

## **Attachment A**

### **Staff Workshop on research needs for utility scale renewable energy (USRE) based RD&D**

In this workshop, Energy Commission staff seeks public input about the goals, benefits, issues, gaps and opportunities, RD&D solutions, and market mechanisms to help accelerate research and development and increased deployment of mixed renewable energy technologies (such as biomass, solar, wind, geothermal and storage) in an integrated and environmentally sound fashion to be applied at the utility scale level.

To assist in the implementation of this USRE RD&D Initiative, staff seeks public input on the following questions or topics.

#### **1. What are the goals and desirable benefits in advancing RD&D and deployment of USRE?**

Advancing the research, development, and deployment of new clean energy technologies is critical in paving the way for clean energy technologies to become mainstream in providing power for utility scale production. At this stage, the **deployment** of existing technologies should be step one. There are technologies available today which have emerged from the R&D stage and are commercialized, but they are handicapped by overall resistance to the perceived risks of new technologies, particularly on the part of the utilities. Over the past 5 years tremendous advancements have been made, particularly in solar energy. One such technology which has crossed the chasm to commercialization is Concentrator Photovoltaic (CPV) technology. With its high efficiency and extremely high energy yield in hot dry areas, and light environmental footprint, the technology is ideally suited to providing utility-scale solar power to California's utilities. From a product standpoint the technology is proven, highly reliable, and being manufactured at scale. Programs which could boost the deployment of this technology would greatly benefit California's energy future. Mechanisms such as performance based incentives for 5-20MW distributed generation projects, accelerated permitting for projects with a light environmental footprint, accelerated permitting or minimum acceptable standards for energy generated per area of land, etc. would all serve the stated objectives. R&D support is also important, but as a second priority. There is significant funding available for viable technologies via federal, private/public/partnerships, venture funding, etc., so additional funding which would certainly be welcome in the form of cost-shared product improvements, etc., but we believe should be secondary to accelerating the deployment of innovative, commercially viable technologies. The R&D focus will be very long-in-coming in terms of near term RSP standards achievement. Clearly all of this activity would be important in reducing our dependence on non-clean fuel sources such as coal and gasoline. Utility scale production of renewable energy is an absolute necessity to help us overcome our reliance on traditional fuels

#### **2. What are the key technical, economic, and environmental issues or**

### **opportunities for USRE implementation?**

In terms of CPV technology, in the past six months it has transformed from the R&D stage to the stage of commercialization; therefore, it now has the technical ability to be deployed at a utility scale. Technically, products are ready. What is most important technologically, is that new and innovative technologies like CPV have tremendous headroom for further advancement. Going forward efficiencies can increase dramatically, resulting in rapidly reducing cost of solar energy. Getting to those advancements, however, requires achieving manufacturing scale today. Both parts of this benefit the state's overall energy picture. The key economic hurdle is bankability. New technology carries a risk premium with it in terms of cost of capital, guarantees, warranty concerns, etc. It is common for banks to finance at differing rates based on the perceived risk. A 1-2% higher interest rate for innovative technology can kill a project, thus the advances made by innovators never get a chance to step over the hurdle. Finding incentives for the developers which allow for risk premiums on rates, or providing guarantees to projects will assist in this area. It is important to understand that bankability is a temporary hurdle. If deployment can progress rapidly, then the bankability issue goes away. This is not a technology which requires long-term support to be viable. One of the key factors about CPV is its light environmental footprint. For CPV the challenge is not environmental issues; environmental considerations are a strength of the technology. It provides next to no water consumption, superior use of land, protection of natural ecosystems, fastest energy payback and lowest intensity of green house gases in the manufacture of systems. These are criteria which are very important to the state and nation, and ones which need to be rewarded or properly acknowledged in decisions on technology to be deployed. At utility scale the environmental impacts are compounded, so cannot be taken lightly in the decision process.

### **3. What are the RD&D solutions for accelerated development and deployment of USRE?**

Performance based incentives for larger distributed generation, warranty insurance for risk reduction, accelerated permitting for technology meeting minimum acceptable standards related to land use and the environment. Establishment of "favored technology" status for technology which meets minimum standards for its first two years post commercialization (cost trajectory, efficiency, energy yield, etc.) would support deployment and thus allow investment by the companies themselves in ongoing R&D.

### **4. What are the RD&D solutions for reducing land and fresh water demands, and biological and environmental impacts of utility scale solar energy development, particularly in the California desert?**

Certain concentrating technologies depend on significant water consumption. Some solar technologies require large land areas, which produce low levels of electricity in comparison to the area of land used. Also worth understanding is the advantage of some solar technologies in deploying in already disturbed

areas, with flexible layouts of the sites. CPV technology compared with other high solar resource area technologies has the least impact on land. It has minimal permanent shading and lower ground cover ratio. This decreases land and wildlife disruption. In addition, most CPV technologies use no water in the production of electricity, other than the water used to clean the panels. Therefore, it makes CPV technology a much more viable option in the high solar resource regions of the Southwestern United States. The demonstration project will further the data analysis of environmental impacts of CPV technology. If these data points are evaluated and verified by a third party, it will give even greater legitimacy to CPV's light environmental footprint. It is worth noting that the CPV Consortium has already invested \$30,000 dollars with the University of California system for research into better understanding the economic benefit of a lighter environmental footprint. CPV manufacturers place high value in the importance of responsible, sustainable clean energy, and will continue to invest in this area directly.