

California Smart Grid Center



California Smart Grid Center California State University, Sacramento



Emir Jose Macari, Dean

College of Engineering and Computer Science



California Smart Grid Center



MISSION



The California Smart Grid Center (CSGC) at Sacramento State will engage in **product testing** of automated metering infrastructure and develop practical field solutions for large-scale integration of Smart Grid technologies.

The Center aims to inform the development of real-time pricing of electricity by providing an **unbiased proving ground** where utilities, industry and the public sector will work together to impact consumer choice, global climate change and energy security.

The Center will work in support of California's utilities to support the development of the highly desired upgrades to the nation's electric grid that will lead to the creation of the **Smart Grid**.

The Center will develop California's **Smart Grid Workforce**.

Smart Grid

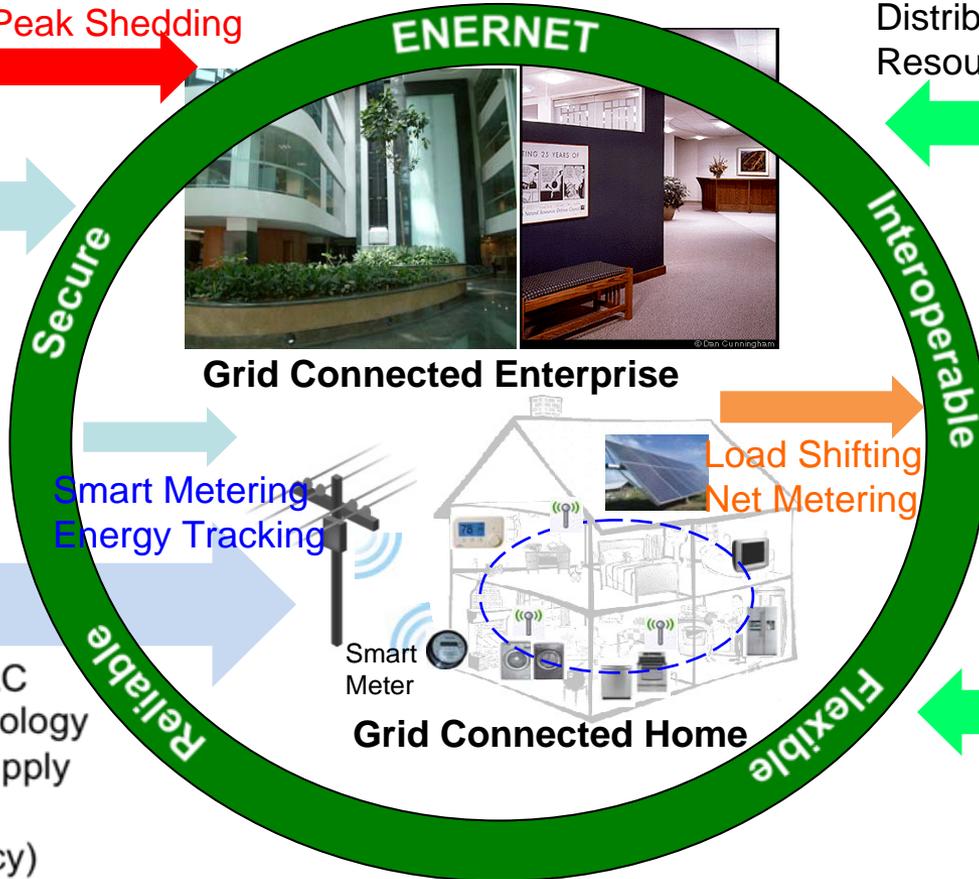


Traditional Sources



Coal Power Plant

Demand Response
Peak Shedding



Renewable Sources



Wind Power

Distributed Resources



Residential Solar PV



Solar Thermal

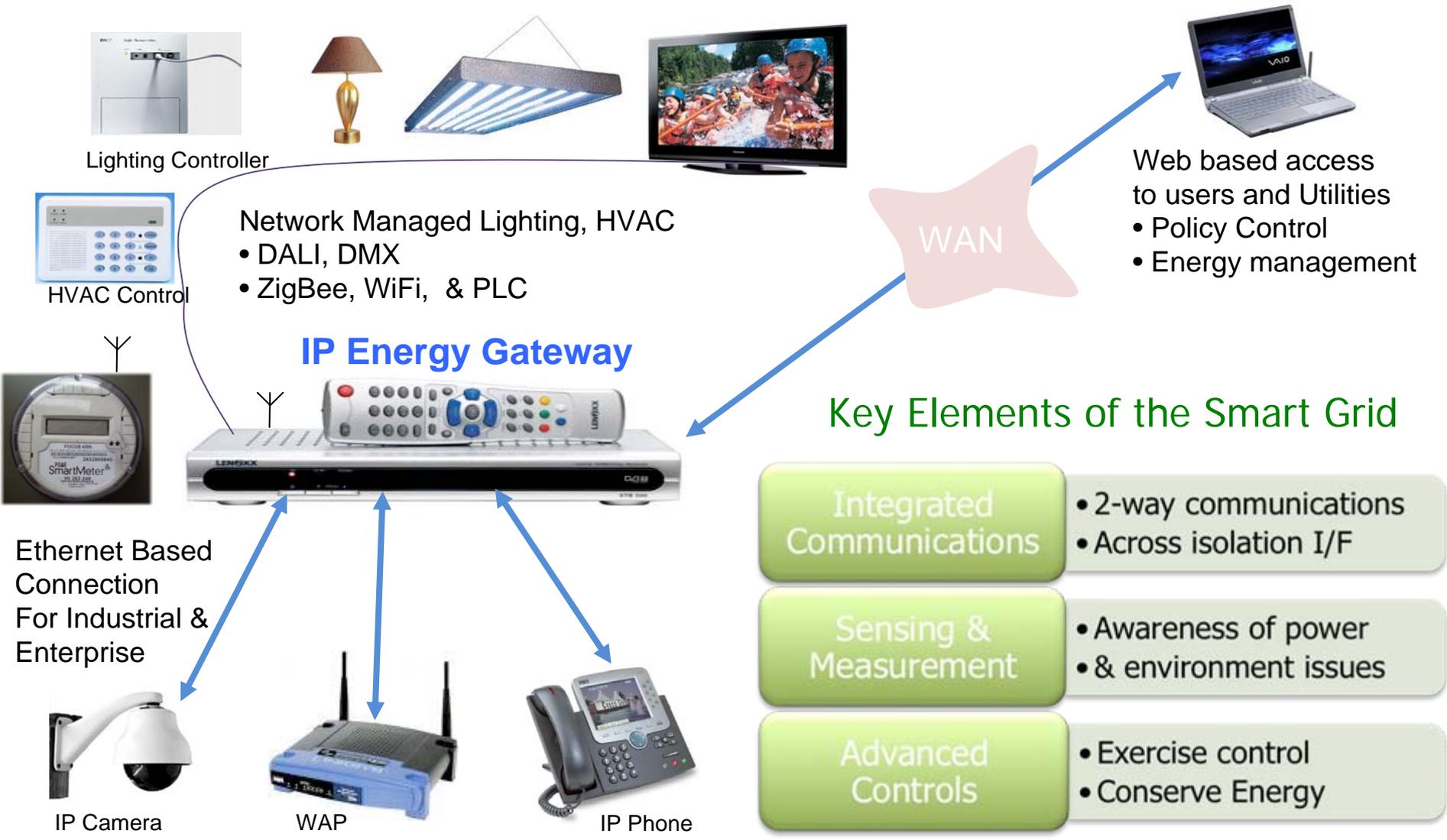


Smart Devices

- IP Based: Zigbee, PLC
- MicroNets, Mesh Topology
- Grid Smart Power Supply
- Self Monitoring PS
- Real Time (low latency)
- Secure (Denial of Service)



Smart Grid Energy Gateway



California Smart Grid Center

Faculty Members

Dr. Turan Gonen; EEE

Dr. John Balachandra; EEE

Dr. Yousif Salah; EEE

Dr. Miroslav Markovic; EEE

Dr. Suresh Vahdva; EEE

Russ Tatro; EEE

Dennis Dalquist; EEE

Dr. Isaac Ghansah; CSC

Dick Smith; CSC

Dr. Bill Mitchell; CSC

Dr. Ted Krovetz; CSC

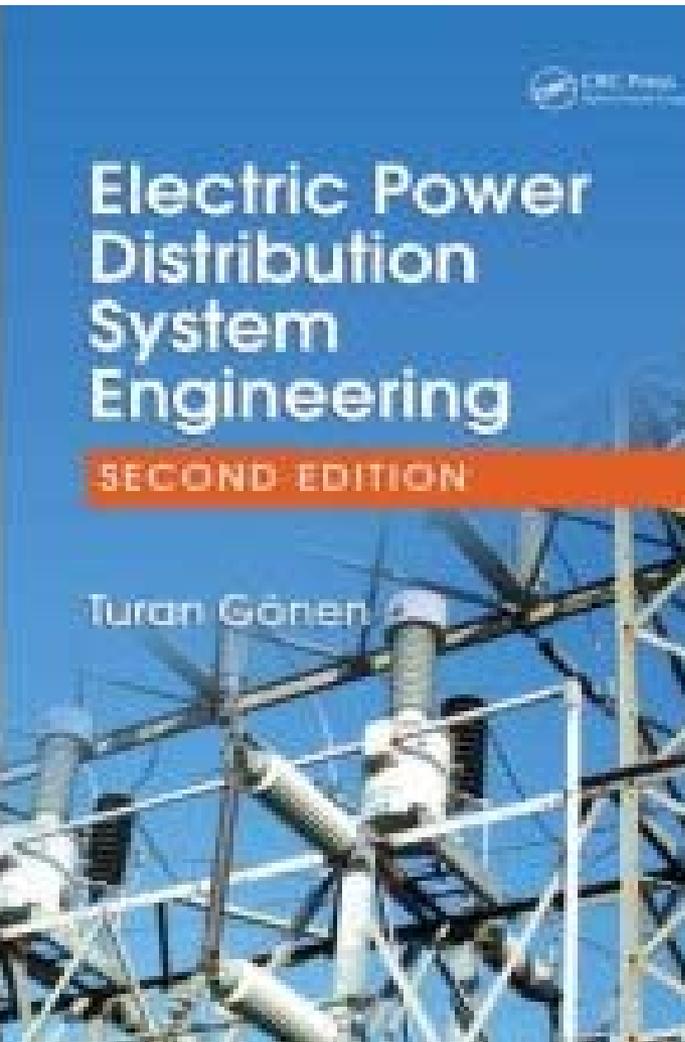
Dr. Tim Marbach; ME

Dr. Dan Noren; ME

Dr. Jim Bergquam; ME



Books in Power Engineering



- 1. Electric Power Distribution System Engineering, Second Edition by Turan Gonen (Hardcover - Dec 14, 2007)
- 2. Electric Power Distribution System Engineering by Turan Gonen (Hardcover - Jul 1, 1985)
- 3. Engineering Economy for Engineering Managers (Wiley Series in Engineering and Technology Management) by Turan Gonen (Paperback - Jan 1990)
- 4. Electrical Machines by Turan Gonen (Hardcover - Jan 1998)
- 5. Modern Power System Analysis by Turan Gonen (Hardcover - Jan 1988)
- 6. Electric Power Transmission System Engineering: Analysis and Design by Turan Gonen (Hardcover - Mar 1988)



National Security Agency & Department of Homeland Security

Center for Information Assurance and Security

May 10, 2007

Sacramento State Named Leader in Information Security

The National Security Agency (*NSA*) and the Department of Homeland Security (*DHS*) have designated Sacramento State's College of Engineering and Computer Science as a *Center of Academic Excellence* in Information Assurance and Security, for academic years 2007-12.



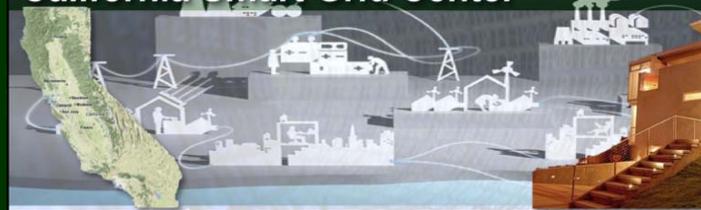
Smart Grid Certificate Courses



EEE 141 Power System Analysis	CSC 114 Digital Evidence & Computer Crime
EEE 142 Energy Systems Control and Optimization	CSC 115 Internet Security and Law
EEE 144 Electric Power Distribution	CSC 138 Computer Networks
EEE 131 Electromechanical Laboratory	CSC 153 Computer Forensics Principles and Practices
EEE 135 Renewable Electrical Energy Sources and Grid Integration	CSC 154 Computer Attacks & Countermeasures
EEE 136 Smart Electric Power Grid	CSC 250 Computer Security & Privacy
EEE 143 Power System Laboratory	CSC 252 Cryptography
EEE 192 Electrical Power Design Project	CSC 253 Computer Forensics
EEE 255 Introduction to Future Power Systems and Smart Grids	CSC 254 Network Security
ME 156 Heating and Air Conditioning Systems	ME 159 High Efficiency HVAC
ME 157 Solar Energy Engineering	ME 154 Alternative Energy Systems



California Smart Grid Center



Net Zero Energy Commercial Buildings by 2030

Net Zero Energy Homes by 2020





Power Engineering Society and Industry

The Power Engineering Society
 In Association With
 IEEE Proudly Present  **IEEE**

“Industry Here For You (IHFY)”
...A very informative event that will give all engineering students a chance to network with leaders in the electrical / electronics industry. Meet and greet with their representatives and learn about career opportunities!!!

- Feb 18, 2009 - 12 noon until 1 pm
- California Suite 3rd floor of the Union Bldg
- Pizza will be served

Companies attending:



CSUS Power Engineering Society . . . check us out at <http://www.csus.edu/org/pes>
 CSUS IEEE . . . check us out at <http://www.ecs.csus.edu/students/ieee/>

Welcome To CSUS PES Event...
“Industry Here For You”
 February 12, 2008

Guest Speakers:



Organized By:
 California State University, Sacramento
POWER ENGINEERING SOCIETY
<http://www.csus.edu/org/pes/>

Sponsored By:
 **SACRAMENTO STATE**
 Career Center

Sacramento CleanTech Showcase



Save the date!

Sacramento
sarta  CleanStart **CleanTech Showcase**

Don't be left out!

Join us for the Third Annual
Sacramento CleanTech Showcase
Friday • October 16th, 2009 • 10:00 am to 5:00 pm
Sacramento State, University Union

- **EXHIBITS:** See the Capitol region's Clean Tech rising stars in action.
- **NETWORKING** with colleagues, business partners, customers and policy makers.
- **SPEAKERS AND PANELS:** Learn about the latest trends, opportunities and resources in Clean Tech.

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For more information: info@CleanStart.org or 916.566.1276
See us on the web: www.CleanStart.org

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sacramento region
CLEAN ENERGY SHOWCASE
venture expo

Friday • 9:00 am to 6:30 pm

September 26th, 2008
Sacramento State University Union Ballroom

Sponsored by:



SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT
The Power To Do More.®



Power Engineering Laboratory





Students working in Transformer Simulation Laboratory



Developing a Diverse and Talented Green Engineering Workforce

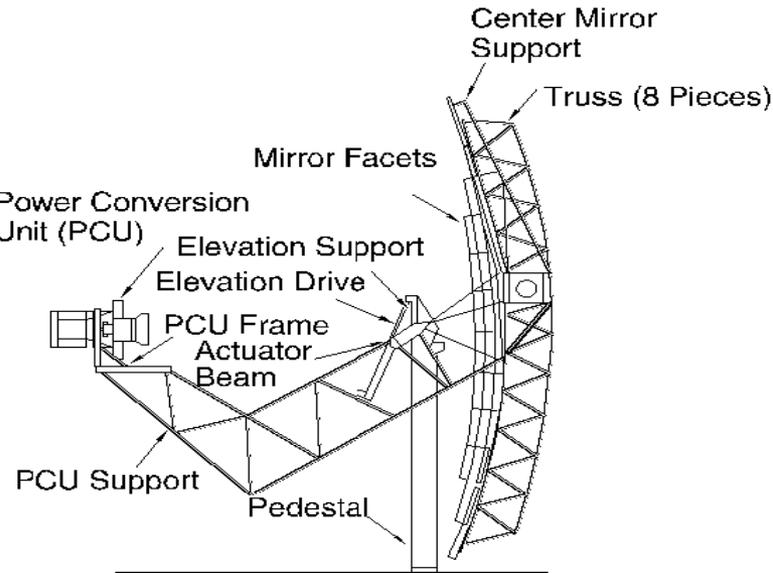
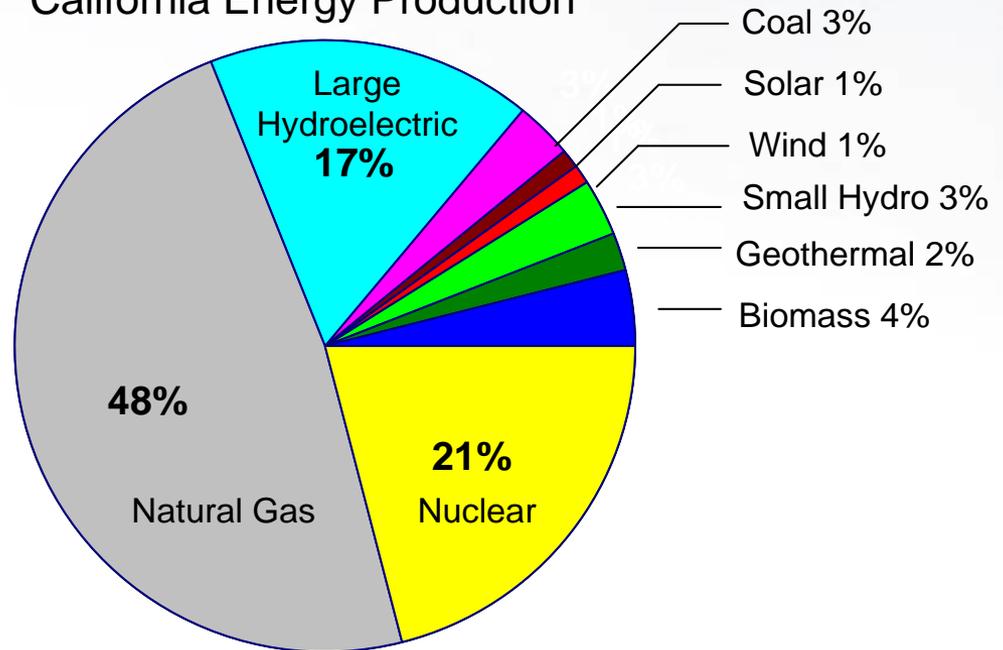




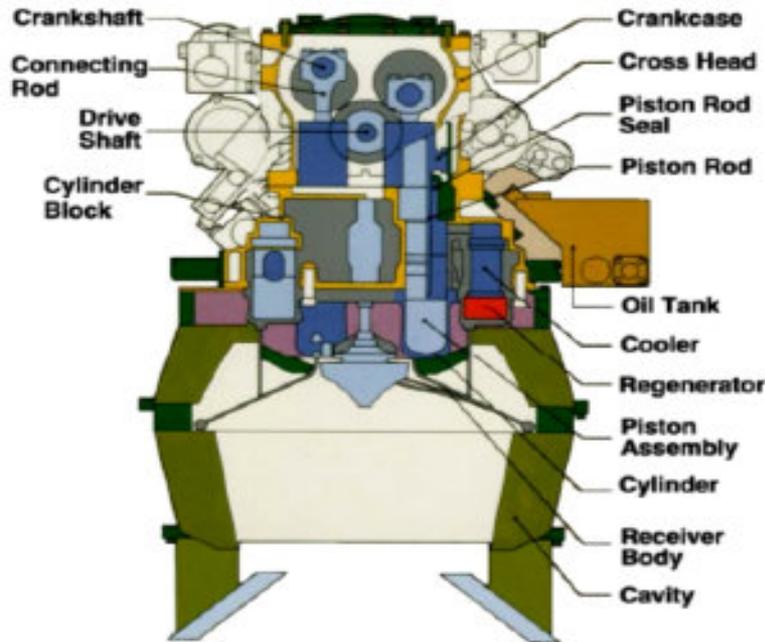
Stirling Solar Dish Generator

- Efficiency rating double any other solar project
- Generation costs in 10 – 15 cent/kW-H range
- Kockums Submarine Sterling 4-95 engine
- Produces zero emissions
- 1800 rpm – 480 volt – 60Hz – 25 kW output
- SCE 500 MW – 20,000 dish array in 2009
- SDG&E 300 MW – 1200 dish array in 2010

California Energy Production



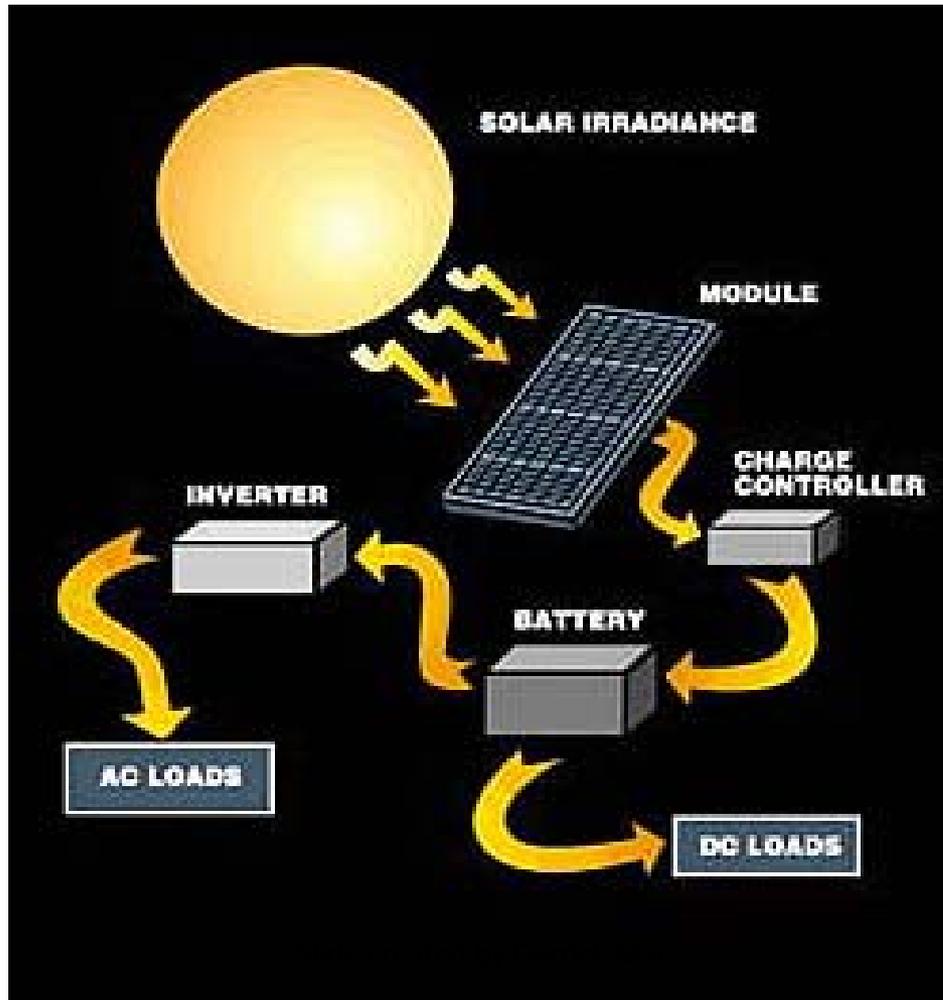
Section



Senior Project Fall 2007

Nick Martin – Solar Positioning
Anthony Le Master – Solar Tracking
Brian Wright – Charge Control
Kevin Wingart – Power Management

Portable Solar Power Station



Project Goals

- Portable grid free solar power source for small consumer electronics device (s)
- Maximize collection, storage, and efficiency of the sun's energy
- Self contained, fully automated system with no need for user input

Functional Description

Theory of Operation

- Design and build solar powered generator
- Solar power stored in batteries for inversion process
- Battery power used to supply 120 VAC/ 60Hz standard outlet power
- Maximized collection and efficiency through tracking

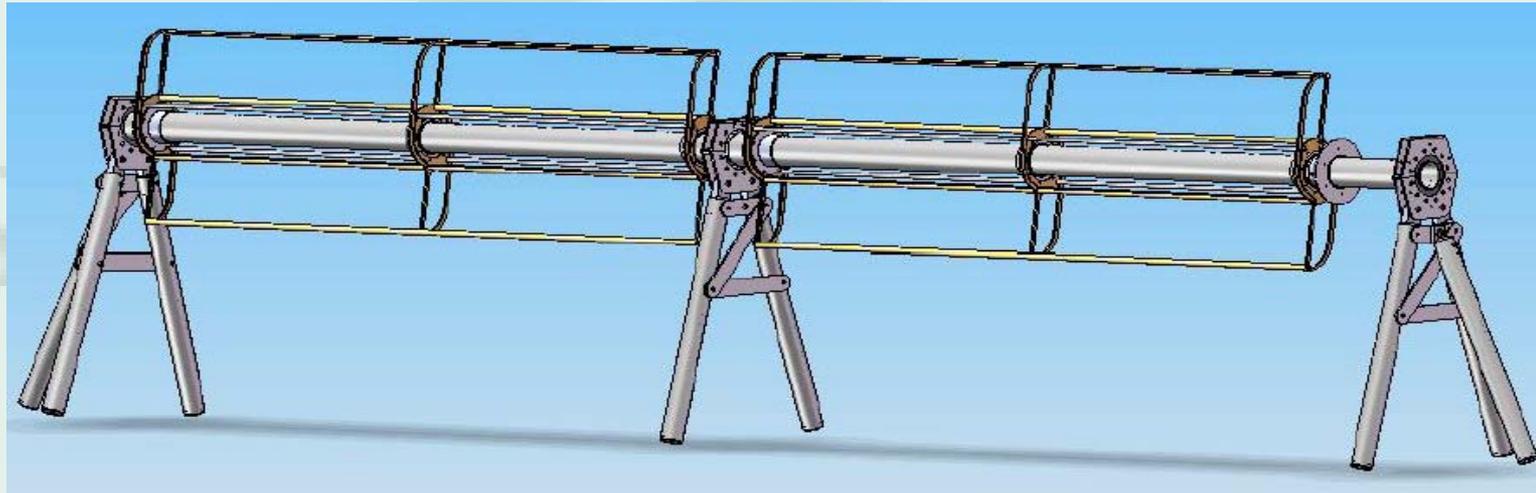


Wind Energy Projects



Senior Design Project

- Mariah Wind Power
 - Roof integrated
 - Savonius
 - Vibrations
 - Stress analysis
 - Bearing selection



“California, because of its unique position, is on the cutting edge of what is to come. What we’re doing is changing the dynamic, preparing the way and encouraging the future.”

Gov. Arnold Schwarzenegger



Can we help create the **Smart Grid?**

Can we help to develop future generations of Engineers and Scientists who will help us combat Global Warming?



YES WE CAN

