

The Solar Zone at the UA Tech Park Phase II Expansion

Request for Proposals:

Solicitation for Advanced Technology
Demonstration Projects in the Area of Solar Energy
Generation and/or Energy Storage



The largest site in the country for demonstration, evaluation and testing new technologies for solar energy is being expanded to include additional projects. This will provide companies the opportunity to demonstrate new concepts for solar energy generation or energy storage techniques under field operating conditions on the grid.

January 2018

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REQUEST FOR PROPOSALS

SECTION ONE: Description of the Solar Zone at the UA Tech Park

As the world moves to adapt renewable energy power production, southern Arizona is uniquely positioned to be a leader in the development of solar energy technology. The average solar radiation in the southwest is the highest of any region in the United States. This makes it an ideal location for the generation of solar power. The main reason that new solar power generation plants are not being built at a more rapid pace is that there is no consensus as to the optimum technology and system configuration to use. More research, system development, and technology demonstration is needed to answer critical questions so the technology being used does not become obsolete as soon as it is installed.

Eighty-five percent of the year, the sun shines in Tucson, making the Solar Zone at University of Arizona's Tech Park (UA Tech Park) the perfect place for testing, evaluation, and demonstration of solar technologies. The Solar Zone is one of a number of "innovation hubs" at the UA Tech Park. The highly successful *Solar Zone* at the UA Tech Park is one of the largest multi-technology solar demonstration sites at the grid level in the United States. The first-of-its-kind solar-centric research park was established in 2010. It consists of 223 acres of land designed to generate 25 megawatts of power, which is nearly twice the daily electrical consumption of the Tech Park and enough to power the homes of more than than 4,600 residential consumers for a year.

The Solar Zone is a unique public-private partnership between the University of Arizona and Tucson Electric Power. Both the University of Arizona and Tucson Electric Power (TEP) are leaders in the renewable energy field. TEP has been nationally recognized for their leadership in renewable energy and has served as a model to other utility companies. The University of Arizona also has internationally recognized expertise in solar and renewable energy.

The Solar Zone provides an environment where different companies install multiple solar technologies and feed the power directly into the grid. Here, researchers and companies work together to test and evaluate these technologies side-by-side under identical operating conditions. The systems being demonstrated involve multiple types of photovoltaic materials including monocrystalline silicon,

thin-film amorphous silicon, and triple-junction solar cells. Some of these are static while others involve single-axis or dual-axis trackers. Some systems have no solar concentration while others concentrate up to 1,000 suns. University of Arizona researchers are testing everything from solar power forecasting to the environmental impact of solar energy installations. Monitoring the power production during one year of operation demonstrates the efficacy of each of these different types of technologies under the same weather and climate conditions. The results clearly demonstrate the importance of system designs allowing for the greatest density of solar cells per acre without shading.

Phase Two of the Solar Zone focuses research and the development on energy storage, grid optimization and micro grids, distributed solar systems, and integrated and embedded solar materials. Phase Two will allow the demonstration of products and their cost effectiveness in the market.

Tech Parks Arizona and the Campus Research Corporation (CRC) are soliciting proposals from companies wishing to demonstrate advanced technologies for either the generation and management of solar energy or energy storage techniques as part of Solar Zone Phase II.



The dotted line above highlights the available land for Phase II Expansion (Approximately 9 acres)

SECTION 2: Phase II Expansion

The UA Tech Park and TEP are currently in the process of expanding the *Solar Zone* into Phase II focusing technology efforts on energy storage and advanced energy generation techniques. Renewable energy sources such as solar and wind have intrinsic stability issues when they are used for power generation. For example, solar energy can not be used to produce power when the sun is not shining, in the evening or during a cloudy day. To mitigate this issue, some of the energy produced while the sun is shining must be stored and used later when needed. In addition, the intermittencies associated with having multiple sources of distributed power generation feeding into the power grid creates instabilities in frequency and amplitude that limits the amount of dispatchable power available. Short-term energy storage is necessary to eliminate these instabilities. Without providing both short-term and long-term energy storage it will not be possible for the power grid to handling significant amounts of renewable energy generation.

Phase II of the *Solar Zone* will be built on 29 acres of land at the UA Tech Park within the *Solar Zone*. It will be used to demonstrate and evaluate advanced energy generation techniques and energy storage technologies for solar power. The first project, which has been completed, is a joint venture with TEP and E-On to demonstrate the use of modern battery storage technology. The remaining 8 acres of land will be divided into sections approximately one acre each for 5 to 10 additional projects. These may include advanced generation concepts and storage techniques such as flywheels, compressed air, thermal storage, supercapacitors, flow batteries, and other types of advanced batteries. This includes both short-term storage for smoothing the inherent fluctuations in solar power output as well as longer-term storage for overnight power production. The plan is to initiate projects producing in the tens of kilowatts of power with the demonstrated capability of scaling up to the megawatt power range for use in grid power stations. This will provide a platform to directly compare different energy generation and storage technologies operating in the field under exactly the same conditions.

The UA Tech Park and TEP will be responsible for site preparation and maintenance including access roads and power interconnects. The company will be responsible for the funding necessary to design, construct, establish and maintain their power generating and storage system and to remove the systems at the conclusion of the demonstration. The power generated will be purchased by Tucson Electric Power. For companies demonstrating storage technologies without the ability to generate their

own power, arrangements can be made to provide solar power from other companies generating power in the Solar Zone.

Projects involving two types of companies are of interest. The first are companies with established technologies capable of generating power at the utility scale (at least 350 KW on about 1 acre of land). The second type are companies wishing to demonstrate emerging technologies on a smaller scale of land. Use agreements between CRC (UA Tech Park's governing body- see appendix) and each company will be negotiated individually depending on the needs of the company. It is anticipated that these will be for terms of 1 to 5 years. However, they can be negotiated for whatever period of performance is required to adequately demonstrate the efficacy of the technology being evaluated. As companies complete their test and evaluation, new companies will be selected to continue the program into the future. Companies will retain control of all their intellectual property. Issues of data control, reporting and confidentiality will be negotiated with each individual contract. Along with having a site for testing and demonstrating technology, companies in the Solar Zone will have the opportunity to have third party evaluation of technology and assistance with access to faculty, student, and laboratory resources at the University of Arizona.

The schedule for *Solar Zone Phase II* expansion is:

- 1) Issue the RFP for projects in early in January 2018;
- 2) Requests for Information submitted before the proposal due date;
- 3) Solar Symposium and Preproposal Conference on February 5, 2018
- 4) Proposal submission due date of March 1, 2018;
- 5) The evaluation and selection of projects will take place during the month of March 2018;
- 6) Contracts between the successful companies and CRC will be negotiated in April and May;
- 7) Selected companies begin the installation of their projects July 1, 2018.

Section THREE: RFP Submittal Process

Tech Parks Arizona and Tucson Electric Power seek companies with innovative technologies for energy generation and/or storage to demonstrate under grid power operating conditions in the field. Any company interested in responding to this solicitation should submit a proposal including the following information in the body of the proposal:

- 1) A description of the technology involved;
- 2) The amount of land use they request;
- 3) The amount of power their project will generate or will require; and
- 4) The ability to scale-up to grid power production.

Along with the above information, the proposal format should reference the *Solar Zone Phase II* RFP, have a descriptive title, and provide information about the company including name, key personnel, financing, and current state of technology development. No confidential information should be included.

Respondents must submit all of the information requested as outlined above in hard copy and electronic format.

Proposals must be submitted by **March 1, 2018 by 5:00 p.m. MST** to:

Dr. Richard Powell, Senior Fellow

Tech Parks Arizona

9070 S. Rita Road, Suite 1750

Tucson, AZ 85747

rpowell@uatechpark.org

All questions regarding the RFP must be submitted in writing to rpowell@uatechpark.org. Response will be made available on the website <https://techparks.arizona.edu/leading-edge/solar-zone>

CRC reserves the right at any time to terminate this process and may at any stage of the process elect not to move forward with the project defined in this RFP.

The University of Arizona and Tucson Electric Power will convene a technical evaluation team to review all submissions and select the companies to be part of *Solar Zone Phase II*. This team will include representatives from UA Tech Park, UA faculty, TEP, National Renewable Energy Laboratory (NREL), and a local solar energy company. The selection criteria will include the innovativeness of the proposed technology as well as the potential to scale-up to grid level power production. The feasibility of making a major impact on the field of solar energy and the potential cost of the system will also be considered. The goal is to find technical solutions to the problems associated with frequency and amplitude instabilities and the intermittancy inherent with renewable energy power generation.



APPENDIX

UA Tech Park—Governance & Management

The University of Arizona’s tech parks are operated under the direction of the Tech Parks Arizona, a University of Arizona (UA) business unit that creates the place, environment and interactive ground to generate, attract and retain technology companies and talent in alignment with the research mission and goals of the UA. Tech Parks Arizona operates the UA Tech Park at Rita Road and is developing the UA Tech Park at The Bridges as well as. Tech Parks Arizona also operates the Arizona Center for Innovation, with a primary goal of promoting technology innovation and commercialization. Tech Parks Arizona is part of Tech Launch Arizona, the office of the University of Arizona that commercializes the results of UA research and development.

Campus Research Corporation (CRC), an Arizona 501 (c) (3) non-profit corporation, on behalf of the University of Arizona and the Arizona Board of Regents (ABOR), is responsible for developing, operating, leasing and marketing the University’s Tech Parks. CRC operates the Tech Parks pursuant to a master lease with ABOR. The Associate Vice President for Tech Parks Arizona also serves in the capacity as president and CEO of Campus Research Corporation, and is responsible for the development and operation of the UA Tech Park at Rita Road and the UA Tech Park at The Bridges. CRC is governed by a 13-member Board of Directors, of which four members are appointed by the UA President and two are appointed by ABOR (one a current regent and one a former regent). The remaining seven members are selected at-large by the Board and serve three-year terms. The CRC Board meets quarterly and has an Executive Committee that meets as needed to act quickly and efficiently on Tech Parks’ business.



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