BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Oversee the Resource Adequacy Program, Consider Program Refinements, and Establish Annual Local Procurement Obligations	Rulemaking R-11-10-023

COMMENTS OF THE GREEN POWER INSTITUTE ON THE STAFF PROPOSAL ON FLEXIBLE CAPACITY IMPLEMENTATION

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COMMENTS OF THE GREEN POWER INSTITUTE ON THE STAFF PROPOSAL ON FLEXIBLE CAPACITY IMPLEMENTATION

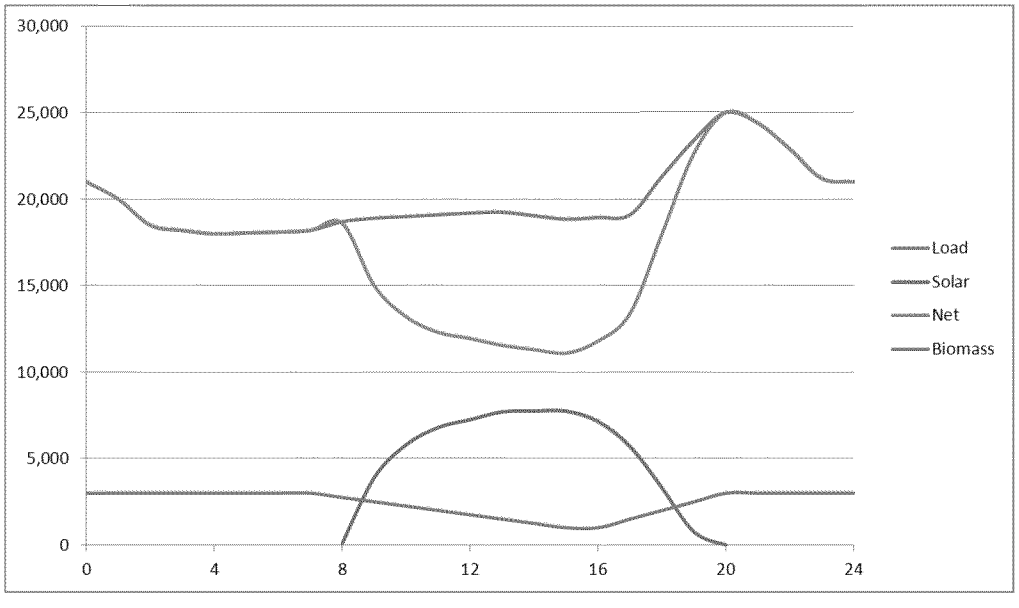
Pursuant to the February 18, 2014, email Ruling of ALJ Gamson, in Rulemaking R.11-10-023, the **Order Instituting Rulemaking to Oversee the Resource Adequacy Program, Consider Program Refinements, and Establish Annual Local Procurement Obligations**, the Green Power Institute (GPI), the renewable energy program of the Pacific Institute for Studies in Development, Environment and Security, respectfully submits these *Comments of the Green Power Institute on the Staff Proposal on Flexible Capacity Implementation*. Our interest in this proceeding is focused on developing the means to derive as much RA capacity and flexible-capacity value as possible out of the fleet of existing and under-development preferred resources, thereby limiting the need to provide these services using conventional generating sources.

The February 10, *Staff Proposal on the Implementation of the Flexible Capacity Procurement Framework* (Staff Proposal), is designed around the capabilities of conventional RA resources, particularly fossil generators and hydro. This is understandable. However, failing to formulate rules and incentives that work for preferred resources will have the effect of keeping these desirable resources out of the flexible-capacity RA marketplace, which is contrary to the goals of this proceeding, as well as contrary to the overall goals of California energy policy.

On page 6 of the Staff Proposal, in the section on Counting Conventions, the document invites parties to propose counting conventions for resources that are not yet covered in the Proposal. The GPI proposes that the Commission develop and adopt counting conventions that are designed around the operating characteristics of baseload renewable generating resources that are capable of providing use-limited, flexible RA capacity services. The development of these protocols is one important prerequisite to bringing these resources into the marketplace.

There are a couple of fundamental differences between using baseload renewables as flexible capacity resources, and using conventional fossil-generating facilities for this purpose. For one thing, baseload renewable generators tend to have slower ramping rates than gas-turbine generators, which suggests that these resources can be expected to be operated differently than conventional resources, including when they are operated in flexible-capacity mode, in order to derive the maximum value from their services. Conventional resources used for delivering flexible RA-capacity services tend to run only when delivering these services, and otherwise be turned off. Baseload renewables used for flexible RA purposes, by way of contrast, tend to be run at full output when not being used to deliver RA services. A typical duty cycle for a biomass generator operating in flexible capacity mode, for example, might look like the purple line in the following graph (note that the curves in the figure are not to scale).

Representative Flexible Operation Mode for Biomass



Beginning with midnight, the baseload biomass generator is operated at full capacity until morning, when the state's solar generators begin to produce power. The biomass

generator is slowly powered down during the day, until it reaches the point from which it can power back up to full output over a three or four hour period when the late afternoon / early evening ramp-up occurs. Once back at full output, it continues to operate that way until the next morning of a day on which this use-limited resource is needed for afternoon ramping, when it will be slowly powered down again in order to be used in flexible operating mode later in the day.

In formulating the Staff Proposal, it appears that there is an expectation on the part of the drafters that when a flexible resource is ordered on, it will power up to full power relatively quickly. In fact, the counting rules for thermal resources operating in flexible mode differentiate between generators that can achieve full power in less than 90 minutes, and generators that require more than 90 minutes to achieve full power. The slower-ramping resources are given lower priority, and the maximum flexible capacity that the slower-ramping resources can be credited with is limited to what they can achieve in the first 90-minutes of their ramp.

In order to optimally utilize baseload renewables as flexible-capacity resources, a different paradigm is needed. As relatively slow-ramping resources that can be expected to operate at full power following the afternoon ramp-up, the greatest value in these resources is that they can be scheduled to ramp at their intrinsic rate over the duration of the three or four hour period of system need. Conventional flexible-capacity resources are dispatched on an as-needed basis, with their full flexible-capacity amount expected to show up relatively quickly. Baseload renewable flexible-capacity resources, by way of contrast, are best used by scheduling them in the day-ahead market to ramp-up gradually over the course of the three- or four-hour period of afternoon system need. This will take care of a portion of the flexible capacity (FC) need, with the rest to be satisfied by dispatchable conventional resources.

Baseload renewable generating resources generally have their own intrinsic ramping rates, which govern, for example, how quickly they are brought up to full capacity after

an outage. In order to determine the amount of FC that these resources can provide, the formula is straightforward:

FC (MW) = Intrinsic Ramp Rate (MW/hr) x Duration of System-Ramping Need (hr)

For example, a 25 MW biomass generator that ramps at 3 MW/hr can provide 9 MW of FC for a three-hour system ramp. In order to provide its flexible-capacity value, the 25-MW generator should be gradually powered down to 16 MW during the daytime, so that it can ramp up to 25 MW during the critical three-hour system ramp.

Use-limited flexible-capacity resources are flexible-capacity resources that can only be used a limited number of times per year. The optimal way to take advantage of use-limited resources is to use them when system ramping needs are at their greatest, and when net daytime demand is at a minimum. The section of the Staff Proposal on use-limited flexible resources, like most of the document, is geared to the characteristics and needs of conventional (fossil) flexible resources. When conventional flexible resources have use limitations, it is usually because of factors such as environmental-permit restrictions, and technical limitations on the number of times these generators can be started-up during a year.

Unlike conventional FC resources, baseload renewables do not have to be started-up each time that they are used in ramping mode. However, in many cases these generators will experience greater wear-and-tear when operated in flexible mode, and turning them down during the day in order to allow afternoon ramping will decrease their production of RECs. For both of these reasons, the use of baseload renewables in flexible-capacity mode should be limited to periods when the need for FC resources is greatest. With future renewable-capacity growth in California expected to be almost entirely in the form of solar PV, the period of greatest need for the use of baseload renewables in flexible-capacity mode is during the winter, especially December and January.

With regards to how to count baseload renewable FC resources towards an LSE's obligation, we agree with other parties who suggest that the amount of credit given should be commensurate with the services provided. The use-limited services that we are describing are high-valued services that can, in effect, top-up an LSE's FC portfolio when the need is at its maximum.

In addition to needing a new counting protocol and operating paradigm, an important barrier to the use of baseload renewables in flexible-operating mode is that the existing PPAs do not anticipate such use, and do not provide any means for eliciting flexible operations, or for paying for them. The existing PPAs expect renewables to operate in baseload mode, and are designed around must-take provisions for the generator's output. Therefore, in order to be able to derive the benefits of flexible operations that these resources are capable of providing, one important contribution that the Commission can make is to facilitate the development of contract provisions that provide for and compensate use-limited flexible operations for baseload renewables.

Solid-fuel biomass is particularly well suited within the category of baseload renewables for operating in flexible-capacity mode. This is a result of two factors. First, biomass is the only renewable that has a substantial variable cost of operation, most of which is the cost of the fuel. The result of this circumstance is that the marginal economic loss to the generator of reducing output prior to a scheduled ramp is reduced compared to generators whose cost of operations is mostly fixed. Second, biomass is the only renewable other than large-dam hydro for which fuel storage is straightforward and easy, meaning that fuel delivery and fuel use are essential decoupled. Thus the generator can be turned up and down without regard to the implications of such operations for the fuel production or receiving operations of the facility. By way of contrast, the implications of flexible operations for the fuel systems at geothermal, biogas and run-of-the-river hydro generators may be a substantial concern for those operations.

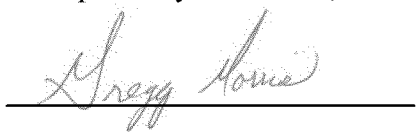
Providing ramping services for something like 100 – 200 hours annually during November through February, which would represent no more than, say, 70 three-hour

ramps over the course of a year, while operating in baseload mode at all other times, is a duty cycle that many baseload generators are capable of providing. For example in our estimation, with broad participation from the existing fleet of biomass generators in California, some 200 MW or more of use-limited flexible capacity could be provided to the grid. The penalty, in terms of loss of annual REC production from the participating generators, would be in the range of one-to-two percent of what they would have produced in traditional, baseload-only operating mode.

Baseload renewables can provide valuable use-limited flexible capacity services to the grid. In order for these services to be provided, it will be necessary to develop counting conventions and RA operating paradigms that provide for their use, and contract mechanisms to reward generators for providing FC services. The strategic use of renewables for afternoon system-ramping needs could fill an important niche in the power system with clean energy.

Dated February 24, 2014, at Berkeley, California.

Respectfully Submitted,



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