BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Implementation and Administration of California Renewables Portfolio Standard Program.	Rulemaking R.11-05-005

PRE-WORKSHOP COMMENTS OF THE GREEN POWER INSTITUTE ON A RENEWABLE NET SHORT POSITION CALCULATION

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Pursuant to the *Request for Pre-Workshop Comments on a Renewable Net Short Position Calculation*, in Proceeding R-11-05-005, the **Order Instituting Rulemaking to Continue Implementation and Administration of California Renewables Portfolio Standard Program**, the Green Power Institute, a program of the Pacific Institute for Studies in Development, Environment, and Security (GPI), provides these *Pre-Workshop Comments of the Green Power Institute on a Renewable Net Short Position Calculation*. Per instructions in the *Request*, this document is being served to the service list, but not filed at the docket office.

In discussing the Commission's need for data to be used in the determination of the Renewables net short (RNS), the *Request* states, on page 2:

> In addition, for projects under development it is necessary for the Commission to determine the probability of project success, or conversely, the risk of contract failure. Therefore, it is important that the Commission develop a standard methodology that determines whether a project is included or excluded from the renewable supply forecast based on the likelihood of project success.

The GPI has long urged the Commission to approach the question of how to estimate the amount of renewable generating capacity that will result from a given portfolio of contracts for projects-under-development using a methodology based on probabilistic analysis. The first sentence of the passage quoted above notes that the Commission needs to determine the probability of success or failure (note that the probability of success + the probability of failure = 1) for each project in the portfolio. However, the following sentence implies that the probabilities that are determined for each project will then be used to either include or exclude the project from the renewable supply forecast. In our opinion, that is the wrong way to use these probabilities.

The correct way to utilize the probabilities-of-success for each project is to multiply a project's probability-of-success by that project's generating capacity (MWh/yr), in order to produce an expected annual output for that project. We are using the precise mathematical meaning of the term "expected" in these *Comments*. Summing the expected annual outputs for each project in the portfolio produces the projected annual on-line generating capacity that will result from the portfolio at a given point in the future.

Note that the probability-of-success for a project or a portfolio of projects has to be tied to a timeframe. For example, what is the probability that a given project-under-development will be operational in 2020? In order to determine a full set of annual RNSs, it will be necessary to determine a function for the probability of success over time for each project in a portfolio. In addition, the probability of success for a given project at a given point in time can change over time. For example, the probability of success for a given project improves when it obtains construction financing and breaks ground. Conversely, the probability of success falls to nearly zero when its application for a construction permit is denied. Thus, estimates of the RNS will have to be periodically refreshed in order for them to continue to have meaning.

The text in the *Request* quoted previously continues:

> Lastly, for existing projects that have contracts which are expected to expire in the foreseeable future, the Commission must develop a standard methodology to determine how to account for expiring contracts in the renewable supply.

In fact, it is not only existing generators with expiring contracts that may be at risk of ceasing to be a source of RPS energy supply to the jurisdictional LSEs. There is a risk that any generator may exit the system at any time. For example, three existing biomass generators whose contracts are not expiring have announced plans within the past two months to exit from the RPS supply mix. Two of the three are shutting down operations altogether, while the other facility is being relieved of its contractual obligations to a jurisdictional LSE, and will enter a sales arrangement with a POU. This comes on the heals of the shutdown of two other long-operating biomass generators during the past year

that were still under contract with PG&E , one of which had a contract amendment pending before the Commission when it decided to shutdown. The good news, from the perspective of the RNS calculation, is that the same kind of probabilistic approach that we have recommended for projects-under-development can also be applied to operational projects. We illustrate in the table below a preliminary calculation of the RNS_{2020} for the three large IOUs.

Calculation of 2020 Net Short

Sales 2011	164,890	GWh
APT @ 20%	32,978	GWh
Annual Sales Growth	1.25%	
Sales in 2020	184,395	GWh
APT @ 33%	60,850	GWh
Expected RPS in 2020	54,813	GWh
Renewable Net Short 2020	6,037	GWh

GWh

	2011 Actuals	PUC RPS Contract Database With PPA	PPA Pending
Biomass	4,006	865	100
Biogas	834	304	
Geothermal	11,834	664	441
Sm. Hydro	3,674	8	
Solar	1,211	19,130	5,396
Wind	12,409	9,283	1,353
Total	33,968	30,254	7,290

Probability of 2020 Operations

Biomass	95%	70%	60%
Biogas	95%	70%	60%
Geothermal	95%	70%	60%
Sm. Hydro	95%	70%	60%
Solar	95%	60%	50%
Wind	95%	70%	60%

2020 Expected Output (GWh)

Biomass*	3,250	606	60
Biogas	792	213	0
Geothermal	11,242	465	265
Sm. Hydro	3,490	6	0
Solar	1,150	11,478	2,698
Wind	11,789	6,498	812
Total	31,714	19,265	3,834

* Including 2012 loss of Colmac, Delano, Madera.

The data in the table are extracted from the March 2012 utility *RPS Compliance Filings*, and the Commission's RPS Contract Database (April 2012 version), which is available on the web. The assumptions about the probabilities of operations in 2020 are supplied by the GPI and are, in our opinion, near the high end of the range of reasonableness for each entry, thus producing an RNS_{2020} that is near the low end of the reasonable range. A more conservative set of assumed probabilities puts the RNS_{2020} well above 10,000 GWh, or well in excess of 15 percent of the 2020 annual procurement target.

According to the discussion on page 5 of the *Request*, there apparently is a perspective common to the IOUs to the effect that the achievement of project milestones is not a very good predictor of the probability of project success for a given project under consideration. We agree that the probability of project success for a particular project cannot be predicted on the basis of the achievement of milestones alone, especially when the objective of estimating the probability is to produce an all-or-nothing determination for the project. On the other hand, we note that whatever the particular circumstances of a given project, as that project achieves its milestones, its probability of achieving on-line operational status obviously increases.

While the achievement of milestones alone may not be a good predictor of the probability of success for a particular project, it may well be reasonable to base predictions of the probability of success for groups of like projects on the basis of milestones, and that is all that is needed when the statistical approach, rather than the all-or-nothing approach, is used to determine the likely supply of energy at a given point in the future based on a portfolio of operating projects and projects-under-development. Resource quality and technological maturity are also important determinants of the probability of success for renewable energy projects.

The final section of the *Request* concerns the application of CA Public Utilities Code §399.13(a)(4)(D), which requires the Commission to adopt an appropriate minimum margin of over contracting in order to ensure that an LSE achieves its RPS procurement obligations. Over-contracting in anticipation of contract failures is a common practice in a

wide range of businesses. The-over contracting margin needed to achieve a desired result can be determined mathematically from a single factor, the average probability-of-success, as follows:

Margin (%) = (100 / (probability of success)) – 1

For example, if the average probability of success for projects with PPAs is 70%, then the appropriate over-contracting margin is 43 percent (100 / 70 – 1 = 0.43). Considering the fact that the current portfolio of contracts is nearly two-thirds solar, we believe that if that kind of mix carries over to the next generation of solicitations, the overall probability of success for the portfolio should be assumed to be closer to 60 percent than it is to 70 percent, and thus the appropriate contracting margin to use to cover the RNS from such a mix of projects is almost surely greater than 50 percent, and possibly greater than 60 percent.

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Respectfully Submitted,

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