



FLORIDA SOLAR ENERGY CENTER®

Creating Energy Independence



***Dr. James Fenton, Director
November 21, 2013***

A Research Institute of the University of Central Florida



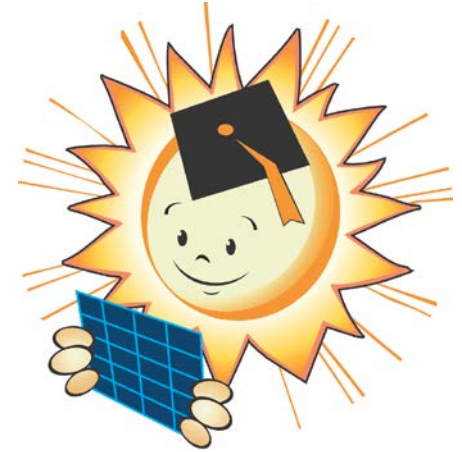
UCF's FSEC Leads in Energy

- U.S. DOE
 - Photovoltaic Manufacturing Consortium (SEMATECH)
 - Building America
 - PV Regional Test Center
 - Southeast Solar Training Network
 - Central Florida Clean Cities (Clean Transportation)
 - FEEDER Consortium
 - Go SOLAR
- U.S. DOT
 - University Electrical Vehicle Transportation Center



K-12 Education Update

- EnergyWhiz Olympics
 - Sat., May 3, 2014
 - New event “Critter Comfort Cottage”
 - First regional event in Gainesville, April 2014
- Solar workshops for teachers
 - Duke, TECO, FPL
- JSS car-building workshop and solar cooker workshop at FSEC



UCF/FSEC Partnerships

[November 07, 2013]

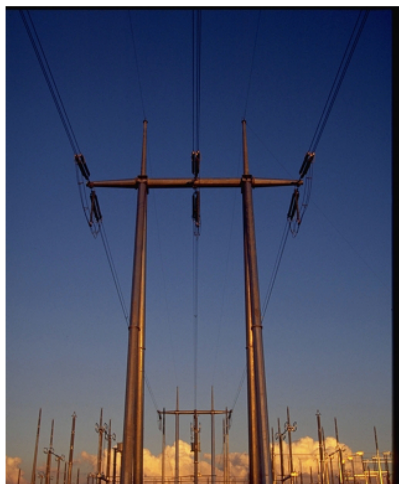
FEEDER



UCF to Lead Effort in Advancing U.S. Renewable Energy and Electric Grid

ORLANDO, Fla. --(Business Wire)--

The University of Central Florida (UCF) has been awarded \$3.2 million to lead one of 4 national consortia to develop distributed technologies, to increase engineering capacity and traditional sources of electricity to renewables such as solar and



"This multi-university demonstration project will be one of the most significant projects of the Center for Science and Technology."

The team includes UCF's Florida Solar Energy Center, the U.S. Dept. of Energy's Office of Energy Efficiency and Renewable Energy (EERE), and the U.S. Dept. of Transportation's Office of Energy Efficiency and Renewable Energy (EERE).

The FEEDER initiative is an accelerated effort to advance the electric grid.



EVTC

DOT Selects UCF to Develop 'Smart Grid' for Plug-in Electric Vehicles



As interest in electric vehicles continues to keep the automotive industry charged, the nation is strategizing how to best integrate plug-in vehicles with its electrical grid and highways. Now, with funding from the U.S. Department of Transportation for the creation of the first transportation center with a focus on electric vehicles, the **University of Central Florida** will help chart that course in Florida.

The Electric Vehicle Transportation Center operated by UCF's Florida Solar Energy Center in Cocoa is a newly funded, four-year, \$9 million research effort to help develop the nation's electric-vehicle transportation network. Research conducted by the center will help transportation planners prepare our nation's highways for the influx of plug-in electric vehicles (PEV), while

Go Solar

Posted by EyesOnNews.com on November 12, 2013 at 9:33 am

Go SOLAR Receives Dept of Energy Award to Increase Use of Solar Energy

For EyesOnNews.com, Nov 12, 2013 - BROWARD COUNTY FLA. -The U.S. Department of Energy (DOE) has awarded the Go SOLAR – Florida team a \$1.6 million SunShot Initiative Rooftop Solar Challenge II competitive award to make it easier for Floridians to install solar panels on their roofs. Go SOLAR Florida is one of only 8 recipients nationwide of a SunShot Initiative award. The purpose of the award is to increase the use of and access to solar energy for state's residents and businesses by reducing market barriers, lowering installation costs and providing access to financing options over the next two

The Go SOLAR Florida team is a partnership of Florida counties, cities, the Florida Solar Energy Center and the University of Central Florida representing approximately 4 million Floridians. Six Florida counties (Alachua, Broward, Miami-Dade, Monroe, Orange and St. Lucie), six Florida County municipalities (Cooper City, Hollywood, Lauderdale Lakes, Pompano Beach, Sunrise and Wilton Manors) and Sarasota County.

The SunShot Initiative program empowers teams to undertake initiatives that make it easier for Americans to go solar, reducing "plug-in" costs by streamlining permitting and zoning codes, improving standards for connecting solar panels to the grid, and increasing access to financing.





Electric Vehicle Transportation Center

- FSEC — Lead
- UCF: Department of Civil Engineering
- UCF: Department of Electrical Engineering
- University of Hawaii
- Tuskegee University



Goals

- Create Center that will plan and optimize both a “Smart Grid” and a “Smart Transportation Network”
- Develop future where PEVs can both use and supply power to the grid
- Transform the U.S transportation system into one that uses electricity





Electric Vehicle Transportation Center

Tasks — Year 1

- Form partnerships
- Assess current state of the art
- Develop EV data
- Assess EV barriers/issues/actions
- Model EV systems
- Educate students



FSEC Funding Challenges

- Last year contracts and grants were about \$8M, over the past five years they were typically around \$10M
- In-house funds for payroll have dropped from a high of \$3.5M to \$3M
- FSEC payroll was \$10M two years ago it is now dropped to \$8M (16 people were laid off)
- Funding from DOE typically over \$6M a year is hard to come by and most projects require matching funds (PVMC \$5M DOE with \$5.8M Match required; **DOT EVTC \$6M DOT with \$3M Match required**, PV RTC \$2M DOE with industry expected to provide 2MW of PV)
- Building efficiency research was and is the best in the nation; DOE dropped from 15 total teams done to 5 and even then we took a 30% cut in funds.
- **FSEC must continue to pursue DOE funds, but also funds from Defense, Transportation, Utilities and Industry!**



FSEC Research Area Challenges

- Demand for Solar Thermal Testing has dropped substantially
- PV Industry not yet able to fully populate 2 MW UCF test site in Orlando
- FSEC is redirecting Faculty to probable funding areas?
 - Solar Thermal → PV testing, EVTC
 - Fuel Cells → PVMC , flow batteries, EVTC
 - Hydrogen Storage & Generation → Biomass drop in fuel, EVTC
- **FSEC must not only align its research areas with perceived DOE research needs, but also with Defense, Transportation, Utility & Industrial needs**



FSEC Opportunities

- Florida is only state with more than 100, 10-kW photovoltaic systems with battery back-up on emergency shelter schools.
 - Upgrade K-12 Educational Data Gathering Systems to Research Quality Data Acquisition for use by FEEDER Consortium
 - Add state-of-the-art car chargers
 - Funds, equipment and research personnel provided by Utilities, Car Charger and Inverter Manufacturers



FSEC Opportunities

- *Establish* an Air Force Energy Center at Eglin AFB in partnership with UCF's FSEC
 - As available funds for the Air Force mission, facilities, and installation are reduced, energy expenditures present the only means to maintain a stable funding base for critical AF programs and activities
 - The Center of Excellence will identify cost-saving energy solutions through Air Force personnel and private and public partnerships.
 - Initial program areas will concentrate on personnel training, energy-efficient facilities, renewable energy power, electric vehicles and “drop-in_ military fuels.



DIVISION UPDATES



Advanced Energy Research Update

- **EVTC (Electric Vehicle Transportation Center)**
A TIER 1 UTC funded by US DOT at \$1.5M/yr level for 4 years
- **KIST Hydrogen Liquefaction System**
A 2-year, \$280k ongoing activity funded by the Korea Institute of Science and Technology (KIST)
- **An Energy-Dense Power Generator for UUVs**
A 2-year, \$135k/yr ongoing research activity funded by the Office of Naval Research
- **Composite Materials for Space Radiation Shielding Applications**
An ongoing, \$40k R&D project funded by the Florida Space Institute
- **Solar Hydrid Photo-thermochemical Water-splitting Cycle with in-situ Thermal Storage**
A 3-year, \$120K/yr project funded by Texas AM University



BUILDINGS RESEARCH UPDATE



Building Code and Ratings

- Florida has moved towards adopting IECC with fewer changes
- Software – open competition
- Energy Ratings – new law passed allows ratings by four organizations
 - Residential Energy Services Network (RESNET)
 - Commercial Energy Services Network (COMNET)
 - Building Performance Institute (BPI)
 - Florida Solar Energy Center (FSEC)



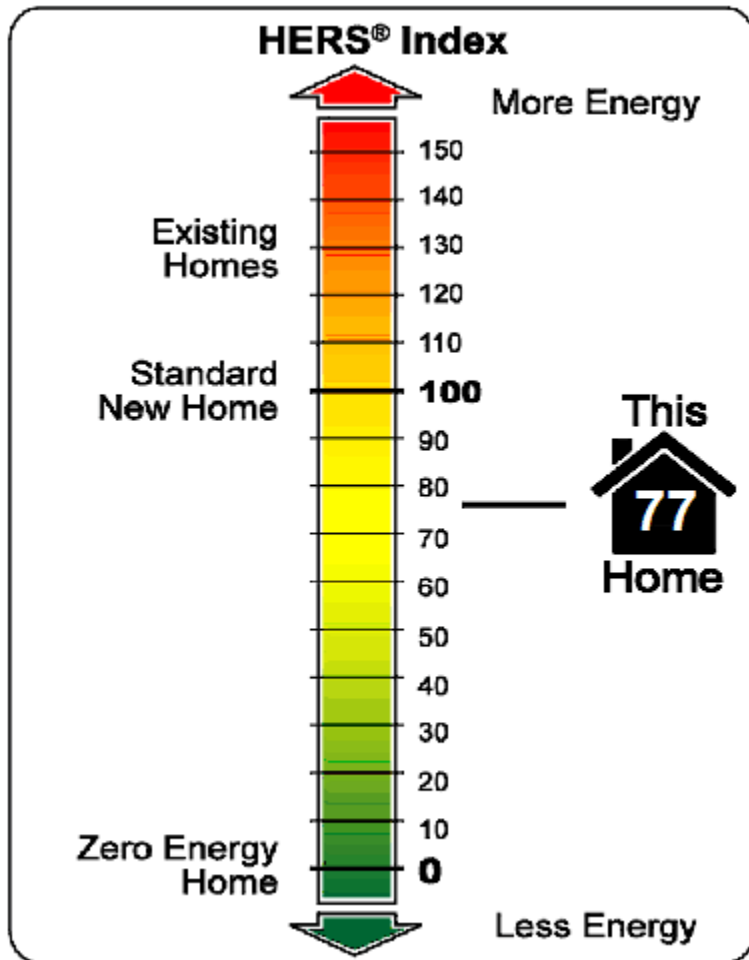
EnergyGauge USA



- Energy Code Compliance
 - IECC 2006 – Chapter 404
 - IECC 2009
 - IECC 2012
 - Florida
- Home Energy Ratings System (HERS) Ratings
 - DOE Builders Challenge
 - Energy Star Homes
- IRS 2013 Tax Deductions
- ACCA Manual J System Sizing
- Detailed Solar Water Heating
- Photovoltaic System Performance
- Fully Accredited (IRS, DOE, RESNET)
- DOE2 hourly Building Simulation



Home Energy Ratings



- Proposed as alternative method of code compliance
- Supported by “Leading Builders of America”
- Many builders committed to using ratings for all homes
- Phoenix allows it as an alternative code
- Energy Star, DOE Challenge, Green Home programs use ratings



Building America Research

- New Reports
 - SEER 21 vs. SEER 13
 - Hot Water Lab Rotation 3
 - Winter and Summer Infiltration/Ventilation Reports
 - 70 Retrofit House Field Study
 - Business Models for Deep Energy Retrofits
 - Multifamily Homes
- BA-PIRC.org



FPL Research

- Building America co-funding for SEER 21 and phased deep retrofits
- Condenser misting for supermarkets
- Solar heat pump



ARRA Research

- VRF System Research – actual performance in field like conditions – Rich Raustad
- Evaporative Condenser with High Efficiency Systems – 30% improvement – John Sherwin, Danny Parker, Rich Raustad



Training

- New courses –
Combustion safety,
Weatherization QCI
- 81 days of training
scheduled for
Jan –June 2014
- Newsletter
- Applied for IREC
Weatherization Training
Center Certification



SOLAR TECHNOLOGIES AND SOLAR SYSTEMS UPDATE





<http://www.uspvmc.org/>



<http://pvrtc.org/>



Solar Training

- FSEC PV Installers Workshop
 - 49 participants since January
- SSTN System Design and Commissioning Course
 - 14 instructors
- Code Officials Training
 - 474 attendees
- 2013 TOTAL: **537 participants**



Recent Awards

- OUC Solar Technical Services
 - Inspections of PV systems in their service area
 - Assistance with large-scale PV deployment projects
 - Presentations to utility employees and solar contractors
 - Grid integration analysis related to implementation of Smart Grid technologies
- SunShot Challenge II: Broward County Award (FSEC sub-recipient)
 - Assist with the streamlined permitting, building official training and solar rights educational tasks



- ▶ [Broward's Sustainability Leadership](#)
- ▶ [Contact Us](#)
- ▶ [Educational Resources](#)
- ▶ [Financing Options](#)
- ▶ [FPL Applications and Rebates](#)
- ▶ [Frequently Asked Questions \(FAQs\)](#)
- ▶ [Go SOLAR Committees](#)
- ▶ [Go SOLAR Events](#)
- ▶ [News & Videos](#)
- ▶ [Participating Cities](#)
- ▶ [Partner Resources](#)
- ▶ [Solar Customer Assistance](#)
- ▶ [Solar Rights In Florida](#)
- ▶ [Status Updates](#)
- ▶ [Training](#)
- ▶ [Phase 2: Rooftop Solar Challenge](#)
- ▶ [Call for Presentations](#)

Welcome to Go SOLAR Broward Rooftop Solar Challenge



Go SOLAR Fest To Be Held June 6-7, 2014



Broward County Environmental Protection and Growth Management Department will host the second annual Go SOLAR Fest, June 6-7, 2014 at the Greater Fort Lauderdale/Broward County Convention Center, in Fort Lauderdale. The event will feature the latest information on alternative and renewable energy. Don't miss it! More...



You're just a click away from your solar permit, the Go SOLAR Online Permitting System is Now Live!

Imagine a process that currently takes weeks to accomplish that is now reduced to a few clicks of your mouse button. Imagine also that the system that you're utilizing is unique to Broward County and the entire county. The Go SOLAR Online Permitting System is a unique accomplishment made possible by the Go SOLAR Broward Rooftop Solar Challenge. This is a U.S. Department of Energy grant-funded program that makes it easier for Broward County residents and businesses to convert to solar energy by reducing the cost and wait time associated with the permitting process for installing photovoltaic (PV) rooftop solar systems.



Online Permitting

Now Online!

Resources

- ▶ [Broward Solar](#)
- ▶ [Rooftop Challenge Committees](#)
- ▶ [Rooftop Solar Challenge](#)
- ▶ [Department of Energy](#)
- ▶ [Participating Cities](#)
- ▶ [Green Incentives & Rebates](#)
- ▶ [Florida Building Code](#)

Foundations for Engineering Education for Distributed Energy Resources

The FEEDER GEARED-Up Team

6,000
Students:
Power &
Energy

100,000
Utility
Employees

7 Universities



8 Utilities



FEEDER Consortium

2 National Labs



Supporting Industries



Test Beds,
Research,
Collaborations

500,000
Industrial
Employees

Program Update



- Leading statewide presence



SAVE THE DATE



Friday, November 15, 2013
10 a.m. – 2:00 p.m.

Florida Solar Energy Center
1679 Clearlake Road | Cocoa, FL 32922

There is no fee but registration will be required. Stay tuned for more details.
Contact: Colleen Kettles | (321) 638-1004 | ckettles@fsec.ucf.edu