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August 29, 2007

California Energy Commission
Docket Office
1516 Ninth Street
Sacramento, CA 95814

Re: Docket No. 07-SB-1

Fat Spaniel Technologies, Inc. (Fat Spaniel) submits the following Supplement to comments submitted today on the Staff Report. The enclosed comments address a concern we have with an idea suggested by the Sacramento Municipal Utility District (SMUD) in its letter to the California Energy Commission of August 22, 2007.[1]

Before addressing SMUD's comments we wish to clearly express our respect and admiration for SMUD's leadership in promoting solar PV. For over two decades now SMUD has been nationally and international recognized as one of the thought and action leaders in the development of solar PV. Fat Spaniel and the rest of the solar industry owe them a debt of gratitude for their leadership.

Fat Spaniel would like to comment on one SMUD recommendation pertaining to metering and performance monitoring standards, appearing on pages 2 and 3 of their August 22 letter. SMUD recommends that metering and performance monitoring standards be separately "defined by each program administrator". SMUD reasons that because the costs and mechanisms related to metering and performance monitoring are uncertain, this justifies a standard permitting each Program Administrator to define their own requirements for performance monitoring and reporting services (PMRS).

Fat Spaniel is concerned that this recommendation, if followed, will significantly increase the cost of metering and monitoring without corresponding benefits to ratepayers. Like the rest of the solar industry, Fat Spaniel is concerned about costs and is constantly striving to reduce costs in the products and services it provides. It is generally recognized that standardization is one of the most effective tools for reducing costs. SMUD's recommendation, however, moves in the opposite direction without a compelling reason for doing so. SMUD states in effect that because it does not understand the costs and benefits of reporting mechanisms Program Administrators should be allowed to set their own standards. SMUDs uncertainty is not a reason for permitting individualized standards by Program Administrators, and instead supports a consistent statewide

[1] http://www.energy.ca.gov/sb1/meetings/2007-08-22_workshop/comments/SMUD_Comments_on_Senate_Bill_SB1.pdf

approach. Moreover, varying metering and performance standards by Program Administrator will require performance monitoring and reporting services providers like Fat Spaniel to package different products, which will inject additional costs into this market. Different requirements by Program Administrators could also lead to different quantities and formats of information that may be a source of confusion and unnecessary burdens for regulators. The California Solar Initiative is a big, new program that faces enormous administrative challenges. What California needs is one set of metering and performance monitoring standards to simplify implementation. The Energy Commission would be wise to disregard SMUD's recommendation in this area.

Sincerely,

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Attorneys for Fat Spaniel Technologies, Inc.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

In the Matter of: Senate Bill 1 Eligibility Criteria and Conditions for Incentives	Energy Commission Docket No. 07-SB-1

COMMENTS OF FAT SPANIEL TECHNOLOGIES, INC. ON SENATE BILL 1 ELIGIBILITY REQUIREMENTS STAFF REPORT

I. INTRODUCTION

Pursuant to the August 9, 2007 "Notice of Renewables Committee Workshop on the Staff Report entitled, "*Eligibility Criteria and Conditions for Incentives for Solar Energy Systems Senate Bill 1*", Fat Spaniel Technologies, Inc. (Fat Spaniel) is pleased to provide the following comments on the Staff Report. Generally, Fat Spaniel supports Staff's recommendation for third party monitoring of solar energy system performance because independent monitoring of system data is the most cost effective means for ensuring optimal system performance and high confidence in the accuracy of production data. Fat Spaniel is concerned, however, that by making this recommendation in Chapter 6, as an "Other Eligibility Criteria", Staff has not recognized the full legal basis and importance placed by SB 1 on maximizing system performance. Consequently, Fat Spaniel proposes the following clarifications to align the Staff Report more closely with the California Energy Commission's responsibilities under SB 1.

II. DISCUSSION

A. The California Solar Initiative Needs Independent Third Party Performance Monitoring to Fulfill the Expectations of SB 1.

The Staff Report correctly recognizes that SB 1 sets three specific expectations for ratepayer-funded solar incentives:

> 1. High quality solar energy systems with maximum system performance to promote the highest energy production per ratepayer dollar;
>
> 2. Optimal system performance during periods of peak demand; and
>
> 3. Appropriate energy efficiency improvements in the new and existing home or commercial structure where the solar energy system is installed. (Emphasis added.)

The Energy Commission's eligibility criteria and conditions for incentives must meet these expectations to fulfill the legislative intent of SB 1.

Fat Spaniel is in the business of ensuring maximum solar system performance by providing the type of trusted performance monitoring only an independent provider of such services can provide. Just as the independent financial auditors of publicly traded companies provide trusted oversight to investors, performance monitoring and reporting service (PMRS) providers offer trustworthy oversight of system performance to solar system owners and California ratepayers. Such oversight is necessary to meet the Legislature's expectations of installation of "high quality solar energy systems with maximum system performance" and "optimal system performance during periods of peak demand."

Due in large part to the California Solar Initiative (CSI) the solar industry in California is about to embark on a rapid expansion. While the industry is dedicated to a good, environmental cause, it has already experienced problems related to the credibility of system performance data that could jeopardize confidence in the CSI program in the future. For example:

1. In 2001, Sanyo was expelled from the Japanese government's PV subsidy program for three years for cheating customers by selling modules at ratings below their designated nominal power.[1]

[1] Report by Dresdner Kleinwort Wasserstein Securities Limited dated 21 June 2001 entitled "Solar PV industry – here comes the sun" See: http://mertschenk.de/Produkte/A-SolarPVIndustry210601.pdf

2. There is empirical evidence to suggest that the nameplate ratings of modules sold in the U.S. may be systematically inflated by as much as 10%.[2]

3. Inverter manufactures have been known to mislead consumers by publishing efficiency curve graphs that do not begin at zero.[3]

4. The CSI's EPBB program has recently experienced an endemic lack of reported shading leading to artificially inflated EPBB rebate payments. In one extreme case an unscrupulous system installer apparently used a graphics editing program to alter a photograph of the rebate site in an attempt to remove visual proof that there was shade falling on the system site!

Like other industries, the solar industry is vulnerable to exploitation by individuals who seek to profit by breaching program rules. It would take only one celebrated example to cast doubt on the entire CSI program. The Legislature recognized this danger when it entrusted the Energy Commission with promulgating eligibility criteria and standards to ensure the credibility of the CSI.

The Staff Report appreciates the importance of integrity of system performance data in several important respects. First, Staff recommends that PV modules used in the CSI be tested by independent Nationally Recognized Testing Laboratories (NRTL), just as in the Energy Commission's New Solar homes Partnership (NSHP) program. (Staff Report, at p. 13.) Second, Staff also recommends that inverters also be tested by independent NRTL. (Staff Report, at p. 14.) Third, Staff recommends that the accuracy of meters must either be self-certified by the manufacturer or by an independent testing body. (Staff Report, at p. 12.) Fourth, the Staff

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[2] Report by Galen Barbose, Ryan Wiser, and Mark Bolinger dated October 2006 entitled "Designing PV Incentive Programs to Promote Performance" See: http://eetd.lbl.gov/EA/EMP/reports/61643.pdf

[3] "In a typical home, there are many hours of the day when the electrical load is very low. Under these conditions, an inverter's efficiency may be around 50 percent or less. The full story is told by a graph of efficiency vs. load, as published by the inverter manufacturer. This is called the "efficiency curve." Read these curves carefully. Some manufacturers cheat by starting the curve at 100 watts or so, not at zero!

"Because the efficiency varies with load, don't assume that an inverter with 93 percent peak efficiency is better than one with 85 percent peak efficiency. If the 85 percent efficient unit is more efficient at low power levels, it may waste less energy through the course of a typical day." From http://www.wholesalesolar.com/Information-Folder/inverters-article.html

recommends that solar systems be required to have third-party field verification on a one-in-seven sampling basis using the NSHP protocols. Finally, the Staff recommends that third party performance monitoring of system performance be required for PBI customers and for EPBB customers, as long as it is economically reasonable. (Staff Report, at p. 47.) In particular, the Staff Report explained the need for PMRS services as follows:

> The use of Performance Monitoring and Reporting Services (PMRS) is critical to the PBI incentives approach and desirable for all systems to enable alerts on low performing systems to allow for timely maintenance and repair and correction of shading problems that may occur over the lifetime of the system. ... PMRS when coupled with maintenance service can be very beneficial to ensure the output of a system over long term, as long as the PMRS is cost viable.

(Staff Report, at p. 44.)

Thus, Staff clearly understands the importance of independence and the utility of using third parties to instill confidence in the data used to distribute financial incentives. Fat Spaniel would like to suggest certain clarifications to how Staff has made its recommendations regarding third party PMRS services.

B. The Staff Report Should Adopt Independent Third Party Monitoring as a Standard for Solar Energy System Components.

Presently, the Staff Report recommends third party monitoring of system performance in Chapter 6, "Other Eligibility Criteria Established in Statute" presumably because Staff feels that such requirements are not sufficiently related to either Solar Energy System Component Standards (Chapter 3) or Solar Energy System Installation Standards (Chapter 4). However, independent performance monitoring is necessary to both. This is also recognized by Staff. For example, in the Recommendations for Guidelines section of Chapter 3, Staff writes:

> <u>The main purpose for test standards and reporting requirements related to components is to have high confidence in the accuracy of the expected performance calculations and to ensure that expected performance is achieved on actual installations.</u> This protects the interest of the solar customer, as well as promotes a sustainable solar industry. This also

> puts California on an equal footing with international test standards and certification requirements known to be more rigorous than in the United States.

(Staff Report, at p. 13; emphasis added.) However, while Staff recommends independent testing of PV modules, inverters, and to a limited extent meters, and reporting of test results for PV modules and inverters, it does not require independent monitoring and reporting of performance data from these components. Performance data of PV modules, inverters and meters, both specific performance characteristics and production data, lies at the heart of the CSI's scheme of performance based incentives and is an important check on EPBB incentives as well. Yet the only recommendation Staff makes related to operations data from these components is a requirement that meters have a communications port enabling PMRS services. Staff's recommendations are incomplete. It is not enough to require one-time testing of PV modules, inverters and meters that will operate for 20 years or more. There is already evidence that unscrupulous or irresponsible component providers have attempted to short change other programs and PV customers and this may take other forms as time goes by. Moreover, solar energy system performance will deteriorate and many questions remain about how performance will deteriorate over time. Though initial component testing can catch initial design and installations problems, this is no guarantee of system performance over the life of the components. Trees can grow and shade PV panels, electrical connections can fray, houses and buildings can be altered. In short, much can happen in the intervening years from the time of installation. There is no better assurance that PV customers and California ratepayers will get what they pay for than a requirement for independent, third party PMRS monitoring of solar energy system components. The Staff Report should add such a standard to ensure that the main purpose of providing high confidence in the accuracy of data used to pay financial incentives is accomplished. The same logic that the Energy Commission applied to require independent

testing and reporting for the NSHP applies equally to the CSI program. (*See* Staff Report, at p. 10 ("The NSHP relies on the specific performance characteristics that are measured by third party testing laboratories. ... And to ensure the integrity of the data provided, test standards have been referenced and independent testing required when reporting these values.")) This is a matter of data integrity.

C. The Staff Report Should Adopt Independent Third Party Monitoring as a Solar Energy System Installation Standard.

Fat Spaniel has similar concerns over the absence of an independent, third party monitoring requirement in Chapter 4. This section of the Staff Report addresses how solar components operate together to yield solar energy over time. To ensure the integrity of solar energy system production data, the Staff Report seems chiefly interested in standards pertaining to inspections of system installations, yet even CEC Staff has acknowledged that the proposed standards for field inspections are not up to task. And of course the environmental conditions at the time of installation are sure to change in the twenty to thirty year lifespan of a typical solar energy system, and even the most careful inspections will miss changes to the systems that occur over decades of use.

For example, Staff cites to current CSI guidelines for random sampling for projects under 30 kW, for mandatory sampling of systems between 30 and 100 kW, and uncertainty with respect to higher sized systems.[4] However, Staff reports that whether the sampling is 100% or 1 in 7, problems have been uncovered in system installations that are not addressed by the Staff Report.[5] The most notable of these problems are errors by installers. (Staff Report, at p. 27.) In

[4] Indeed, the Staff Report states that the CSI Guidelines are unclear with respect to what the sampling rate is for both the EPBB and PBI systems. (Staff Report, at p. 27.)

[5] "The early experience in conducting these inspections and points of failure, are being used to consider improved inspection procedures that will be used by all the CSI inspectors." (Staff Report, at p. 27.)

response to widespread issues of faulty installation, Staff proposes more inspections and adaptation of NSHP protocols from residential installations. But more inspections will not remedy the simple human error that is always present in labor intensive procedures, especially in fields that are new to large numbers of tradesmen. Third party verification does not provide a sufficient quality control check of the system once it is in operation because it too includes a human element, and human error is as unavoidable in inspections as it is in installations. In addition, more inspections are more expensive because they require hiring, training and deploying more inspectors.

Fat Spaniel's goal is to reduce costs and eliminate human error through automation. While Fat Spaniel cannot remove human error in installations it (and similar PMRS providers) can provide virtually error-free verification of system performance that will ensure data integrity over the life of the solar energy system and this data can be evaluated against computer performance models that are customized to each installation. Thus, not only would independent, third party monitoring verify that the system as installed is performing up to expectations, but that it continues to do so for as long as financial incentives are dispensed. This kind of automated verification is more cost effective and reliable than the vague "improved field inspection procedures" alluded to in the Staff Report. Rather than propose more inspections of dubious efficacy,[6] Fat Spaniel recommends that the Staff Report should include similar independent, third party monitoring standards for solar energy systems in their entirety for the same reasons advanced previously for the monitoring of system components. Such monitoring

[6] Staff's doubts about adaptation of additional field verification protocols are apparent in the Questions for Further Consideration at the end of Chapter 4. For example, Staff writes, "Does the proposed field verification protocol have any limitations to address all the various installations and technologies of equipment? If so, can they be addressed through extending the protocol to cover outlying cases? What lessons could be learned and applied from the current CSI inspections?" Staff might also add, "Are more protocols for installers to follow likely to eliminate the human error inherent in labor-intensive construction activities?"

systems are inexpensive and costs are declining. They are reliable, and can routinely collect, process, disseminate, and store performance data with exceptionally low error rates (in most cases approaching 0.000001%). Independent, third party monitoring also responds to changed conditions, such as growing trees and alterations in the host structures, because it is *continuous* monitoring, not just a snap-shot in time, as is the case with field inspections. And most importantly, independent, third party monitoring will verify "maximum system performance" and "optimal system performance during periods of peak demand" with a high confidence of accuracy over the life of the solar energy system.

The Legislature has assigned the Energy Commission the responsibility of establishing eligibility criteria for all solar energy systems receiving ratepayer funded incentives, after consulting with interested members of the public, such as Fat Spaniel. (Pub. Resources Code, § 25782(a).) Moreover, the Energy Commission is required to establish conditions for dispensing incentives that will "promote the greatest energy production per ratepayer dollar" and "optimize" solar energy system performance during periods of peak electricity demand." (Pub. Resources Code, § 25782(b).) Further, the Energy Commission must "develop standards that provide for compliance with the minimum ratings" established to assure reasonable performance of solar energy systems. (Pub. Resources Code, § 25782(c).) Thus, the Energy Commission has the authority and the independent statutory responsibility to ensure that testing and eligibility standards are in place to ensure that the expectations of the Legislature are fulfilled. The Energy Commission's statutory duty with respect to ensuring credible system performance does not stop once the solar energy system is installed but continues over the life of each system. The surest and most cost effective means of fulfilling that responsibility is to adopt low cost, independent, third party performance monitoring of all PBI systems, and where PMRS services meet the cost

cap established by the California Public Utilities Commission (CPUC), for EPBB systems as well. Consequently, Fat Spaniel recommends that Chapter 4 of the Staff Report be revised to include this standard as part of the Solar Energy System Installation Standards.

III. CONCLUSION

The solar industry within California is at a crossroads. The Energy Commission's guidelines in implementing the directives of SB1 will determine, in large part, the long-term success of the solar industry within this country. As currently drafted the CEC Staff Report properly recommends that a third-party perform all post installation system performance monitoring, however the Staff Report needs revision to specifically make that standard a requirement of both Solar Energy System Components and Solar Energy System Installations. Throughout the guidelines, the Energy Commission stresses the importance of bringing a heightened level of independent testing, certification, inspection, and monitoring to the California solar industry because, just as in the financial markets, only the independent assurance of system performance can take the industry down the road to success. By making the revisions we propose, the Energy Commission will ensure that it has discharged its statutory duty to ensure that from point of sale, to installation, to actual performance in the field, the owners of PV systems, as well as the ratepayers of California, are getting what they expect and can trust what they are being told. Accordingly, Fat Spaniel supports requiring independent, third party monitoring a standard for both system components and solar energy systems as a whole.

Dated: August 29, 2007

Respectfully submitted,

/s/

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