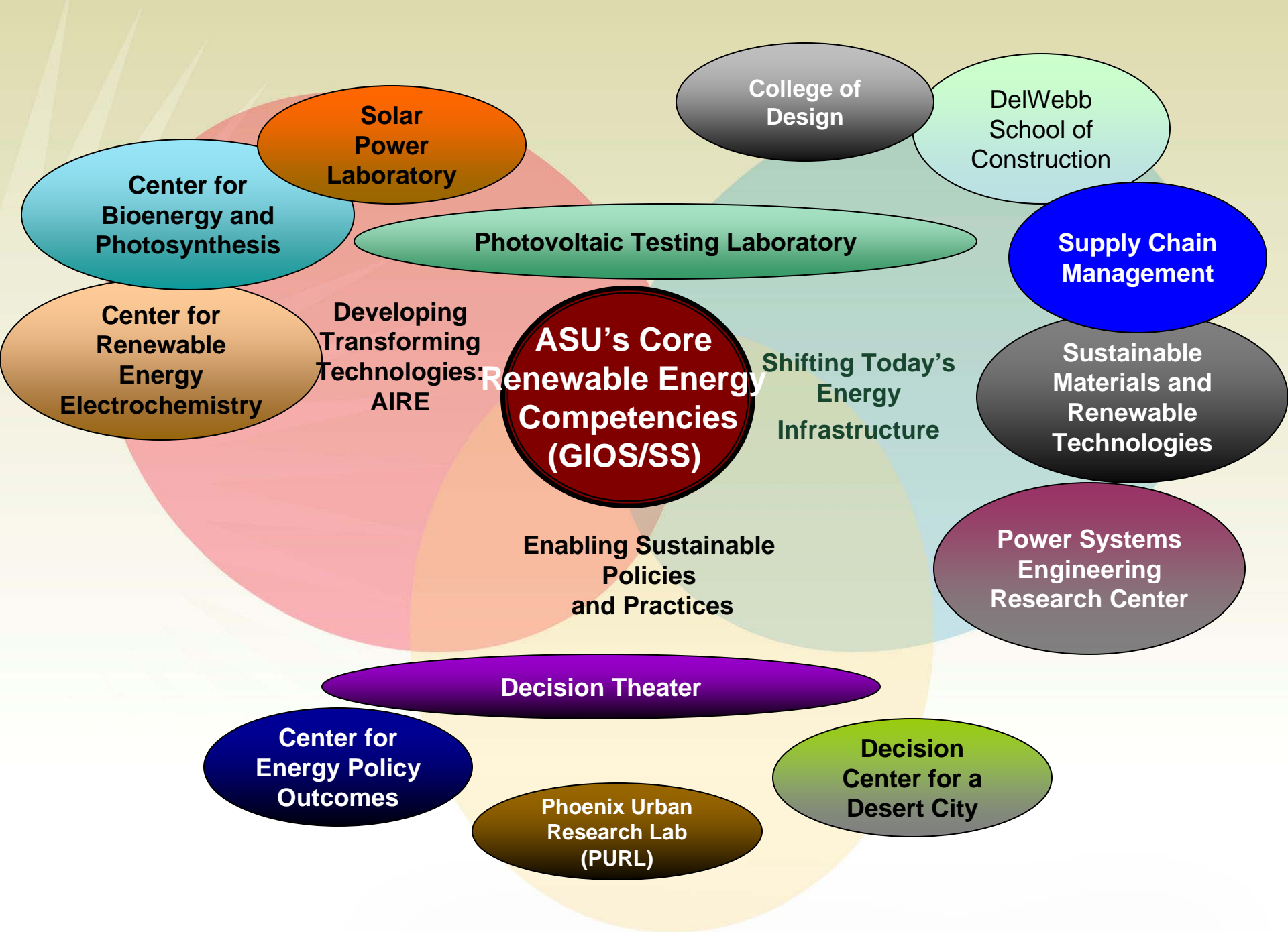


Arizona Institute for Renewable Energy Workshop

April 29th, 2008



Arizona Institute for Renewable Energy (AIRE)

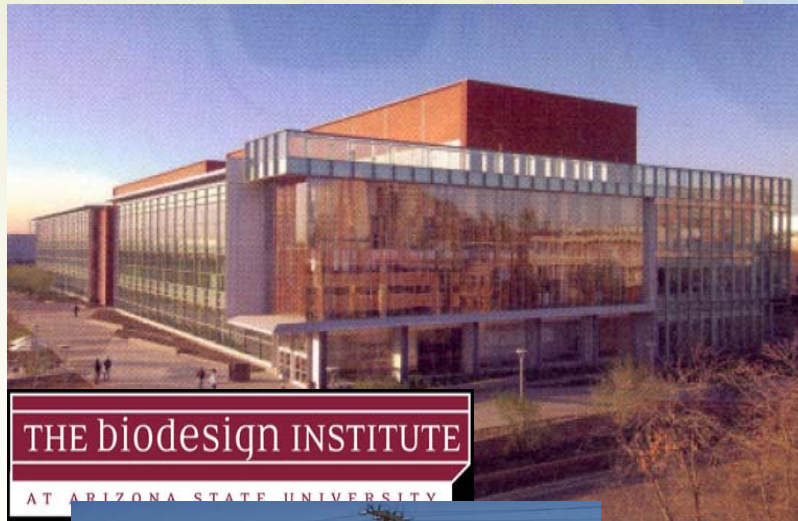
Photovoltaic Testing Laboratory

Solar Power Laboratory

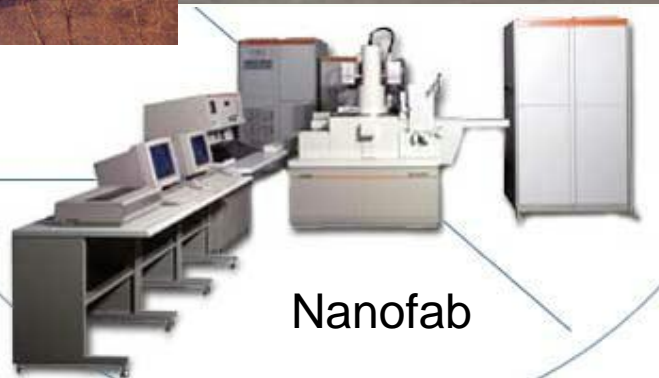
Center for Bio-Energy and Photosynthesis

Center for Renewable Energy Electrochemistry

Capabilities and Infrastructure



STATE HIGH RESOLUTION ELECTRON MICROSCOPY



School of
Materials

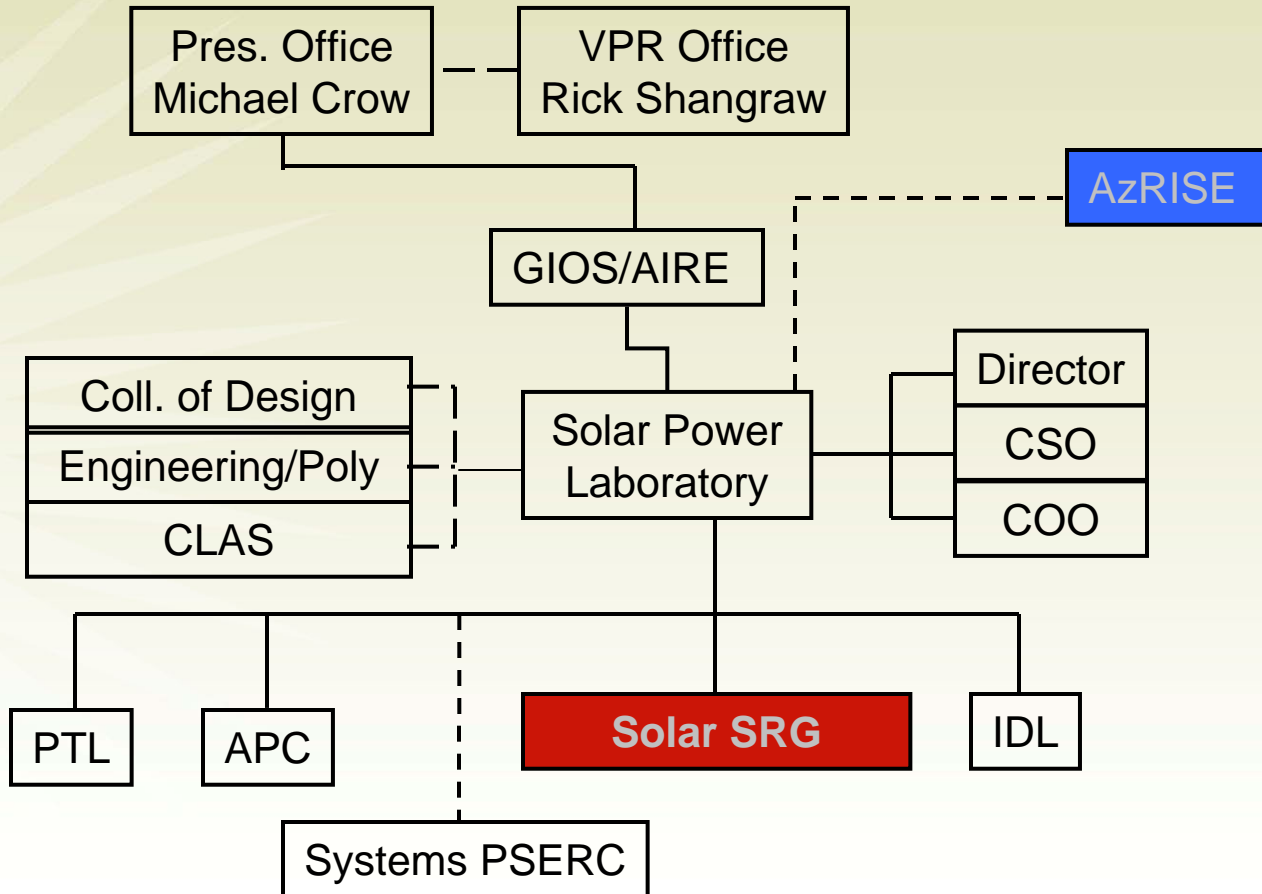
Arizona Institute for Renewable Energy (AIRE)

- **MISSION:** to research and develop reliable, affordable, renewable energy sources and storage. Special attention is paid to those technologies suitable for commercialization in the Southwest United States.
- Provide a focal point for prototype and systems analysis for these renewable energy sources.
- Provide curricula to undergraduates and graduates appropriate in this area, including social, economic, and policy focuses, and it will work with the local high schools to involve students at this level
- AIRE is focused on four renewable energy research areas bioenergy, photovoltaics, fuel cell/energy storage, and energy system testing, which form the intellectual focus for overlapping centers in each area

AIRE Timeline

- **Spring 2007- First planning meetings**
- **Spring/Summer 2007- Initial seed funding for three centers: Bioenergy and Photosynthesis, Advanced Photovoltaics Center, Center for Renewable Energy Electrochemistry**
- **August 2007- ABOR approval sought for AIRE, B&P, APC, and CREE**
- **August 2007- Joint proposal submitted to ABOR for funding Solar Energy Initiative at UA and ASU**
- **December 2007- Solar Energy Initiative approved: Planning for Solar Power Laboratory**
- **January 2007- ABOR approval for AIRE, B&P, APC, and CREE**

ASU ABOR Solar Energy Initiative Structure



Workshop Motivation

- **Coordination of renewable energy efforts across ASU and linkage to state-wide efforts**
- **Feedback and dialogue on vision going forward**
- **Coordinate response to opportunities**
 - **DoE Energy Frontiers Research Centers (LOI due 7/1/08)**
 - **NSF Science and Technology Centers (Spring 09)**
 - **NSF Engineering Research Centers (Summer 09)**

Energy Frontier Research Centers

- The EFRC awards are expected to be in the \$2–5 million range annually for an initial 5-year period (total \$100M)
- EFRC will address one or more of the *five challenges*:
 - Process control at electron level
 - Revolutionary material design with the tailored properties
 - Understanding and control properties emerging from components
 - mastering energy and information at nanoscale rivaling the nature
 - Characterization and control of the matter away from equilibrium

Other requirements:

- balanced and comprehensive
- provides opportunities to inspire, train, and support leading scientists
- leadership communicates effectively with scientists of all disciplines
- comprehensive management plan for a world-leading program that encourages high-risk, high-reward research. The plan demonstrates that the whole is substantially greater than the sum of the individual parts.

EFRC Areas of Application

- Solar Energy Utilization
- Hydrogen Fuel Initiative
- Advanced Nuclear Energy Systems
- Materials under Extreme Environments
- Solid-State Lighting
- Electrical Energy Storage
- Geological Sequestration of CO₂
- Catalysis for Energy
- Clean and Efficient Combustion
- Superconductivity

Individual and Small Group Awards **Research Areas of Interest**

- **Ultrafast Science:** *Non-equilibrium phenomena at atomic scale*
- **Chemical Imaging:** Chemical behavior of molecule and nanostructures
- **Complex Systems or Emergent Behavior:** phase transitions, high temperature superconductivity, colossal magneto resistance, random field magnets, and spin liquids and glasses (examples)
- **Midscale Instrumentation:** Inexpensive nanotools with high resolution
- **Accelerator and Detector Research:** accelerator physics and x-ray and neutron detectors

Workshop Program

- 8:30-8:45** **Stephen Goodnick "Greetings and Introduction to AIRE"**
- 8:45-9:00** **Jonathan Fink "ASU Sustainability Initiative"**
- 9:00-9:20** **Phil Smithers "APS Renewable Energy Initiative"**
- 9:20-9:35** **Joseph Simmons "Arizona Research Institute for Solar Energy"**
- 9:35-10:00** **Vision and strategy of participating centers**
- 10:00-10:30** **Coffee break and networking**

Workshop Program

- 10:30-11:10** Photovoltaics: Yong-Hang Zhang and Ghassan Jabbour
- 11:10-11:50** Bioenergy and Photosynthesis: Devens Gust and Bruce Rittman
- 11:50-12:30** Renewable Energy Electrochemistry: Cody Friesen and Dominic Gervasio
- 12:30-1:30** Lunch (Bamboo Club)
- 1:30-1:50** Wim Vermaas “Bioenergy”
- 1:50-2:10** Neal Woodbury “Peptide-Based Catalysts for Water Splitting”
- 2:10-2:30** Govindasamy Thamizh-Mani “Photovoltaic and Fuel Cell Testing and Certifications”

Workshop Program

- 2:30-2:50** **Slobodan Petrovic “Polytechnic Energy Program”**
- 2:50-3:10** **Mark van Shilfgaarde “Materials Challenges for Photovoltaics: Modeling Prospective”**
- 3:10-3:40** **Coffee break and networking**
- 3:40-5:30** **Panel Discussion: Grand Challenges in the Development and Deployment of Renewable Energy**
- 5:30** **Reception (Bamboo Club)**