

Overview: Solar Energy as an Arizona Economic Priority

The new solar context: Belief that over the next 20 years Arizona's extraordinary solar resource offers a natural competitive advantage and an opportunity for global leadership in a clean energy economy. SFAz's solar goals:

- Improve solar's cost competitiveness/bankability
- Create new products that are easily scalable and best fit with the resource
- Catalyze new investment that connect sites with highest solar resource to high value regional and national markets
- Build an analysis capability that breaks down regional barriers, creates a small cadre of committed people, and facilitates decision making.

Solar Technology Initiative Operating Plan

Solar is integral to SFAz's effort to create a statewide collaborative economic engine creating new industries and expanding the state's revenue base.

It created the Solar Technology Initiative (STI) designed to:

- Support solar technology innovation that links with industry interests
- Create decision tools that build on a common interest and advance deployment of solar energy
- Break down structural barriers between Arizona universities and industry
- Advance concentrating PV as a competitive grid option for Arizona and the desert southwest
- Increase the reliability and bankability of solar energy systems
- Create knowledge networks
- Insure supply of trained solar workers for Arizona industry

STI's Plan Deployed in Three Interlocking Projects: 1. AzSmart

A single comprehensive analysis tool developed to optimize renewable energy deployment on the Arizona grid. The project:

- Using a seven screen decision theatre provides an interactive, integrated, visual decision tool.
- Creates a multidisciplinary team: ASU/UA economists, power engineers, GIS experts, and IT modelers.
- Presents immediate results that used to take months.
- Utilizes only industry or operational project inputs
- Pick a potential site or an objective: example replace coal plant at four corners with renewable energy projects.
 - Tells you where
 - Best technology and power output
 - Prices
 - Transmission and water implications
 - Environmental and Economic costs

#2 Photovoltaic Environmental Performance and Reliability

Using industry products and with utilities, NREL, Sandia as partners increase our understanding of the factors which limit industry's development of high performance reliable modules and systems. The project:

- Improves the manufacturability of modules and inverters
- Narrows warranty issues
- Provides a platform for organizing and quantifying field performance data
- Develops accelerated lifetime testing methods
- Reduces module testing turnaround time
- Trains solar workforce of future
- Offers preferred access to Arizona based firms

#3 Concentrating Photovoltaic Systems (CPV)

Arizona with its best in the nation solar radiation is the ideal market for tens of gigawatts of high performance concentrating solar energy systems. The project supports:

- Development of innovative concentrator systems concepts
- Creation of a Cluster of 5 industry leaders and 8 universities to improve the cost competitiveness of CPV systems
- Research plan includes cells, cell packaging and optics, trackers and finally assembly of complete systems.
- Milestone deliverables start with fixing specifications, moving to validating component manufacturing and finally characterizing field performance.
- An accelerator network with easy access to key policy and private sector players provides outreach and market analysis.

Technology in the Context of Infrastructure Investment Driven by Public Benefits

- Rickover giant believer in nuclear power and its role our national defense, and engineering oversight was the top priority.
- Gulf Oil Spill failed to look at the technological challenges in ever deeper waters— environmental assessment took priority
- Hoover Dam Bypass Bridge lesson in regional/federal cooperation—280 ft cranes collapsed in high winds replacements now carry 20 ton boulders
- Gotthard Base Tunnel: 400 meter long boring machines 60 bit on 10metre bore head, 25 tonne pressure . One centimetre vertical and horizontal leeway
- San Jose Mine rescue: Piston-driven hammers drove a curving 28-inch diameter shaft 2041 feet through hard quartzite rock to reach the miners. Specially-designed spring-loaded wheels enabled the Freedom Rescue Capsule to ride smoothly on its trips though the rock-lined tunnel. NASA provided a high-calorie liquid diet to the trapped miners designed to prevent nausea during the nearly half-mile curving ascent and medical instruments closely monitored their vital signs during the entire ride.