Written Testimony Submitted to the Senate Committee on Energy and Natural Resources

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Dr. Frederick H. Morse
Senior Advisor, US Operations
Abengoa Solar, Inc.
236 Massachusetts Avenue, NE, Suite 605
Washington, DC 20002

Senators Bingaman, Domenici and Sanders, thank you for inviting me to speak to you today about one of America's most promising renewable energy technologies – Concentrating Solar Power, or CSP. My company, Abengoa Solar, develops, builds, owns and operates CSP plants around the world and is also planning trying to do this in the United States.

Americans are deeply concerned over their future, with oil and natural gas prices rising to unexpected levels, with fears of a recession and loss of jobs, with reports that the concentration of carbon dioxide in the atmosphere continues to increase, threatening many adverse consequences. Importantly, the EPA has identified electricity generation from fossil fuels as the single largest source of domestic CO2 emissions.

But there is an exciting clean energy technology right in front of us that can become part of the solution to America's energy, economic and environmental challenges. The solution is Concentrating Solar Power and it can and should be a part of our national energy portfolio going forward.

CSP refers to a family of technologies that convert the sun's thermal energy into steam to generate electricity with zero carbon emissions. Some CSP technologies concentrate the sun and convert it directly into electricity via an engine or photovoltaics located at the focal point. Figure 1 shows the major CSP technologies.

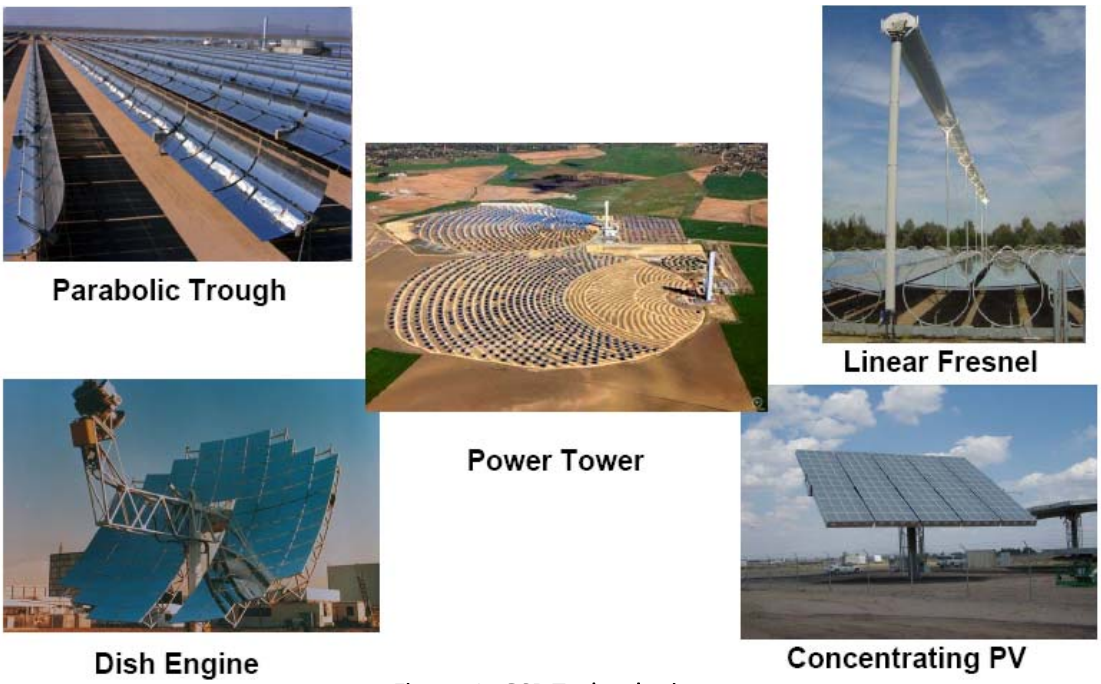


Figure 1: CSP Technologies

CSP is most cost effective at utility scale (hundreds of MW) and some CSP technologies can provide electricity, on demand, when it is needed, and some can even produce electricity well into the night to meet summer peak demand. Some CSP technologies are commercially available and have been working reliably for over 20 years in the Mojave Desert, where they have not failed to meet a single hour of peak demand since they came on line – with the help of favorable tax policies. Figure 2 shows the output from a portion of the 354 MW CSP Plant.

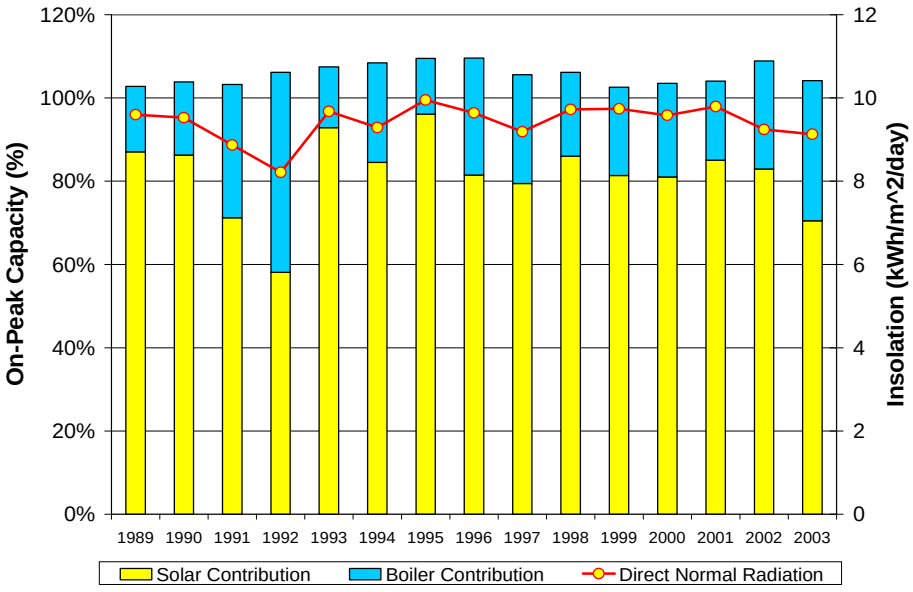


Figure 2: SEGS Plant output from 1989 – 2003

It can be seen that when combined with natural gas to firm the output, these plants had an on-peak capacity factor of over 100% every year of their operation. Most current CSP plants now firm their output using thermal storage to become "pure" solar plants. Utilities are familiar with CSP and wish to add it to their energy mix. Not tomorrow, but today.

CSP is a power system straining to burst onto the southwest utility scene. Well over a dozen companies are developing CSP plants using private – not Federal – funds, and eight have signed contracts with utilities which total over 4,500 MW – equivalent to 4 large coal or natural gas plants that will not have to be built. These 4,500 MW of CSP plants will be able to power over one million homes. Because CSP has attributes that utilities prefer (generates steam, comes in large sizes and is dispatchable), more utility contracts are certain as the cost of CSP declines relative to fossil-fuel generation.

The solar-rich Southwest can look forward to the day when a solar-powered plant, not natural gas-fired or coal-fired generation, will be a utility's first choice - irrespective of whether or not renewable energy mandates exist. Because the CSP resource potential in the Southwest exceeds the hydro potential of the Pacific Northwest, CSP can become a major driver of the economy of southwestern U.S. and play a major role in meeting the region's future energy needs and environmental targets.

As the rays from the sun enter the earth's atmosphere, a portion are scattered and absorbed by the moisture and particulates in the atmosphere while some reach the surface directly. The unscattered portion is called Direct Normal Insolation. Because CSP technologies can only use the direct radiation, it is essential to know where the level of that radiation is highest as that will be the best place to locate a CSP plant, assuming the site meets other requirements. The National Renewable Energy Laboratory has, over the past years, used satellite date to map the solar resource in the United States. Figure 3 shows the distribution of Direct Normal Insolation in the southwestern U.S. The darker the color, the higher the solar radiation and the better for locating a CSP plant.

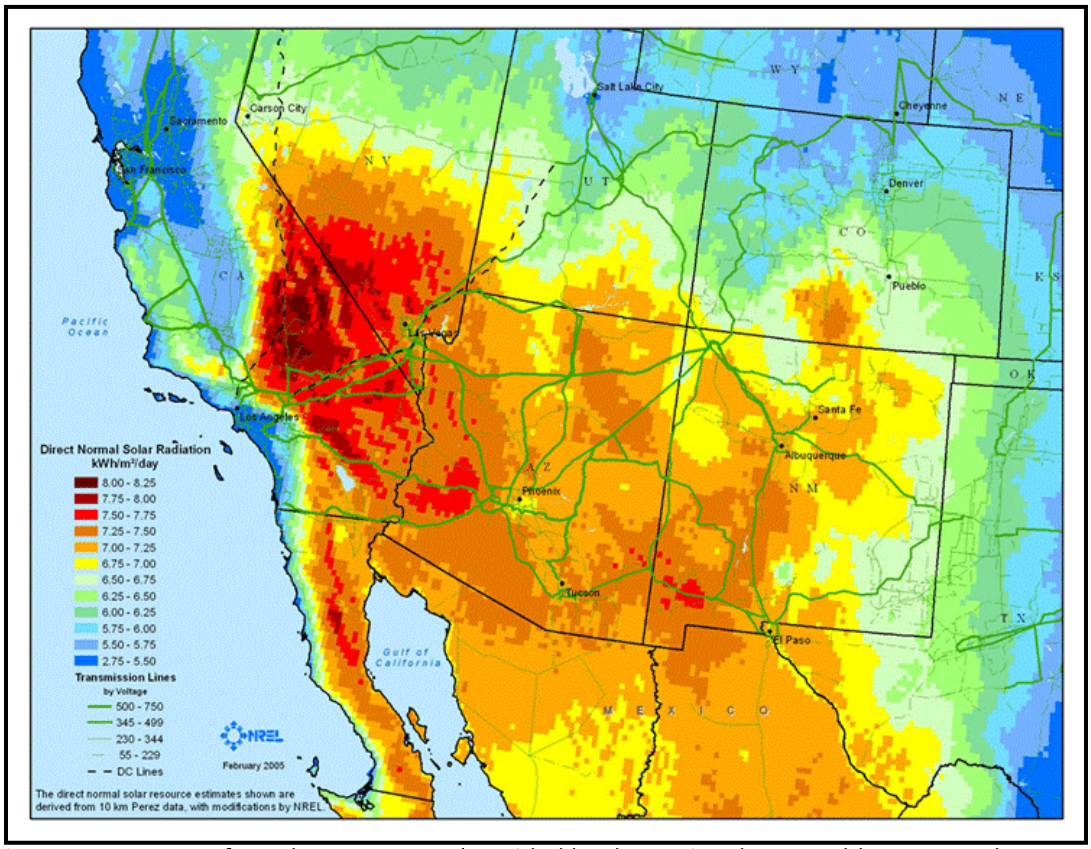


Figure 3: DNI map of Southwestern U.S. (provided by the National Renewable Energy Laboratory)

NREL then used GIS methodologies to filter out places where a CSP plant could or should not be sited, such as cities, waterways, environmentally sensitive areas, and mountains and slopes greater than 1%. The resulting map is shown in Figure 4.

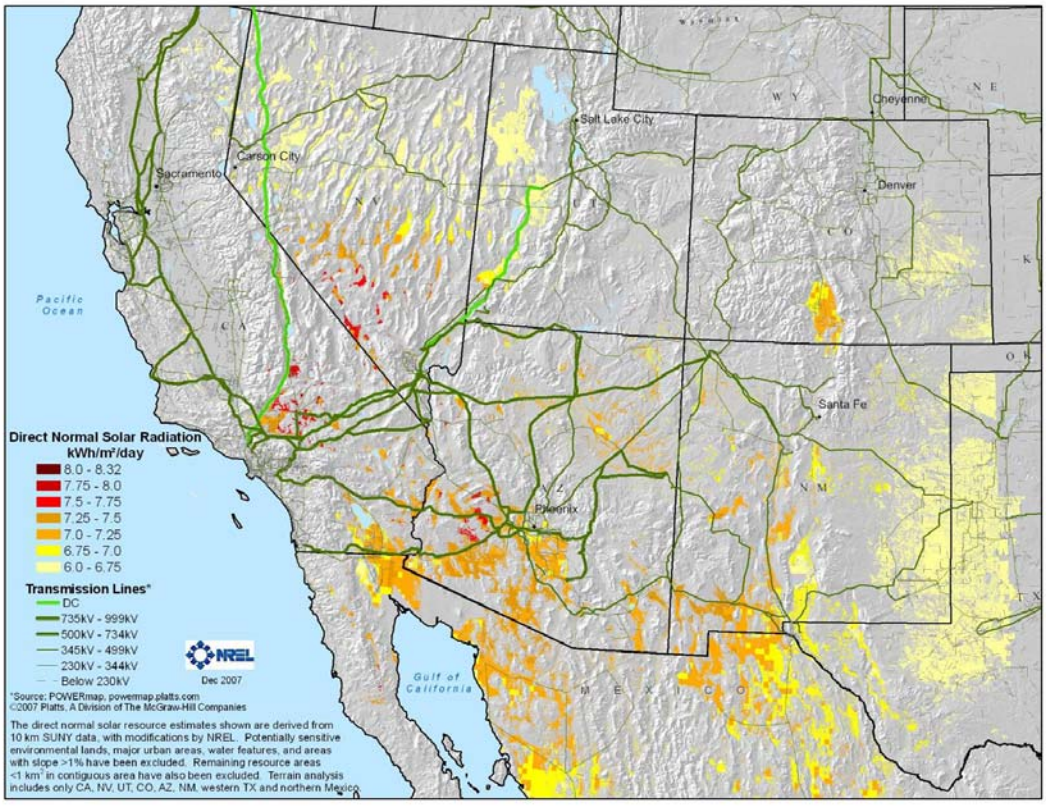
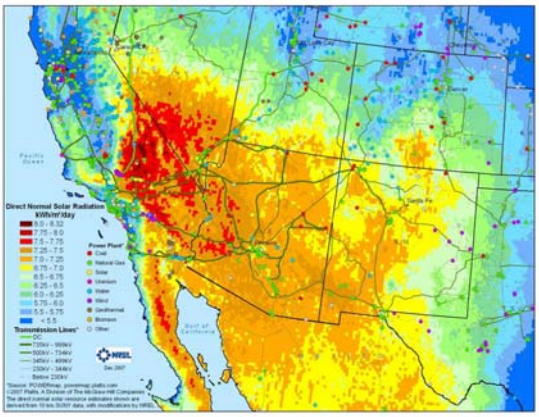


Figure 4: Filtered DNI map with <1% slope U.S.
(provided by the National Renewable Energy Laboratory)

While most of the areas with high direct normal solar radiation have been removed, what remains are the "sweet spots" for CSP in the United States. The remaining areas represent the upper limit because additional environmental restrictions may exist or be placed on their use for CSP plants. Figure 5 shows the area and potential for CSP generation on the areas shown in Figure 4.

State	Land Area (mi^2)	Solar Capacity (MW)	Solar Generation Capacity GWh
AZ	13,613	1,742,461	4,121,268
CA	6,278	803,647	1,900,786
CO	6,232	797,758	1,886,858
NV	11,090	1,419,480	3,357,355
NM	20,356	2,605,585	6,162,729
TX	6,374	815,880	1,929,719
UT	23,288	2,980,823	7,050,242
Total	87,232	11,165,633	26,408,956



The table and map represent land that has no primary use today, exclude land with slope > 1%, and do not count sensitive lands.

Solar Energy Resource ≥ 6.0
Capacity assumes 5 acres/MW
Generation assumes 27% annual capacity factor

Figure 5: Potential for CSP Generation

It can be seen that there is ample land and potential in the southwest to provide as much electricity as is needed and desired. And the technology to use this resource, CSP, exists and is poised to enter the utility market in large amounts.

However, one federal legislative action is essential if this new wave of solar power plants is to happen: the immediate 8 year extension of the 30% federal Investment Tax Credit or ITC. Without an 8 year extension, this rapid growth of Concentrating Solar Power will not occur and New Mexico loses, the southwest loses and America loses. Even the 4,500 MW of signed contracts will be voided since their pricing is contingent on the long-term availability of the ITC. Without an eight year extension of the ITC now, the CSP industry will be stopped dead in its tracks. Only the U.S. Congress can extend the ITC, and this is something that has proved surprisingly difficult.

Why must the ITC be extended now? Because during the time since the power purchase contracts for the 4,500MWs of CSP plants have been signed, the price of steel has increased dramatically and similar increases have been noted in the other commodities used for CSP plants. Until the ITC is passed, financing is not possible and therefore it is not possible to purchase the components needed to build the CSP plant. Furthermore, the financial markets continue to be troubled, making debt financing more difficult and costly. The longer CSP projects have to wait, the more difficult it will be to adhere to the terms of existing contracts and to finance these projects.

Aside from the extension of the ITC, there are no major barriers facing CSP. If the eight-year extension is enacted, CSP will burst onto the utility market. Of course there are other things that the Federal government could assist the CSP industry with. For example, the BLM should adopt a friendlier land policy for CSP, a process that is has begun, thanks to an impetus provided by EPAct.2005 The BLM is now identifying large tracks of federal land that are well suited for siting CSP plants and will perform generic environmental studies. This process needs to move along rapidly and with input from the CSP industry, and needs to be adequately supported by the Congress. The Federal government should provide stronger leadership in transmission, as the lack of new transmission lines is affecting needed electricity growth in many parts of the Nation. This same inattention affects concentrating solar power as prime CSP areas lack connection to the growing load centers in the southwest. Furthermore, the long time it takes to build such lines will limit the rate and extent of the growth of CSP in the market, underscoring the need for greater action in this area.. Finally, the CSP R&D program at DOE has been underfunded for many years and that needs to be corrected to support the innovation needed to help bring the cost of CSP electricity down.

The ITC could be thought of as a switch that if turned to ON and left ON for eight years, it will open the CSP market and trigger the building of CSP plants. The contracts signed to date with the utilities will require an investment of around $20 billion, all private sector dollars. And the investment community is ready to provide

the needed debt and equity to finance CSP plants, but only if the ITC is extended for at least eight years.

The reason for the minimum of eight years is because of the long time it takes to complete the many essential steps to build a large power plant. These steps begin with finding and gaining control of a suitable site, obtaining regulatory approval on the power purchase agreement, completing the permitting process necessary to begin construction of the plant, building the plant and allowing some time for delays in any of these steps. This process is described in a presentation made at a briefing on 16 May 2008, at the request of Senator Sanders office.

CSP plants being bid today would be built in the 2012 and 2013 time period. If developers are to achieve cost reductions from 2 or 3 utility procurement cycles, only an eight year extension is effective.

The power point presentation titled "Why does it take so long to build a CSP plant" is attached to provide additional information on the steps and time needed to bring a CSP plant into commercial operation.

The economic benefits from the unleashing of CSP are impressive. Every dollar of tax credit claimed by the ITC will be multiplied many times over in terms of the private capital investment, purchases from suppliers, wages for new jobs, and local and regional flow-through commerce. The job creation is significant. Approximately 25,000 construction jobs are associated with the 4,500 MW under contract. In addition, the building of new factories and assembly facilities for the main components will add more jobs and offer products for export to help our balance of trade. As natural gas is displaced by CSP, CO2 emissions are reduced and, in time, its clean energy could be available for plug-in hybrid cars, thereby helping to reduce our dependence on foreign oil.

The following analyses provide additional details on the economic benefits form both CSP plants and related manufacturing:

- "Economic, Energy, and Environmental Benefits of Concentrating Solar Power in California." April 2006 by L. Stoddard, J. Abiecunas, and R. O'Connell Black & Veatch

- "New Mexico Concentrating Solar Plant Feasibility Study." February 9, 2005 Prepared for the New Mexico Energy, Minerals and Natural Resources Department by the University of New Mexico Bureau of Business and Economic Research and Black and Veatch. The study may be found at: http://www.emnrd.state.nm.us/ECMD/RenewableEnergy/documents/NMCSP-draft-final-rpt-02-05.pdf

- "The Potential Economic Impact of Constructing and Operating Solar Power Generation Facilities in Nevada: Draft Preliminary Report." July 8, 2003 by

R. Keith Schwer and Mary Riddel of the Center for Business and Economic Research University of Nevada, Las Vegas

I want to close with a specific example of CSP's potential:

If the ITC is extended, Abengoa Solar will build the 280MW Solana CSP plant in Arizona that is now under contract. Under this contract, the energy will be sold to Arizona Public Service, powering over 70,000 homes with carbon-free energy. The schematic in Figure 6 below shows the Solana CSP plant. This plant will create 2,000 construction jobs and about 85 permanent jobs in a town with 68% of its population living below the poverty level. And this plant is likely to the first of many that APS will build to meet its growing demand for new electricity. However, Solana will not be built unless the ITC is extended soon. Instead, APS will likely turn to natural gas, adding to the climate change issues associated with fossil fuel generation. I attach for the record, a letter sent to Senator Cantwell, explaining why Solana can not be built unless the ITC is extended now.

Figure 6: Schematic of the Solana CSP Plant Power Block

American cannot afford to ignore one of its greatest domestic energy resources, especially if it is carbon free and can never be depleted. America cannot afford to ignore developing that energy resource, especially if it will create jobs that can not be exported. American cannot afford to ignore that resource, especially if it adds to security of supply and to the reliability of its energy system. But we risk doing just that.

CSP developers are investing their money to develop CSP projects, Wall Street is ready to provide debt and equity, the states have invested in CSP with their incentives – the missing and critical investment is that of the federal government via the ITC. Please extend it now.

Thank you for your attention. I would be pleased to answer your questions.