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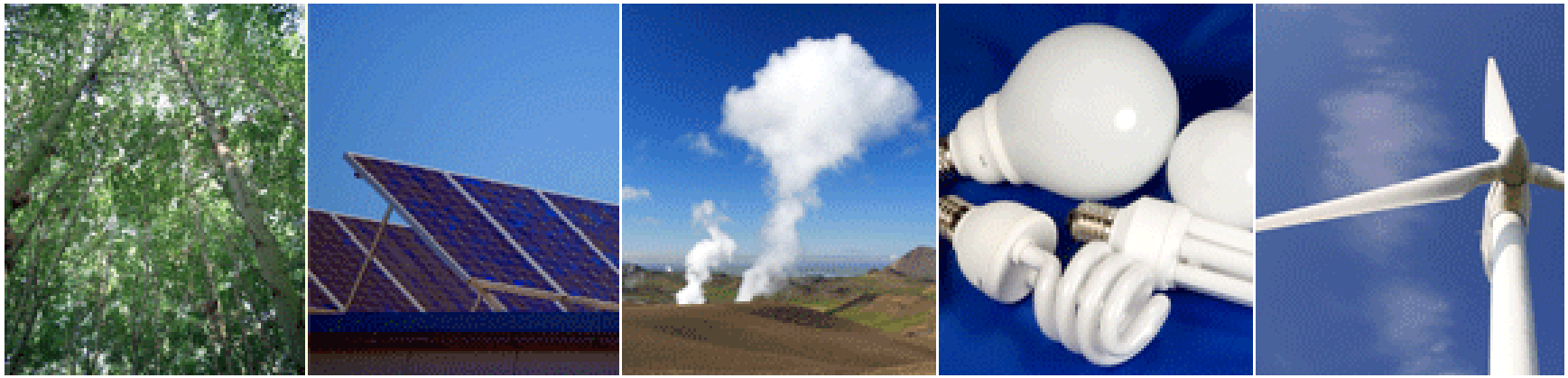
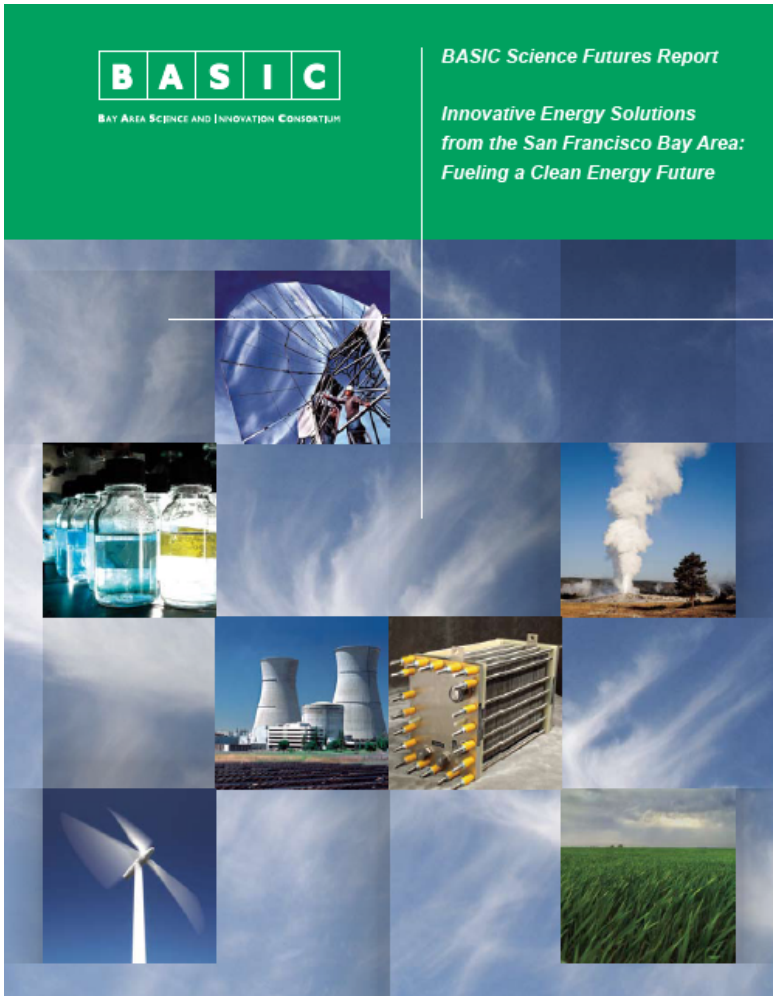
Regional Initiatives and Research Emphasis in Clean Technology

JUNBA 2009 – Next Step to a Greener Earth
January 13, 2009

Barry M. Klein
Vice Chancellor for Research
University of California, Davis



BASIC Science Futures Report



- This first-of-its kind report on major **alternative energy technologies**
- **Innovative energy solutions** from the San Francisco Bay Area

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BASIC Science Futures Report Themes

The **BASIC Sciences Futures Report** is available online at**:**

http://www.bayareabasic.org/basicpublications.html

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Biomass Fuel:
California Biomass Collaborative

- Enhance the sustainable management and development of biomass
- Statewide collaborative program in scientific research and innovation
- Membership is open to all sectors and groups

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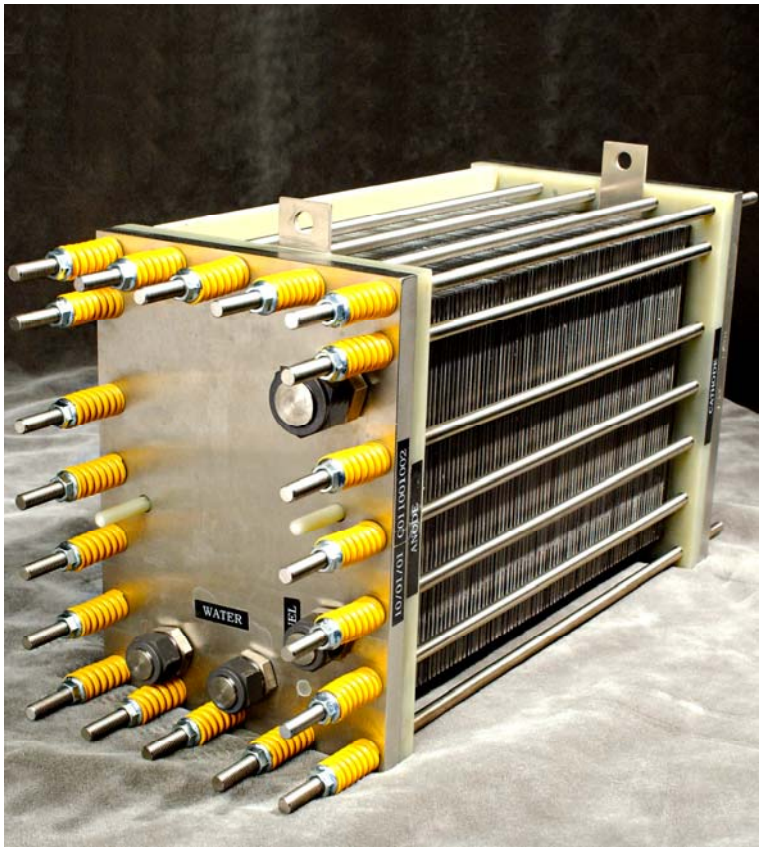
Electrochemical and Magnetic Technologies: Batteries

- BATT Program
- PolyPlus
- Farasis Energy
- Battery Design Company
- Nanoexa



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Geothermal Energy

- **Stanford:** Geothermal reservoir engineering techniques
- **USGS:** Developing supply curves for both hydrothermal and Enhanced Geothermal Systems (EGS)

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Hydrogen Fuel:
Innovation @ Sandia

Production → Delivery → Storage → Application

- H2 Simulation
  cost models for production and delivery
- H2 Storage
- H2 Engine Efficiency

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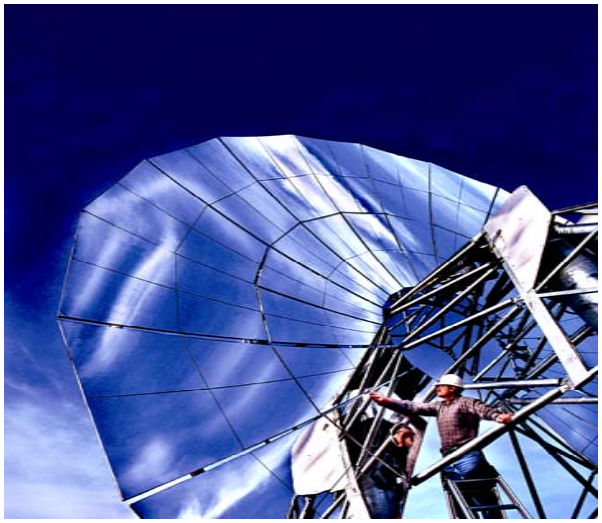
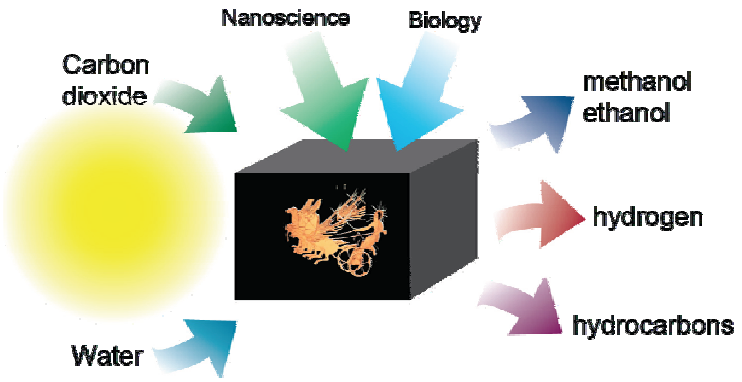
Solar Energy:
The Helios Project

- Conversion of solar energy into carbon-neutral form of energy

- **Target**
  - Light-to-Fuel at 10% Power Efficiency
  - $ 3/GJ (= Gasoline at $0.4/ Gallon)
  - Carbon Neutral
  - Manufacturable and Sustainable
  - Storable and Transportable Fuel





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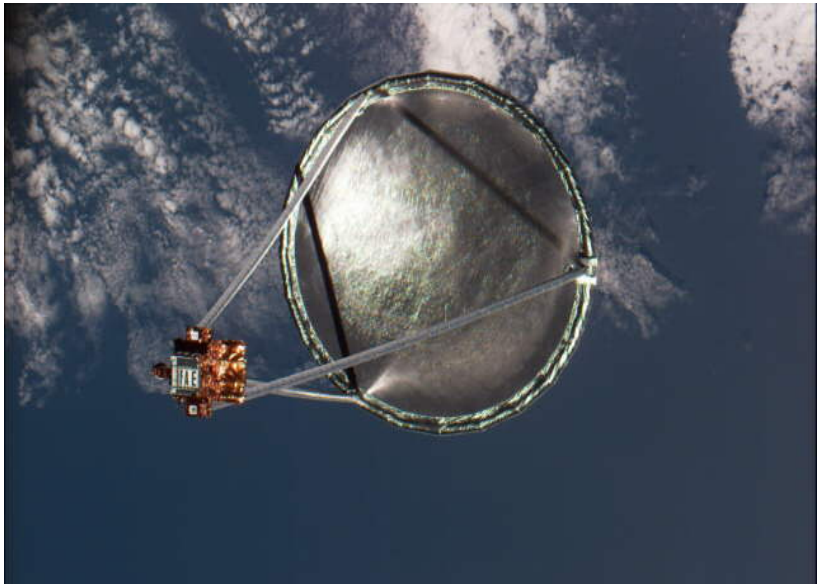
Solar Energy: Lockheed Martin



- Repurposing space technology developed for terrestrial use.
- Solar concentrator technology
- Potential of >40% efficiency

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Wind Energy:
California Wind Energy Collaborative

- **Mission**
  - Support the development of safe, reliable, environmentally sound, and affordable wind electric generation capacity within the state.
- **Activities**
  - Scientific research
  - Technology development and deployment
  - Technical training

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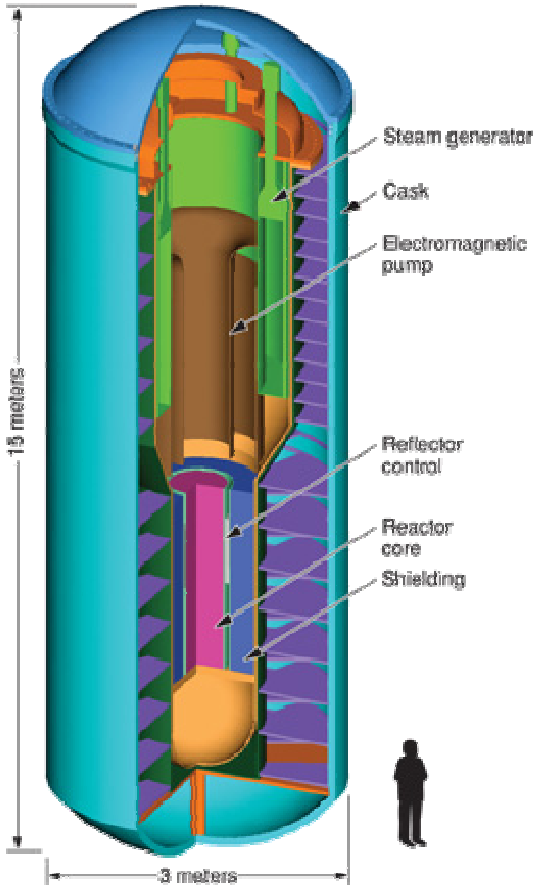
Nuclear Energy:
SSTAR Program



- Self-contained nuclear reactor with tamper-resistant features.
- Produce 10 to 100 megawatts electric
- Safely transported on ship or by a heavy-haul transport truck.
- Lawrence Livermore, Los Alamos, and Argonne national laboratories collaboration

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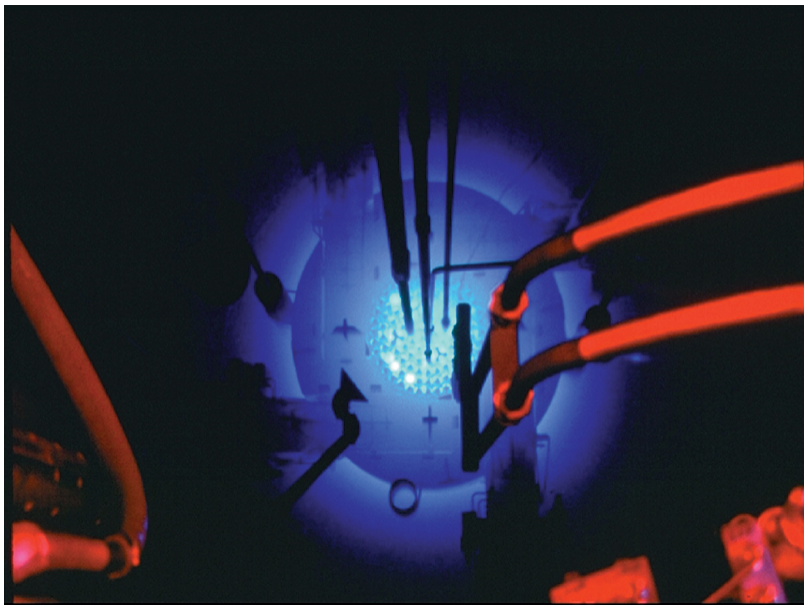
Nuclear Energy:
UC Davis McClellan Nuclear Radiation Center

Conduct and facilitate a wide variety of research involving imaging and radiation

- Biomedical Research
- Neutron Activation Analysis
- Materials Science
- Environmental Research
- Nuclear Engineering
- Industrial Isotope Research and Development
- Nondestructive Inspection Techniques
- Advanced Imaging Techniques



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Energy Efficiency:
PG&E Emerging Technologies Program

- Accelerate the introduction of innovative energy efficient solutions
- Links R&D cycle and the marketplace
- Verifies performance and customer acceptance of new products to provide consumers new innovative solutions at minimum risk

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Energy Efficiency:
Joint BioEnergy Institute

- San Francisco Bay Area scientific partnership
- Research focus is biomass-to-biofuel solutions
  - Feedstock Production
  - Deconstruction
  - Fuel Synthesis
  - Technologies
- Three National Laboratories (LBNL, LLNL, Sandia), major public (including UC Berkeley and UC Davis) and private universities, industry, and federal agencies

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Green Capital Alliance

The Green Capital Alliance unites Sacramento region employers, academic and research institutions, economic development and community organizations, and local governments in supporting clean technology and sustainability.

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UC Davis:
The Right Place – The Right Time

- Tradition of renewable energy research and practice
- Interdisciplinary nature of faculty research
- Demonstrated excellence and planned growth in energy
- Community concerned about energy and environment

UC Davis Energy Institute

UC Davis is a leader in energy research with **more than 160 faculty** engaged in research and academic programs through the **UC Davis Energy Institute**.

http://www.energy.ucdavis.edu

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UC Davis Institute of Transportation Studies

- Leading university transportation and energy center in the U.S.
- Strength of public outreach
- Unique in its multidisciplinary approach
- $6 million annual budget

www.its.ucdavis.edu

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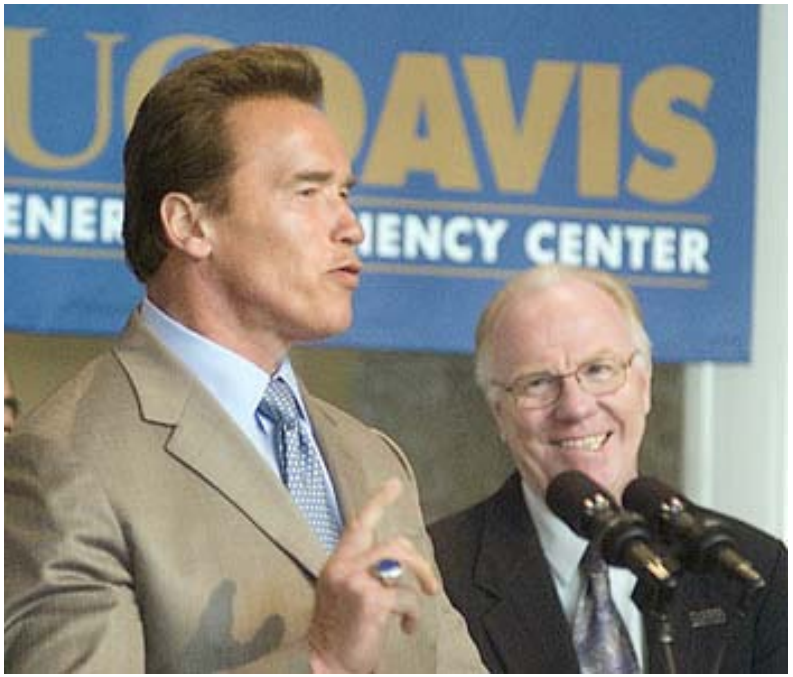
UC Davis Energy Efficiency Center



April 12, 2006: Governor Arnold Schwarzenegger joins UC Davis for announcement of $1 million grant from California Clean Energy Fund to establish the Energy Efficiency Center.

CalCEF
California Clean Energy Fund

Chevron
EDISON INTERNATIONAL
Goldman Sachs
Pacific Gas and Electric Company
Sempra Energy
WAL★MART
Save money. Live better.

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