

## DOCKETED

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**STATE OF CALIFORNIA**

**Energy Resources Conservation and Development Commission**

In the Matter of:

APPLICATION FOR CERTIFICATION  
FOR THE PALEN SOLAR ENERGY  
GENERATING SYSTEM

DOCKET NO. 09-AFC-7

**INTERVENOR CENTER FOR BIOLOGICAL DIVERSITY**

**Exhibit 3146**

**Reply Testimony of Bill Powers P.E.**

**Re: Rebuttal Testimony on June 23, 2014 Opening Testimony to May 21,  
2014 Committee Order Granting Petitioner's Motion to Reopen the Evidentiary  
Record and Setting Revised Schedule, Palen Solar Electric Generating System  
Amendment**

**Docket 09-AFC-7**

**Statement**

Powers Engineering has prepared the following rebuttal testimony on the June 23, 2014 opening testimony by Brightsource and CEC staff on the May 21, 2014 Committee Order Granting Petitioner's Motion to Reopen the Evidentiary Record and Setting Revised Schedule, Palen Solar Electric Generating System Amendment. This rebuttal testimony supplements opening testimony submitted in this matter on June 23, 2014, as well as earlier opening testimony submitted on October 5, 2010 and testimony given at the California Energy Commission hearing on October 27, 2010.

**I. The IOUs and CPUC Routinely Modify PPAs to Reflect Changing Circumstances**

Changing circumstances that can affect the terms of a Power Purchase Agreement (PPA) can include a change in technology or renegotiated pricing. Therefore, the potential need to change a PPA does not make an alternative infeasible.

For example, the 25-year PPA between project developer Tenaska Solar Ventures and SDG&E identified Soitec concentrating PV technology as the solar technology to be used to develop a 150 MW solar project in Imperial County. However, Tenaska recently announced it was switching from Soitec concentrating PV to conventional PV technology.<sup>1</sup>

A changing circumstance that would affect PPA pricing, for example, could be the need to curtail operations for one month in spring and one month in fall to protect migratory birds. The pricing in the existing PSEGS PPAs reflects unlimited operation. Two months of forced curtailment would result in the unanticipated loss of 17 percent of the annual operating time of PSEGS, unless increased operation on natural gas is authorized to allow solar generation to be substituted with natural gas-fired generation.<sup>2</sup>

## **II. The Substantive Aspect of a “Large Generator Interconnection Agreement - LGIA” Is the MW Capacity of the Generator, Not the Generation Technology**

The purpose of an LGIA is to assure the output from a new generation source is fully compatible with capacity of the existing transmission system and associated power quality requirements. It is not generation technology specific beyond the generator being able to meet voltage, frequency, and power factor requirements. If the LGIA currently specifies that the generator type to be connected at PSEGS is a power tower, it can be modified administratively to reflect an alternative technology assuming the alternative generation technology has the same MW output and acceptable power quality characteristics.

## **III. Comparison of Operational Benefits of PSEGS (tower) Versus PV Alternative Is Misleading**

Brightsource Opening Testimony on the operational benefits of PSEGS (tower) versus PV alternative is misleading. There is no Thermal Energy Storage (TES) benefit of PV because a PV system would use batteries, not TES, for energy storage. A PV system with batteries would be a substantially lower cost alternative than PSEGS with TES, as discussed in Powers Opening Testimony. There is no inertia response with a PV system because it does not use a heavy, high inertia steam turbine-generator to generate electric power. This inertia, useful for providing reactive power in a conventional generator, is replicated in a PV system with readily available smart inverter technology. The use of natural gas combustion as a necessary element of a solar power technology is a weakness, not a benefit. The strategic objective of the RPS program is to displace natural gas generation, not to promote it.

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<sup>1</sup> Exhibit 3147, PV Magazine, *Tenaska switches to PV for 150 MW California project*, April 16, 2014.

<sup>2</sup>  $(2 \text{ months}/12 \text{ months}) = 0.1667$  (16.7 percent).

#### **IV. PV Systems Equipped With Smart Inverters Are Fully Capable of Providing the Same Grid Reliability Attributes as PSEGS**

The use of smart inverters in PV systems enables PV systems to provide the same grid reliability support functions that PSEGS attributes to the power tower technology. The CPUC is currently scheduled to require smart inverters on all new PV systems beginning in 2015.<sup>3</sup> The cost impact of requiring smart inverters is on the order of a 1 percent increase in overall PV project cost.<sup>4</sup>

#### **V. Distributed PV Located in Urban/Suburban Load Pockets Eliminates Migratory Bird Impacts and Provides Local Capacity for Grid Reliability**

Distributed PV located in urban load pockets would eliminate the migratory bird impacts of PSEGS. Distributed PV would also provide local capacity for enhanced grid reliability, as described in Powers Opening Testimony.

#### **VI. PSEGS as Currently Designed Is Not Capable of Allocating a Significant Amount of Solar Energy for TES (reply to Staff testimony)**

Staff appears to make a calculation error in asserting that there are sufficient extra heliostats in the current design to provide 2 hours of TES storage at a rated output of 1,884.6 MMBtu/hr. Staff states that 81,258 heliostats are necessary to generate 1,884.6 MMBtu/hr, and that there would be 3,402 additional heliostats in the existing design to supply heat for the TES. If the 81,258 heliostats generate 1,884.6 MMBtu/hr, then proportionately 3,402 heliostats would generate 78.9 MMBtu/hr. In six hours of operation, these 3,402 heliostats would generate 473.4 MMBtu.<sup>5</sup> 473.4 MMBtu would provide only 15 minutes of MCR electricity production at a rated heat input of 1,884.6 MMBtu/hr.<sup>6</sup>

All other TES heat input beyond the 15 minutes of MCR electricity production provided by the 3,402 heliostats dedicated to the TES would come from natural gas firing.<sup>7</sup> To achieve 2 hours of TES using only 3,402 heliostats, 88 percent of the heat input to the TES would have to come from natural gas firing.<sup>8</sup> Most of the electricity generated by heat stored in the TES would be fossil-fuel based electricity, as the heat stored in the TES would largely be heat from the combustion of natural gas.

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<sup>3</sup> Exhibit 3148, GreenTech Media, *California Closes In on Smart Solar Inverter Rules*, November 13, 2013.

<sup>4</sup> Exhibit 3149, GreenTech Media, *Western Utilities Call for Smart Solar Inverters*, August 9, 2013.

<sup>5</sup>  $6 \text{ hours} \times 78.9 \text{ MMBtu/hr} = 473.4 \text{ MMBtu}$ .

<sup>6</sup>  $(473.4 \text{ MMBtu} \div 1,884.6 \text{ MMBtu/hr}) \times 60 \text{ minutes/hr} = 15 \text{ minutes}$

<sup>7</sup> CEC Overriding Considerations, June 2014, p. 69, footnote 44.

<sup>8</sup>  $100 \times [(120 \text{ minutes} - 15 \text{ minutes})/120 \text{ minutes}] = 87.5 \text{ percent}$

**Declaration of Bill Powers P.E.**

**Re: Rebuttal Testimony to June 23, 2014 Opening Testimony to May 21, 2014  
Committee Order Granting Petitioner's Motion to Reopen the Evidentiary  
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**Docket 09-AFC-7**

I, Bill Powers, declare as follows:

- 1) I am currently a registered professional mechanical engineer in California with over 30 years of experience in the energy and environmental fields. I am also the owner of Powers Engineering.
- 2) My relevant professional qualifications and experience are set forth in my previously submitted resume submitted in this matter and are incorporated herein by reference.
- 3) I prepared the testimony attached hereto and incorporated herein by reference, responding to the June 23, 2014 Opening Testimony to Committee Order Granting Petitioner's Motion to Reopen the Evidentiary Record and Setting Revised Schedule, Palen Solar Electric Generating System Amendment
- 4) I prepared the testimony attached hereto and incorporated herein by reference relating to the proposed Palen Solar Electric Generating System in the Chuckwalla Valley in Riverside County.
- 5) It is my professional opinion that the attached testimony is true and accurate with respect to the issues that is addressed.
- 6) I am personally familiar with the facts and conclusions described within the attached testimony and if called as a witness, I could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

*Bill Powers, P.E.*

Dated: July 18, 2014

Signed: \_\_\_\_\_

At: San Diego, California