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STATE OF CALIFORNIA

**Energy Resources Conservation
and Development Commission**

In the Matter of:

Petition for Amendment for the **PALEN
SOLAR ELECTRIC GENERATING
SYSTEM**

Docket No. 09-AFC-7C

**TESTIMONY OF WILLIAM J. PEREZ
ON BEHALF OF CURE
ON OVERRIDING CONSIDERATIONS**

EXHIBIT 6000

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**TESTIMONY OF WILLIAM J. PEREZ ON BEHALF OF CURE ON
OVERRIDING CONSIDERATIONS**

EXHIBIT 6000

INTRODUCTION

My name is Bill Perez. I am the Business Manager of the Building & Construction Trades Council of San Bernardino & Riverside Counties, and have been in this position for the past 7½ years. The Business Manager is the highest ranking official of the Council and runs its day to day business. The Council is the central coordinating group for all of the construction unions in San Bernardino and Riverside Counties. In this position, I am familiar with the construction of the major industrial projects built in these two counties, including power plants.

Before being elected to my current position, I served as the Business Manager of Local 440 of the International Brotherhood of Electrical Workers for 11 years. I have been a journeyman electrician since 1979, after finishing my 4 year apprenticeship.

In my current position, I participate in the regular labor-management meetings between the contractors and unions engaged in building power plants. During these meetings, usually held monthly, we discuss many topics, including the number of construction workers of each union working on the project, and work cooperatively to address any issues so that construction can proceed smoothly and efficiently.

I am familiar with the construction of the BrightSource Ivanpah Project, the Abengoa Mojave Project and the First Solar Desert Sunlight Project. These three projects represent the major types of solar projects – solar thermal power tower, solar thermal trough and solar photovoltaic, respectively. Each of these projects was built within the jurisdiction of my Council under a Project Labor Agreement and employed union construction workers. I am also familiar with the gas-fired projects built in the jurisdiction of the Council: the Blythe combined cycle, Mountainview combined cycle, High Desert Victorville combined cycle, and the Sentinel simple cycle. Each of these projects was also built within the jurisdiction of my Council under a Project Labor Agreement and employed union construction workers.

The purpose of my testimony is to discuss the different types of economic benefits each type of project provides through employment of construction workers. I will discuss, (1) the total hours of construction work required (which correlates to the economic benefits from construction employment); (2) the range

of skills required; and (3) the differing opportunities for apprentice training. Some of this data is summarized in the following table.

Table 1: Comparison of Construction Benefits by Technology¹

	Size (MW)	Journeyman Hours	Apprentice Hours	Total Hours	Total Hours per MW	Type of unions/crafts
Gas Simple Cycle	800	850,000	150,000	1,000,000	1,250	All
Gas Combined Cycle	530	1,200,000	320,000	1,600,000	3,018	All
Solar PV	400	2,400,000	600,000	3,000,000	7,500	5 or 6
Solar Trough	250	3,600,000	900,000	4,500,000	18,000	All
Solar Tower	370	5,840,000	1,460,000	7,300,000	19,730	All

1. All three solar technologies provide more hours of construction than a gas-fired power plant

Every type of solar project requires more hours of construction than every type of gas-fired plant.

The power block of a gas-fired power plant and a solar thermal power plant are similar. Gas -fired projects generally use the same components and similar construction hours in the power block as a solar thermal project. The distinction lies in the delivery of heat to the power block. A gas-fired power plant requires little more than a gas pipeline and metering station. The construction hours required to install a natural gas line and metering station to the power block of a gas-fired plant are significantly less than the hours, and number of trades required, for “fuel” collection in a solar field. Even though the gas utility connection may be miles away, a small number of crafts are involved and installation can be done in a matter of weeks, as opposed to months or even years.

Solar PV project construction hours consist mainly in the collection of the fuel source, but have no power block. The fuel source collection and generation development happens concurrently; a panel collects the fuel source and provides

¹ Estimates based on the referenced projects within the jurisdiction of my Council and data from other recent projects.

generation at a single point without any power block. Installing the solar panels and tracking system alone requires many more hours of construction than constructing any sort of gas-fired plant, but without a power block, it requires much less than a solar thermal project.

Solar thermal projects provide the greatest number of construction hours (between 18,000 and 19,730 total hours per MW), combining the hours required to construct the power block, similar to a gas-fired project, plus development of the solar field.

2. Solar tower technology provides more hours of construction than solar trough, which provides more than solar PV

The greatest difference in construction hours for tower and trough technologies as compared to PV lies in the power block construction. PV has no power block. Therefore, there are no pumps, compressors, boilers, turbines, cooling equipment nor the foundations, piping, electrical, controls and tanks required for a thermal project. Thus, PV provides the fewest overall number of construction hours of the various solar technologies.

Solar trough construction hours are generally equivalent to solar tower, for the solar field construction. However, there are more construction hours for the solar tower because of the design and layout of the power blocks. Because of the tower, there is a third dimension – a structural component supporting the solar receiver/boiler. This leads to three major phases of construction – power block, solar field and structural tower. A solar tower moves the boiler from ground level to the top of a structural tower. More construction hours and a greater variety of highly skilled crafts are required to construct the tower, boiler, major foundations and elevators in a solar tower project. The “solar boiler” is now hundreds of feet from the balance of plant-equipment, increasing the size of piping and electrical feeders; requiring, for example, additional insulation, fire protection, lighting, and temporary and permanent elevators.

3. Solar tower technology requires the broadest range of skills and construction workers from nearly every type of construction union

Solar tower projects require the broadest range of skills and construction workforce; broader than PV, trough or gas-fired plants.

Utility scale PV generally utilizes crafts such as Electricians, Laborers, Equipment Operators, Iron Workers and Carpenters. There is little or no work for other types of construction workers.

Solar trough projects require a broader range of skills than PV projects, across more crafts including the standard mechanical, electrical, and civil crafts.

Solar tower however, requires even greater use of structural Iron Workers, Tower Crane Operators, Elevator Operators and Mechanics. The broad skill sets and increased number of those workers needed that possess them are:

- Boilermakers
- Elevator Installers/Operators/Mechanics
- Structural Iron Workers
- Electricians
- Industrial Insulators
- Fire Alarm/Communications
- Industrial Painters
- Tower Crane Operators
- Fire Sprinkler Fitters
- Heavy Haul / equipment Operators
- Laborer
- Cement Masons
- Form Carpenters

4. Solar tower technology provides more and better apprentice training opportunities than any other technology

In addition to providing more economic benefits from the construction payroll, because there are more construction hours across a broader set of crafts for tower construction, there is increased opportunity and demand for apprenticeship programs with solar tower projects.

On average, 1 of every 5 hours of construction is performed by apprentices working and learning in each of the crafts. Apprenticeships range from 2 to 5 years and require completion of a set number of classroom attendance hours and “On-the-Job-Training.” For union projects built under a Project Labor Agreement, apprentice programs have both State and Federal approval.

The union apprentice programs offer a broad range of entry level career opportunities for veterans, women, and minorities. These programs cost the apprentice nothing; they “earn while they learn.” However, the availability of openings is directly dependant on the hours and type of construction work available. Solar tower construction brings more of these opportunities to residents in many areas that would not otherwise have projects to support the ability to train workers.

Therefore, solar tower technology provides the most economic benefits to a local workforce and the best quality apprentice training opportunities.

DECLARATION

I, William J. Perez, declare as follows:

I have reviewed the above testimony regarding overriding considerations for the Palen Solar Electric Generating System. To the best of my knowledge, all of the facts in my testimony are true and correct. To the extent that this testimony contains opinion, such opinion is my own.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct to the best of my knowledge and belief. This declaration is signed at South San Francisco, California.

Dated: June 23, 2014

Respectfully submitted,

_____/s/_____
William J. Perez