



## **DOE Request for Information (RFI)**

### **Solar Demonstration Zone Project RFI Number: DE-FOA-0000303**

#### **Respondent**

The CPV Consortium  
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#### **Response:**

The CPV Consortium is a non-profit industry organization that supports the development and long-term success of the Concentrator Photovoltaics industry with the goal of providing a low-cost, reliable source of renewable energy. [www.cpvconsortium.org](http://www.cpvconsortium.org)

The CPV Consortium believes that the Solar Demonstration Zone Project is an extraordinary opportunity for CPV suppliers to demonstrate the transformation of the industry from a R&D technology to a commercially viable, low-cost, and environmentally conscious technology. The CPV Consortium does not deploy systems of its own; however, many of its members are very interested in participating in this project.

#### **Questions**

##### **1. What specific technologies will benefit the most from this type of program?**

Technologies which are faced with the challenge of crossing the chasm from the prototype/test stage of business to commercialization. Concentrator Photovoltaic (CPV) technology is the best example of a type of technology which is ideal to this program as it has been significantly proven at the R&D/prototype stage, yet is challenged with the perceived risks of customers in supporting the technology's transition into commercial scale deployments. Currently, CPV has no US based commercial scale deployment and there is a need to increase the amount of field data to increase bankability of the technology in getting funding for commercial deployment. This data will further prove the benefits and advantages of the technology, including higher efficiency than all other photovoltaic systems, low water consumption, limited environmental impact, and the fastest trajectory to the lowest cost of solar energy as the technology reaches scale. CPV

is a highly scalable technology that will benefit from the opportunity to demonstrate rapid installation, sequential powering up, and rapid scaling-up to a larger Phase II project.

- 2. Will this type of demonstration program help address the needs of the financial community in order for it to make a loan on a large CSP project (>100MW) incorporating new technology (e.g. cost, hours of operation, size)? If so, what are the appropriate measures by which DOE should select and evaluate projects? What other considerations are required by the financial community?**

The financial community will value the data from this project, especially in phase II, because it will demonstrate real, live data evaluated by a third party. CPV technology is very well suited to a demonstration project such as this, since the scalability of the technology would allow deployment of a few megawatts up to hundreds of megawatts. Data which is directly projectable to very large scale plants can be obtained, analyzed and projected can be obtained with small, medium or larger size demonstration projects. The DOE should consider: ability to deploy projects quickly, development costs, installation timeline, power plant efficiency, operating and maintenance costs, 8760 data, LCOE, the environmental impacts of the technology, along with ability to obtain permitting in the available time period.

- 3. Will this type of demonstration program provide members of the utility industry greater confidence when entering into a PPA with a developer of a large CSP project? If so, what are the appropriate measures by which DOE should select and evaluate projects?**

The demonstration project will provide utilities with a working demonstration of a power plant and a set of data points to evaluate. If these data points can be evaluated and verified by a third party, the utility and financial community will place additional importance on this information. A key metric of this type of demonstration point would be proof by the proposer that they have a product which is mature enough to provide appropriate data. Maturity issues would include minimum level of manufacturing capacity (i.e. 25-30MW), certified product (IEC 62108), at least two years of on-sun experience with prototype or production products.

- 4. What additional activities or support could the DOE lend to this concept to increase its value or success?**

The management group that is hired by the DOE to establish the deployment site or sites should be responsible for a master power purchase agreement (PPA) for energy generated by demonstration projects. The PPA is one of the most challenging elements in making a renewable energy project successful, and the DOE should assure that the PPA is pre-handled in the same way as the site, the interconnection, and other vital elements that are anticipated to be pre-handled (preliminary EIS, water supply, etc). In addition, we believe that there should be third party evaluation of project performance data and the DOE should consider multiple types of power storage solutions and providers.

- 5. What services and support, and at what cost, would you anticipate receiving from a national laboratory (e.g. Sandia or NREL)?**

Impartial third party verification of the data produced from the systems under test at the Solar Demonstration Zone Project will be needed for the investment and utility communities to further invest in the technology; therefore, national laboratories should be involved in this testing and verification of the results. CPV is advancing to commercialization, so cooperative development of the technologies with the assistance of the national laboratories is valuable.

**6. Should there be a requirement that applications be joint submissions with a utility PPA partner?**

There should not be a requirement that the application be joint submissions with a utility PPA partner in Phase I, but there should be a requirement in Phase II. In Phase I it should be an advantage to the proposer if they are proposing a project that has at least one of the required elements for a project: developer, off-taker, PPA holder. Without one or two of these items established it would be a slow deployment project, delaying the results the DOE would achieve in data, analysis, etc.

**7. Are there other specific market, technology or cost barriers that this announcement should have applicants address, such as military conflict, land use, environmental concerns, water availability, or transmission access?**

For most of the areas with a high DNI, there is a shortage of water; therefore, water use and the environmental impact of the systems should be a considerations addressed by this project. In addition, land use and environmental concerns should be addressed because these are real world factors that affect current solar development projects. All of these are becoming increasingly important in permitting and the desire to accelerate this process in order to address the challenges of renewable portfolio standards.

**8. What environmental impacts may result from the development of specific technologies?**

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 limitation of some concentrating 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, as compared to all other solar technologies. 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 DNI, arid regions of 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. The CPV Consortium has already invested \$30,000 dollars into a better understanding of this issue. The DOE project would further that research in both breadth and depth.

**9. What measures should be put in place to avoid intellectual property conflict and contractual delay in the build out of the demonstration plants?**

Non-disclosure agreements, site fencing, site access restriction, and security for data will help to avoid intellectual property conflict and contractual delay.

**10. Are there any specific technologies that would not be financeable even if successfully demonstrated?**

Solar technology has been created to mitigate the negative environmental impacts of energy production; therefore, technologies that may use environmentally hazardous methods or materials should not be part of the demonstration project. A minimal acceptable cradle-to-cradle footprint should be a key consideration for the demonstration.

**11. How much time would you anticipate is required to prepare an adequate technical application for the Phase I sub-commercial scale demonstration project?**

60-120 days should be adequate for Phase 1 project. The need for this type of demonstration is critical to the advancement of the technology. Allowing too extended a period of time would defeat the urgency of the project. A possible approach would be to accept applications to a given date, with the DOE having the ability to accept proposals for an additional period of time as a back-up in case the early submissions do not meet the needs of the programs. Timing is important and this program is needed in the near term.

**12. Would the applicant foresee the Phase I projects being commercially operated for an extended period of time (15-20 years), or used solely for the purpose of the demonstration and then dismantled or used for other purposes?**

To achieve maximum information about the technology and its long term efficiency, impact on the environment, and other factors for utility scale incorporation of the technology, the Phase I projects should be operated commercially for extended periods of time. Also to make the projects financially feasible it would be important to have a representative operating time frame. This further supports the ongoing development of projects.

**13. Should DOE charge applicants for land use, water, site management and security (if so – what is a reasonable cost). How should the commercial terms for the revenue generated from the demonstration projects be structured?**

Due to the fact that Phase I is more of a demonstration of concept, there should be minimal cost associated with the project. Phase II should be as close to the real world as possible to ensure that the technology is commercially viable. The structure of the commercial terms for revenue generated depends on the location of the project site, the local utilities PPA and the real world value of land, water, site management, and security.

**14. What level of funding on a cost per MW basis would the applicant expect will be needed to build the Phase I sub-commercial scale demonstration plant?**

This is an area where we have asked our members to respond directly.

**15. Would it be reasonable to include evaluation criteria of lowest levelized cost of energy? Are there other evaluation criteria that should be included?**

Yes, it is very reasonable to include the evaluation criteria of the lowest levelized cost of energy (LCOE) because it is a real world criterion.

**16. Should applicants have a power purchase agreement (PPA) as one measure to demonstrate their ability to carry the pilot-scale plant to full-scale? If so, are the timeframes provided reasonable?**

Applicants should not need to have a PPA in Phase I, but should need it in Phase II. An established PPA partner at Phase I could be a positive part of the value proposition in evaluating competitive projects.

**17. What MW capacity is appropriate for the pilot-scale projects to demonstrate technology and operational performance? What scale-up factor is anticipated that would enable the technology to be financed by that demonstration?**

In order to assure that the DOE deployment program can essentially move the entire CPV industry toward commercialization, there should be a 10MW carve-out for CPV projects that are sized from 200kW to 2MW. This will assure that many CPV companies can participate, which will help to move the entire CPV industry forward. The number of companies able to participate will be affected by the criterion established in order to meet interconnect standards, etc. It will also mean that far more technologies than a mere 4-6 can participate in the deployment program.

We recommend that this be increase to 40MW in Phase II because it demonstrates economies of scale and strong bankability.

**18. Are there any suggestions regarding the operation of infrastructure supporting the Phase I sub-commercial scale demonstrations? Should the DOE explore the use of a common power block to which several of the Phase I projects feed super-heated steam?**

**19. Should the applicants be required to submit a full-scale application along with the pilot-scale application?**

Yes, a full-scale application will be a road map and an evaluation tool to determine the successful completion of the development milestones for Phase I. It will also provide a framework for the transition from Phase I to Phase II.

**20. Should only Phase I applicants be eligible to submit applications for Phase II?**

Yes, because Phase I builds upon Phase II.

**21. Is the timeline for Phase I appropriate? Will the Phase I timeline provide sufficient operating experience to support financing for the Phase II demonstration?**

Yes, it appears to be appropriate.

**22. Would a competitive lease option be appropriate for Phase II projects?**

It would be appropriate as an option, particularly if permitting is simplified through use of the lease option.