

SOLAR ZONE

THERE'S NO PLACE LIKE IT UNDER THE SUN

The Solar Zone at the UA Tech Park is one of the largest multi-technology solar demonstration sites in the United States. The University of Arizona leveraged its assets to develop an innovative renewable energy project with its industry partner, Tucson Electric Power (TEP). Together, they created an ideal environment to test and deploy current and future solar technologies.

The Solar Zone is located within the UA Tech Park, a dynamic community where innovators and business leaders meet and where emerging companies and technology giants work side by side. The Park is located in a suburban setting on Tucson's rapidly growing southeast side. Its spacious campus encompasses 1,345 acres. The Park provides almost 2 million square feet of space for high-tech offices, research and development, and laboratory facilities.

The Solar Zone is managed by Tech Parks Arizona, which is part of Tech Launch Arizona, the University of Arizona's (UA) office that commercializes invention stemming from University research. Tech Parks develops innovation hubs that unite industry and research to advance leading-edge technology by creating "Interactive Ground", that connects university, community and industry in the pursuit of technology innovation and commercialization. The Solar Zone exemplifies this connection.

The goals of the Solar Zone are:

- *to create a supportive environment where companies can develop, test, and demonstrate the next generation of renewable energy technologies and products.*
- *to attract private investment capital and key suppliers into the region.*
- *to create sustainable, high wage jobs.*
- *to develop a workforce with the skills to support the solar technology industry.*
- *to reduce the region's reliance on traditional energy sources.*
- *to educate the public on the importance of sustainable energy.*

Power generation and distribution are only one component of the Solar Zone. Equally important is research and development. To successfully compete with coal and oil-based energy and become a larger part of the overall energy mix, solar energy must become more efficient and less costly.



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The Solar Zone provides university and industry researchers with the ability to test and evaluate new technologies as they perform side by side. Testing under identical operating conditions allows developers to determine when systems are most efficient and economical. At the Solar Zone, University of Arizona researchers conduct tests ranging from solar power forecasting to the environmental impact of solar energy installations.

The sun shines in Tucson at optimal radiance for 85 percent of the year. That means that solar technologies can be tested effectively and thoroughly year-round. Tech Parks Arizona has created a bridge between academia and industry through green technology innovations. The ability for many technologies to be tested and evaluated at the Solar Zone has allowed participating companies to access, modify, and improve the efficiency and potential impact of renewable energy.

The Solar Zone is an integrated, multi-dimensional research center that fosters all elements of solar energy development, including:

- *generation and distribution,*
- *research and development,*
- *assembly and manufacturing,*
- *product development,*
- *testing and evaluation,*
- *workforce training, and*
- *public education and demonstration.*



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Solar Zone by the Facts

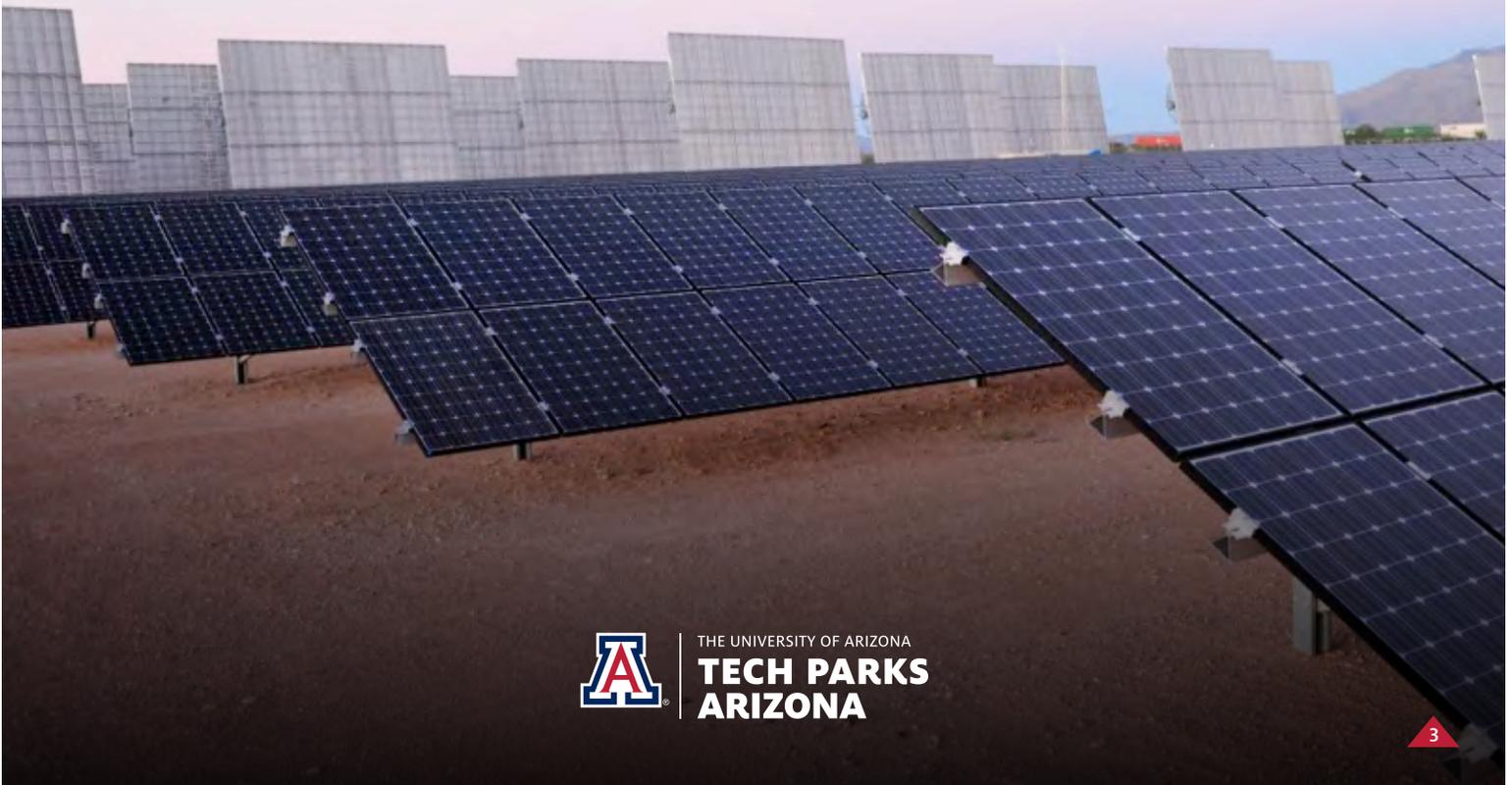
- Total acres = 223
- Total companies = 10
- Total power generation capacity = 25 MW
- Power storage = 10 MW

Phase One

Tech Parks Arizona recently completed Phase One of the Solar Zone at the UA Tech Park. Phase One covers the testing and evaluation of power generation at the utility scale.

The site is 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 4,600 TEP residential customers for a year. Each Solar Zone tenant has a 20-year agreement with TEP. Under the agreement, TEP purchases the solar power generated by the Solar Zone— which is fed directly into the grid— to expand its renewable energy resources in Southern Arizona.

The Solar Zone's comprehensive strategy progressively builds the program by first focusing on power generation and distribution. Phase One includes 95,000 solar panels and more than 100 solar concentrators that generate power.



Solar Projects

TEP #1

- Tucson Electric Power / Solon
- 1.6 MW powering 258 homes
- 5,808 Solar Panels on 13.9 Acres
- Single Axis, Tracking Solon Photovoltaic Panels (c-Si)
- 500 KW Lithium-Ion battery storage



ARZON SOLAR

- Arzon Solar, LLC (Company), Amonix Inc. (Brand)
- 2MW powering 250 homes
- 36 Solar Structures on 16.1 Acres
- Dual Axis Tracking Concentrated Photovoltaic Structures (CPV)



TEP

- Tucson Electric Power Company
- 5MW powering 609 homes
- 21,294 Solon Solar Panels on 33.31 Acres
- Fixed Position Photovoltaic Panels (c-Si)



TECH PARK SOLAR

- E.ON Climate & Renewables
- 6MW powering 1,181 homes
- 24,000 solar panels on 37.3 Acres
- Single Axis Tracking Photovoltaic Panels (c-Si and JA)



GATOS MONTES SOLAR, LLC

- Duke Energy
 - 6MW powering 822 homes
 - 44,000 thin film panels on 37.41 Acres
 - Fixed Position Photovoltaic Panels (Thin Film)
-



WASHINGTON GAS ENERGY SYSTEMS, INC.

- Washington Gas Energy Systems
 - 1.1MW powering 96 homes
 - 9 acres (4 acres solar)
 - Single Axis Tracking Flat Photovoltaic Module Arrays
-



REHNU, INC. (Under Construction)

- REhnu
 - 840 kW powering 138 homes
 - 5 acres
 - Dual Axis Tracking Concentrated Photovoltaic Structures (CPV)
-



CRYSTAL GREEN ENERGY

- Crystal Green Energy Corporation
- Combined heat and power solar optic module system designed to produce high efficiency thermal and electrical output for direct consumer energy



VAIL ACADEMY AND HIGH SCHOOL

- Vail Academy and High School
- 57kW powering Vail Academy
- Fixed Position Photovoltaic (PV)



IRON HORSE ENERGY STORAGE & SOLAR

- E.ON Climate & Renewables built a 10-MW / 2.5 MWh lithium titanate oxide storage facility and an accompanying 2.4 MW solar array for Tucson Electric Power (TEP) to provide grid reliability services.



FIBERSTRIKE BY CLEVELAND ELECTRIC

- Cleveland Electric Laboratories is using the Solar Zone as a large-scale testing and demonstration site for its FiberStrike Fence Mounted Perimeter Security System. The FiberStrike suite of sensors and sensing systems has been developed by Cleveland Electric Laboratories Advanced Technology Group. Cleveland Electric Labs has installed a demonstrable fence mounted intrusion detection system in the Solar Zone. This system is capable of instantly sensing and analyzing movements or disruptions that could signal an intrusion.



Phase Two

Tech Parks Arizona has initiated Phase Two of the Solar Zone. This phase includes research and development focused 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. The University of Arizona and Tech Parks Arizona are also exploring the deployment of solar energy in mining, agriculture, and defense and security systems.

Phase Two opens up additional parcels of land for testing and demonstration projects.

The first project of Phase Two is an innovative energy storage systems. E.ON is developing a 10-MW lithium titanate oxide (LTO) storage facility and accompanying 2-MW solar array on contract for Tucson Electric Power.

The systems will be used primarily to help maintain the required balance between energy demand and supply. Energy storage systems can boost power output levels more quickly than conventional generating resources. If the voltage frequency of the regional electric grid suddenly dropped, power producers like Tucson Electric Power (TEP) would be required to quickly ramp up output to boost frequency and maintain reliability. The systems also can help prevent power outages during periods of high energy demand by supporting stable voltage on TEP's energy delivery system. In the event of an outage, the systems could provide about 5 MW of power for up to an hour. In the future, energy storage systems could be used to help ensure the quality and reliability of electric service during continued expansion of renewable resources.

Phase Two also includes plans for a solar education and a visitor center. The center will allow visitors to get up close to functional solar systems and learn about solar technology and its application. The center is an integral part of the University of Arizona's educational outreach and ties directly into one of the goals of the Tech Park and Solar Zone to educate the public about renewable energy.

University of Arizona

The University of Arizona (UA) is one of the top-ranked US universities in the area of sustainability. The university currently employs several sustainability strategies throughout the campus, which helps contribute to the reduction of energy consumption, as well as the minimization of greenhouse gas emissions. The University of Arizona recently received a STARS gold rating in recognition of their efforts in sustainability. The university is one out of only thirty universities throughout the US and Canada to receive this award.

The University of Arizona's Office of Sustainability works to ensure that the UA continues to be a leader in sustainability among its peers. They collaborate with partners across the University of Arizona and throughout the community to coordinate environmental sustainability initiatives and communication. Another powerhouse is the UA Renewable Energy Network (REN) which is a university-wide initiative designed to support the expanded regional, national, and global use of abundant, clean, and economical renewable energy by connecting community and industry to the UA's research and educational programs. Through a variety of initiatives and established offices, the University of Arizona is a leader sustainable and renewable energy in the nation.

At the Leading Edge

The Solar Zone continues to evolve. It is a unique and compelling location for solar energy development. Building on the research strengths of the University of Arizona, following the innovative lead of Tucson Electric Power, and using the land and research facilities at the UA Tech Park, the Solar Zone is positioning Tucson on the leading edge of solar energy innovation and development. Arizona's special focus is on research and development.

The Solar Zone will continue to gather data to increase the optimization of solar generation and technology for increasing the efficiency of photovoltaic energy production and the grid. Technologies such as storage, dc optimizers, inverters, and cleaning technologies will be evaluated to understand their impact on system effectiveness.

Educational Outreach

As part of the Solar Zone's educational outreach, Tech Parks Arizona conducts Racing the Sun, a solar go-kart race for high school students. Racing the Sun is a statewide competition in which high school students design, build, and race solar-powered go-karts.

Racing the Sun provides a STEM (science, technology, engineering and math) experience for students and challenges them to think critically. Throughout the program, students learn how engineering concepts are applied in the real world and experience firsthand how solar energy is used. Through field trips and interaction with university students and professionals, they are also introduced to potential career paths.

National and International Recognition

The Solar Zone has received international recognition for its solar and renewable energy expertise. Honors include:

- Environmental Stewardship Award for Southern Arizona was presented to TEP for their investment in solar energy through the Solar Zone - Valley Forward Environmental Excellence Awards
- Gold Award for Sustainable & Green Development—International Economic Development Council's Excellence in Economic Development Awards (2012)
- Green Innovator of the Year—Governor's Celebration of Innovation Awards (2012)
- Investor Owned Utility of the Year – presented to Tucson Electric Power by the Solar Electric Power Association for its role in developing the Solar Zone (2012)
- Leading U.S. hub for solar energy manufacturing—recognition by *Business Facilities* magazine (2012)
- Innovation in Green Technology Award—U.S. Economic Development Administration's Innovation in Economic Development Awards (2010)
- Common Ground Award for Economic Development— Metropolitan Pima Alliance (2010)
- Governor's Excellence Award for Innovative Economic Development (2010)
- Honorable mention, Solar Zone Concept Plan—Making Arizona Competitive for the 21st Century Merit Awards (2010)

**INTERESTED IN LEARNING MORE ABOUT
THE SOLAR ZONE AT THE UA TECH PARK?**

Contact us at 520-621-4088 or info@uatechpark.org



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