

## Solar Energy to Empower Arizona's Future Economy

Solar energy makes the climate and all life on earth possible. In fact, in just a single day, the sun beams down more than 10,000 times the commercial energy consumed by society in an entire year.

With its abundant year-round sunshine, Arizona, perhaps more so than any other state, has the greatest untapped potential to become a pioneering leader in the development of a future solar cell industry needed to drive our ever-increasing energy requirements.

Yet, despite this plentiful, clean, and renewable source of energy, widespread adoption of solar power has been limited by the current inefficiencies of solar cell technology that can convert only 15-20 percent of the available energy into electricity.



This **Generating Station Solar System** is located in Springerville, Arizona, and could become commonplace in reducing energy costs and driving Arizona's future economy. Global Solar Energy, of Tucson, installed the station, which produces enough electricity for about 1,000 homes.



This **Molecular Beam Epitaxy Machine** is used to deposit atomic-thin layers of materials to make up the ultra-high efficiency solar cells that are being developed by the ASU and UA research groups.

To catalyze the development of next-generation, solar cell technology, Science Foundation Arizona awarded a \$500,000 Innovation Investment Award to a collaborating team from Arizona State University (ASU) and the University of Arizona (UA) to promote the wide-spread use of solar cells for commercial applications. Global Solar Energy of Tucson is an integral industry partner.

The research team is incorporating nanotechnology methods to produce a generation of solar cells that can significantly increase efficiency thereby reducing the cost of solar power. In development is a new solar cell, called concentrator photovoltaics, that is three times more efficient than a conventional silicon device. Powering the heart of this innovative technology, scientists deposit thin layers of semiconductors that are able to absorb and transform a greater portion of sunlight directly into electrical currents. In addition, the research group is also doubling the effectiveness of the current commercial products by forming a stack of two thin film solar cells – one optimized for producing electricity from red sunlight and one optimized for blue light.

This collaboration enhances Arizona's emerging prominence in solar cell research, and fuels the growth of Arizona home-grown technology and such local companies as First Solar and Global Solar - two rising stars in the solar cell industry. Innovations in solar technology will also play a significant role in achieving the Arizona Corporation Commission's Renewable Energy Standards that require 15% of all electric power to be derived from renewable sources by 2025.