power to maintain system services similar to stand-alone renewable generators and should accordingly not be penalized for what could be considered de minimis consumption. Therefore, we propose that where the annual derate factor is determined to be 95% or higher, the customer should receive 100% of annual NEM credits. Setting an upper threshold will also keep utility administrative costs lower by reducing the amount of paperwork for systems strictly using renewable energy.

We strongly urge the commission to consider our proposal because it accomplishes the need to preserve the quality of NEM credits without imposing market damaging sizing constraints on system configuration or renewable energy production.

V. STORAGE SYSTEM SIZING LIMITS ARE NOT AN EFFECTIVE APPROACH TO QUALIFYING STORAGE USE AND LIMITS HURT THE DEVELOPING STORAGE MARKET VALUE PROPOSITION

As described above in section III.B. and controlled for with our proposed method for calculating NEM credits in section IV., storage sizing limits based on a system's renewable energy capacity do not benefit a developing market -- they constrain a system's applications, restrict system optimization of renewable integrated storage systems, and limits overall value to both the grid and customer.

Consequently, the sizing limits referenced in the ACR and established within section 4.3.3 of the SGIP program handbook benefit ad-hoc piecemeal systems which are inherently inferior to a fully integrated and UL certified product line. The Sunverge SIS comes in two inverter capacities, 4.5kW and 6.0kW, with battery storage capacities ranging from 2-20kWh that fit within the two square-foot footprint of our uniquely designed enclosure. Further, each SIS is designed for >15+ years of commercial operation, is factory commissioned, and we monitor each installed system in real-time from our operations center to maintain system up-time and operability. By comparison, piecemeal storage systems assembled onsite and lacking the same level of testing and attention to detail operate more like a demonstration project and can cause costly issues for customers and utilities alike.¹ Allowing the storage system manufacturers and project developers the freedom to size inverter, battery, and generation system according to onsite load, tariff, and value will better serve the long-term

¹ Value of Energy Storage with PV
http://www1.eere.energy.gov/solar/pdfs/highpenforum2013_2_3_smud.pdf

needs of customers and grid alike.

For example, the best solar economic value proposition for a homeowner with an annual 4.5kW max demand might optimize at 3kW or less of solar to primarily offset higher tier electricity pricing. However, during an outage, that customer will want all 4.5kW of power available and the battery system must be 4.5kW or larger to fully back-up their home. It is not reasonable to use the generation system capacity to limit this customer to a backup system capable of only supporting 67% of their home power needs during an outage. Further, battery capacity can also vary widely based on customer needs and should not be limited by inverter or generation capacity. Using the same example customer on a time-varied pricing tariff, consider typical residential load profiles are generally lower (1 kW for example) during the middle of the day when solar generation is at its peak. Assuming an average 4 kWh of energy generated per 1 kW (CEC-AC) of solar generation per day, this customer needs approximately 9 kWh of battery capacity per day to capture and shift the 2 kW of excess solar generation to offset energy consumed during higher priced evening billing periods. Should the customer also want two or more hours of back-up power supply available at all times, the battery capacity must be sized larger than four times the inverter capacity ($18 \text{ kWh} = 9 \text{ kWh} + (4.5\text{kW} * 2 \text{ hours})$). Limiting battery or storage system inverter capacity based on generation capacity has the potential to limit the amount of back-up power and other value streams that should be made widely available to the customer. Requiring specific capacities for a storage system to be eligible for as an “additional enhancement” used for backup based on the amount of

grid-tied solar capacity, especially with integrated solutions such as our SIS product line, creates undue burden on a developing market and will result in slower market adoption and less reliable renewable energy paired storage systems.

VI. SGIP INTERCONNECTION DEADLINES

While appreciated, 14 days of extra time is not equivalent to the more than 120 days of lost time between when we were first notified of the utility interpretation for NEM storage and approval of this ruling. Since we first received notice from the utilities, project development and construction was put on hold pending a resolution. That means once the issues described herein are resolved, each project must restart construction and apply for permitting/interconnection accordingly; and project completion will take longer than 14 days. We ask that you allow program administrators to extend the reservation expiration date at least 120 days for storage incentive reservations that received their conditional reservation by June 2013.

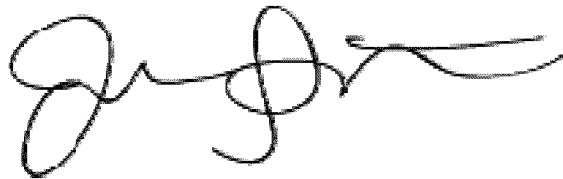
IV. CONCLUSION.

These comments are filed by Sunverge to provide insights from our company's energy storage system manufacturing and development experience in California and abroad. We generally agree with the NEM qualifying exemptions suggested for storage within the ACR, though the methods suggested for single inverter integrated systems are complicated

and more likely to cause harm than our simple approach to derate NEM credits annually. We strongly oppose any prescribed system capacity limits as compared with connected generation as they only serve to incorrectly constrain applications and encourage piecemeal systems. Finally, SGIP reservation expiration date extensions should be on par with the more than 120 days our projects have been suspended since first notified by each utility. We greatly appreciate the Commission's attention the issues described herein and look forward to rapid resolution of these issues so we may continue to move forward with our current and future energy storage projects paired with renewables.

Executed on November 1, 2013 in Stockton, CA

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Jon Fortune', with a long horizontal flourish extending to the right.

Jon Fortune
Director,
Regulatory & Energy Services
Sunverge Energy, Inc.