

## Testimony of Sean Gallagher

Vice President of Marketing and Regulatory Affairs, Tessera Solar

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### **Introduction:**

Thank you, Chairman Markey, Ranking Member Sensenbrenner, Members of the Committee. I am Sean Gallagher, Vice President of Marketing and Regulatory Affairs for Tessera Solar. It is a pleasure to share some insights with the Committee about our technology and our quest to bring that technology to utility-scale commercial development.

Tessera Solar, headquartered in Houston, Texas, was formed to be the exclusive developer and operator of the SunCatcher™ Power System developed by our sister company, Stirling Energy Systems, headquartered in Scottsdale, Arizona. In May 2008, the NTR, an Irish renewable energy development company, invested \$100 million into Stirling Energy Systems, and created Tessera Solar as the project development arm of the business.

### **Technology:**

Concentrating Solar Power (CSP) is emerging as one of the most promising sources of zero greenhouse gas emission renewable energy for the 21<sup>st</sup> Century. Enough solar energy falls on the earth's surface in one hour to meet the world's energy needs for one year. However, the technological challenge is to harness that energy and deliver it to customers in a cost-effective manner.

Solar electric technologies come in two basic flavors: photovoltaic and solar thermal electric or CSP. Photovoltaic systems like those you find on residential and commercial rooftops use an electrochemical process to convert sunlight directly into electricity. CSP systems use heat from the sun to create mechanical energy, which is converted into electricity. Our system is a species of CSP.

Stirling Energy Systems developed the SunCatcher™ Power System in cooperation with the Sandia National Laboratories. The SunCatcher™ system is a 25-kilowatt-electric (kWe) solar dish Stirling system that automatically tracks the sun in order to collect and focus solar energy on the power conversion unit, which generates grid quality electricity. The system consists of a parabolic dish structure that supports an array of curved glass mirrors, which concentrates the solar energy on to the power conversion unit. A power conversion unit is mounted on a boom at the focal point of the dish, where the sun's rays are concentrated. Power is generated by a closed-loop, high-efficiency four-cylinder reciprocating Solar Stirling Engine. Heat from the sun is concentrated onto the front end of the engine, which reaches temperatures of 1300 degrees Fahrenheit. The heat causes the internal working fluid to expand and power the pistons in the four-cylinder Stirling Engine. The pistons are attached to a crankshaft, which turns a generator. Each dish-engine system produces 25 kW of power, enough to power approximately 15-20 average California households on a hot summer afternoon. No water is used for cooling.

## **Technology Benefits & Advantages**

The system's design has some significant advantages and benefits that will help to make solar thermal technology a reliable, cost effective and environmentally sustainable option for utilities.

- First, the SunCatcher™ Power System has the highest solar-to-grid electric efficiency, 31.25%. This efficiency means that the SunCatcher system has lower raw material use than other solar power technologies
- Second, the modular design allows for minimal land disturbance, higher terrain flexibility, and highest on-sun availability since there is no single point of failure. The modular system can also be built to the scale required by a particular community.
- Third, the technology uses far less water than peer technologies. Water-cooled parabolic trough plants producing 500 megawatts of electricity require over 3,000 acre-feet of water per year, and even air-cooled solar tower systems require 125 acre-feet per year. The SunCatcher™ system requires only 22 acre-feet of water per year—and only uses water to wash the mirrors. For the arid Southwest, where solar resources are most abundant, this is a significant advantage.
- And finally, it is an environmentally friendly technology that produces no greenhouse gas emissions, or other combustion byproducts. The system also contains no hazardous heat transfer fluids.

These advantages enable Tessera Solar to offer peak power output at very competitive prices. The SunCatcher is among the lowest cost solar power options available.

The SunCatcher™ system is a result of over a decade of innovative engineering and validation testing with hundreds of thousands of hours of on-sun testing on each major subsystem, and over 50,000 hours of on-sun testing for the complete system.

Over the years, companies like Ford Motor Company, McDonnell-Douglas, Boeing, and Southern California Edison have all worked to improve the design of the Stirling Dish Engine. In 1996, Stirling Energy Systems bought the earlier designs and worked in collaboration with the Sandia National Laboratories to create a system that is now ready to be manufactured and deployed in world-scale power plants.

### **Job Creation**

Our technology's past is in America and we believe its future should be here too. Because this technology uses steel, glass, and engines, the supply chain is automotive. We are partnering with Tier 1 automotive suppliers to manufacture SunCatcher™ components. The company that will make the engines manufactures engines for the U.S. carmakers. The company that will make the mirror facets makes windshields, doors, and car hoods. The American automotive industry has the skills and expertise to build this. The industry has existing manufacturing capacity that will be converted for manufacturing of solar power components. Deploying this technology on a commercial scale in the United States and across the world will create jobs in precisely those sectors and regions of the country in which America has been falling behind. As we get into

volume production in 2010 we will be putting autoworkers back to work, eventually creating up to 4,000 jobs across the supply chain.

**Development:**

The next challenge for our company, and the United States is to begin developing breakthrough technologies like the SunCatcher™ on a commercial scale. Beginning in 2010, Tessera Solar plans to break ground on two of the world's largest solar farms in California with our partners San Diego Gas & Electric and Southern California Edison. Our Calico and the Imperial Valley projects in Southern California will create 300-700 construction and assembly jobs each. These projects will produce a combined 1,750MW of clean, renewable electricity using 64,000 SunCatcher™ units in all. We have also signed a power purchase agreement with CPS Energy to build another 27MW plant in West Texas to supply San Antonio with peak power. The Western Ranch project will be the first concentrating solar power plant in Texas.

Our California projects are in the BLM permitting process. The Imperial Valley project should have its permitting complete by next spring and will go into construction next year. The Calico project in the Southern California and the Western Ranch project on private land in Texas are also slated to begin construction next year pending the completion of all permit approvals.

Tessera Solar has two of the three projects that are farthest along in the BLM permitting process. We've established good working relationships with the BLM and appreciate their efforts to conduct a full, open, public process in a timely manner. We also recognize that BLM has been overwhelmed with renewable energy applications over the past two years. We support Congress' providing additional resources and additional

direction to BLM to process these applications. We have suggested process reforms to the BLM process. For instance, increased application fees and milestone requirements on developers would address the potential for land speculation. We do not support proposals that would apply the oil & gas competitive leasing model to renewable energy applications – among other things, competitive leasing would tend to skew the playing field to companies with large balance sheets rather than companies with good projects.

### **Financing Challenges**

The changes that have wracked the financial sector in the past year have created significant challenges for financing renewable power plants. Congress responded to these challenges by creating the Department of Energy’s loan guarantee programs, and the Treasury grant in lieu of investment tax credits. These programs will be critical in the next two years for projects like ours – and others in the solar industry to obtain the financing necessary to construct projects. In order to take advantage of these incentives the Administration will need to take the following steps to allow companies like ours to move these projects forward, create jobs and generate carbon free electricity:

- Issue effective regulations for the Department of Energy section 1703 and 1705 loan guarantee programs that are consistent with commercial banking practices and successful loan guarantee programs like the Export-Import Bank of the United States and the Overseas Private Investment Corporation (OPIC), which have both been successful from a risk management perspective. Absent loan guarantees, our projects and others like them face an impossible task finding financing due to the battered credit markets, and the unwillingness of private lenders to take risks on new technologies.

- Accelerate the National Environmental Policy Act (NEPA) review process that is triggered by the Loan Guarantee application. Based on previous reviews, we estimate that the NEPA review process will take 12-18 months. The length of this process delays the length of time it takes to commence construction, and may cause us to miss important start dates to take advantage of financial incentives provided by the Recovery Act. For projects that do not otherwise trigger NEPA, a more efficient process should be applied.
- In order to qualify for grants in lieu of the investment tax credit provided in the Recovery Act our projects must commence construction by December 31, 2010. The Treasury Department has issued initial guidance for these grants. The delay of the Department of Energy's Loan Guarantee Program for renewable energy projects makes it more difficult to meet the "commence construction" date. A one-year extension of the grant program to December 31, 2011 is clearly needed.

### **Transmission**

Transmission lines will also have to be sited and constructed to get this zero-carbon electricity to customers in Southern California's population centers, and to maximize the ability of the solar power resource in the Southwest to be delivered to customers across the west and the US. We support the transmission title in the American Clean Energy Leadership Act, which was passed out of the Senate Energy and Natural Resources Committee, and we are working through our trade association to strengthen it.

One obstacle to both renewable development and transmission development is current policy and practices that requires a renewable power developer to pay for the cost of any transmission network upgrades necessary to deliver the renewable energy to

customers. In the case of our Calico project in the Southern California, the network transmission costs that would be allocated to the project are close to \$400 million. Although the transmission owner pays such funds back to the developer over a five-year period, the obligation to fund the transmission upgrades in the first place puts an unreasonable burden on a renewable energy developer. The solution would require transmission owners to fund such network upgrades.

**Closing**

Generations of entrepreneurs and engineers have been working towards the moment when this technology can be deployed, now we need to seize the opportunity and see that it is done. Thank you Mr. Chairman.



**Attachment 1**