Clean Energy News

At the USF UNIVERSITY OF SOUTH FLORIDA

NUMBER 4 SPRING 2009

CERC

KEY CERC RESEARCH

Photovoltaic Thin Film

Photocatalytic Detoxification and Disinfection

Solar Thermal Power

Hydrogen Production and Storage

Combined Power/ Cooling Thermodynamic Cycle

Rectenna Solar Energy Conversion

Biomass and Biofuels

Carbon Capture and Sequestration

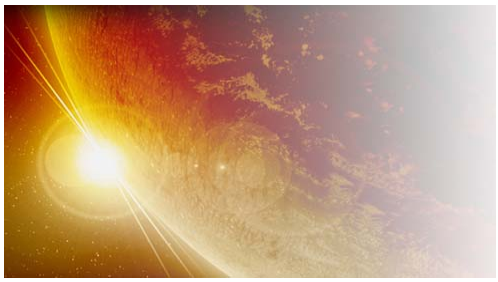
INSIDE THIS ISSUE:

Florida Recovery in the Sunshine

Florida Governor Charlie Crist continues to support renewable energy and Florida government in the sunshine. In May 2009, Governor Crist unveiled "Florida Recovery" as a resource to assist Floridians with reviewing State and local government's use of the federal new stimulus funds (www.flarecovery.com).

Governor Crist has proposed using $4.7 billion of the $14 billion 2009 federal stimulus dollars allotted to Florida, to aid the State this current fiscal year. An outstanding highlight from Florida appropriations of the stimulus dollars are the $126 million allowed for promoting energy efficiency. The State University System's Florida Energy Systems Consortium (FESC), created by the 2008 State of Florida Energy Bill, will promote collaboration among energy experts across all the state universities.

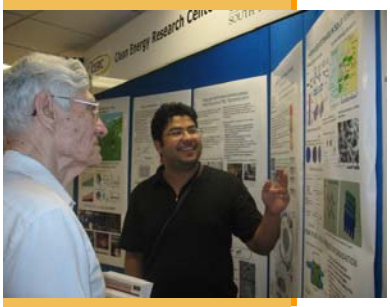
Other areas receiving stimulus dollars include supporting children and families with critical health and human service needs, improving infrastructure, creating jobs and enhance Florida's overall workforce. Managing the receipt of Florida's share of the stimulus dollars is the Florida Office of Economic Recovery. The office's openness and transparency will empower the people of Florida to hold government accountable for their use of taxpayer dollars, and serves as an example of Crist's staunch support of the Florida Sunshine Laws.



Federal Stimulus for Clean Energy

- $26.86 billion investment in energy efficiency will help to kick-start the economy by creating more than half a million jobs and saving hundreds of billion of dollars in wasted energy costs.
- $18.95 billion for green transportation, including public transit and high-speed rail projects, will put more than 300,000 people to work building the transportation solutions we need to cut greenhouse gas pollution.
- $32.8 billion for clean energy projects to help significantly reduce global warming pollution and cut down on pollution to rivers, lakes, and coastal waters, making them safe for drinking water, swimming, and fishing.

Engineering Expo '09



CERC scientist Burton Krakow and graduate student Gokmen Demirkaya discuss current CERC research.

February saw large numbers of middle and high school students attending the Engineering Expo, an annual USF event celebrating National Engineers week. The Expo provides an opportunity for middle school and high school students to interact with USF College of Engineering researchers and area engineering firms.

The Expo includes contests exhibits and shows on the magic of engineering, physics and chemistry. The "Laser Light Show," the "Chemical Magic Show," "Physics: The Science of Everything," and the "Electrathon Car Races," were a lot of fun for everyone.

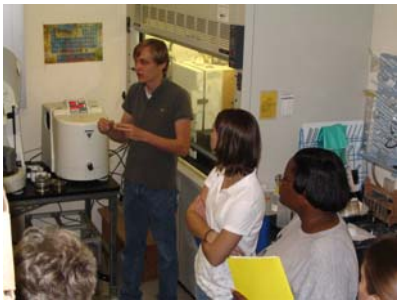
CERC displayed current research in photocatalytic detoxification and disinfection, and hydrogen fuel cells, among others.

CERC graduate students Michael Celestin and Huijuan Chen explain CERC research to middle schoolers.

"The sunshine that strikes American roads each year contains more energy than all the fossil fuels used by the entire world."
(Denis Hayes, International Chair of Earth Day)

STARS Going Green

In March, CERC participated in the "STARS Going Green Workshop" which enabled elementary school teachers to tour our hydrogen storage laboratories. STARS, which stands for Student Teacher and Resources in Science Program, annually hosts Summer Camps for elementary and middle school children to tour USF laboratories. CERC regularly participates in the STARS Summer Camps.



CERC graduate student Michael Neimann talks to elementary school

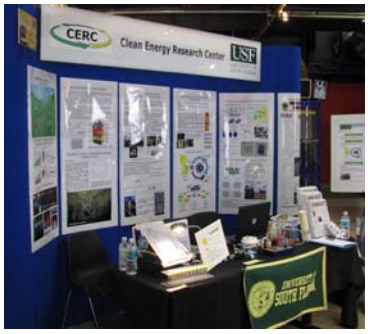
Clean Energy Seminars

Jiuhua Chen of FIU, spoke on the influence of pressure on ammonia borane.

In February, Dr. Jiuhua Chen of the Center for the Study of Extreme Conditions at Florida International University presented "Influence of Pressure on Ammonia Borane and other Boron Related Materials." Ammonia borane (H_3BNH_3) is one of the potential candidates for hydrogen storage materials with the highest gravimetric capacity.

In April, Jon A. Schuller of the Geballe Lab for Advanced Materials at Stanford University presented "Dielectric Optical Antenna Emitters and Metamaterials." Optical antennas are critical components in nanophotonics research due to their unparalleled ability to concentrate electromagnetic energy into nanoscale volumes.

Renewable Energy Symposium



Posters graphically display CERC's ongoing research.

In March, CERC displayed our research at the Second Annual Sunshine State Renewable Energy Expo and Symposium in Tallahassee.

CERC's informative display booth drew a lot of interest from attendees who posed questions ranging from "how is hydrogen stored in metal hydrides;" "what is photocatalysis and its applications;" "what are the advantages of producing hydrogen by H_2S electrolysis;" and, "how do fuel cells work?"

The symposium is a forum for the public, government and industry to learn more about Florida's renewable energy projects, its promise for financial opportunities and a chance to network with policy makers, companies, university research groups and the media.

Renewable energy generated from the sun, biomass and ocean currents can supply a great portion of Florida's energy needs.

USF FESC Kick-Off Meeting

FESC Florida Energy Systems Consortium

The Florida Energy Systems Consortium (FESC) was created in the energy bill signed into law by Gov. Charlie Crist in June 2008 in Miami. As a founding member of FESC, the CERC hosted the April Kick-Off Meeting of USF researchers involved with FESC projects. Strategic FESC research thrusts include understanding Florida's energy systems by:

- *Enhancing Energy Efficiency and Conservation*
- *Developing Florida's Biomass Resources*
- *Harnessing Florida's Solar Resources*
- *Ensuring Nuclear Energy & Carbon Constrained Technologies for Electric Power in Florida*
- *Exploiting Florida's Ocean and Wind Energy Resources*
- *Securing our Energy Storage and Delivery Infrastructure*

Presentations were given by USF faculty Shekhar Bhansali, Tapas Das, Richard Gilbert, Yogi Goswami, Babu Joseph, Don Morel, Stan Russell, Lee Stefanakos, and Mark Stewart. USF Vice President for Research Karen Holbrook also attended with Engineering Dean and Assoc. Dean John Wiencek and Tom Weller and FESC Director Tim Anderson and Assoc. Directors Canan Balaban and Eric Sanders.

Activities and Honors

- In February CERC director Lee Stefanakos participated in the Spain-Florida Business Conference, hosted by H.M. King of Spain, Juan Carlos I, at the Four Seasons Hotel in Miami.
- In March CERC co-director Yogi Goswami met with Senator-FL Bill Nelson and Congresswoman-FL Cathy Castor, as well as officials at the National Academy of Engineers and Department of Energy.
- In 2009, Tapas Das, Assoc. Provost and Prof. of Industrial & Mgmnt. Systems Engineering started a two-year term as Chair of the Energy, Natural Resources and Environment Section of the Institute of Operations Research and Management Sciences (INFORMS).

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Clean Energy is Green Energy

The Clean Energy Research Center's mission is scientific research, technical and infrastructure development and information transfer. CERC is involved in fundamental investigations into new environmentally clean energy sources and systems: hydrogen, fuels cells, solar energy and energy conversion and biomass — Energy sources that meet the needs of the public and industry.

We're on the web! http://cerc.eng.usf.edu/

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Education without Borders

USF UNIVERSITY OF SOUTH FLORIDA

A significant step toward global education is the gathering of the world's top college students at "Education without Borders 2009," a biennial international student conference held in Dubai, United Arab Emirates, in April.

Sixteen students from the USF received the honor of participating in the conference. They were part a delegation of 1,000 students representing 120 nations and 300 universalities from around the world.

CERC's graduate student Huijuan Chen was one of the USF students selected to attend the conference which focused on a broad theme of "Innovative Solutions to Global Challenges."

Joined by USF Assoc. Vice President for Global Strategies, Linda Whiteford (center), students gathered prior to their departure to Dubai. CERC's Huijuan Chen is pictured 2nd from the right in the second row.

USF anthropology master's student Aki Nakanishi's paper *"Facilitating Youth Participatory Action Research: Reflections, Strategies and Applications"* was awarded one of eight prizes for student presenters. She received her award from Sheikh Nahayan Mabarak Al Nahayan, UAE Minister of Higher Education, and Princess Astrid of Belgium.