



FLORIDA SOLAR ENERGY CENTER

Creating Energy Independence Since 1975

UCF's Florida Energy Systems Consortium (FESC)

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September 2008

A Research Institute of the University of Central Florida





HB 7135: 1004.648 FESC

- ❖ FESC created *to promote collaboration among experts in the SUS for the purposes of sharing energy-related expertise and assisting in the development and implementation of a comprehensive, long-term, environmentally compatible, sustainable, and efficient energy strategic plan for the state.*
- ❖ The consortium shall focus on the research and development of innovative energy systems that will lead to alternative energy strategies, improved energy efficiencies, and expanded economic development for the state.



Unprecedented Commitment by UCF

Priority 1: Solar Energy & Energy Efficiency

- ❖ UCF 4 Endowed Faculty
 - At least 3 in PV
 - 1 alt fuels or fuel cells
- ❖ UCF Provides 4 permanent lines
 - 4 Endowments initiated (Future Industry)
 - Equipment Start-Up Packages (~\$800K each)



Consortium Members

1. University of Florida.
2. Florida State University.
3. Florida Agricultural and Mechanical University.
4. University of South Florida.
5. Florida Atlantic University.
6. University of West Florida.
7. University of Central Florida.
8. University of North Florida.
9. Florida International University.
10. Florida Gulf Coast University.
11. New College of Florida.



FESC Purpose and Vision

- ❖ Purpose: *to promote collaboration among experts in the State University System for the purposes of sharing energy-related expertise and assisting in the development and implementation of a comprehensive, long-term, environmentally compatible, sustainable, and efficient energy strategic plan for the state*
- ❖ Vision: *World leader in energy research, education, technology, and energy systems analysis*

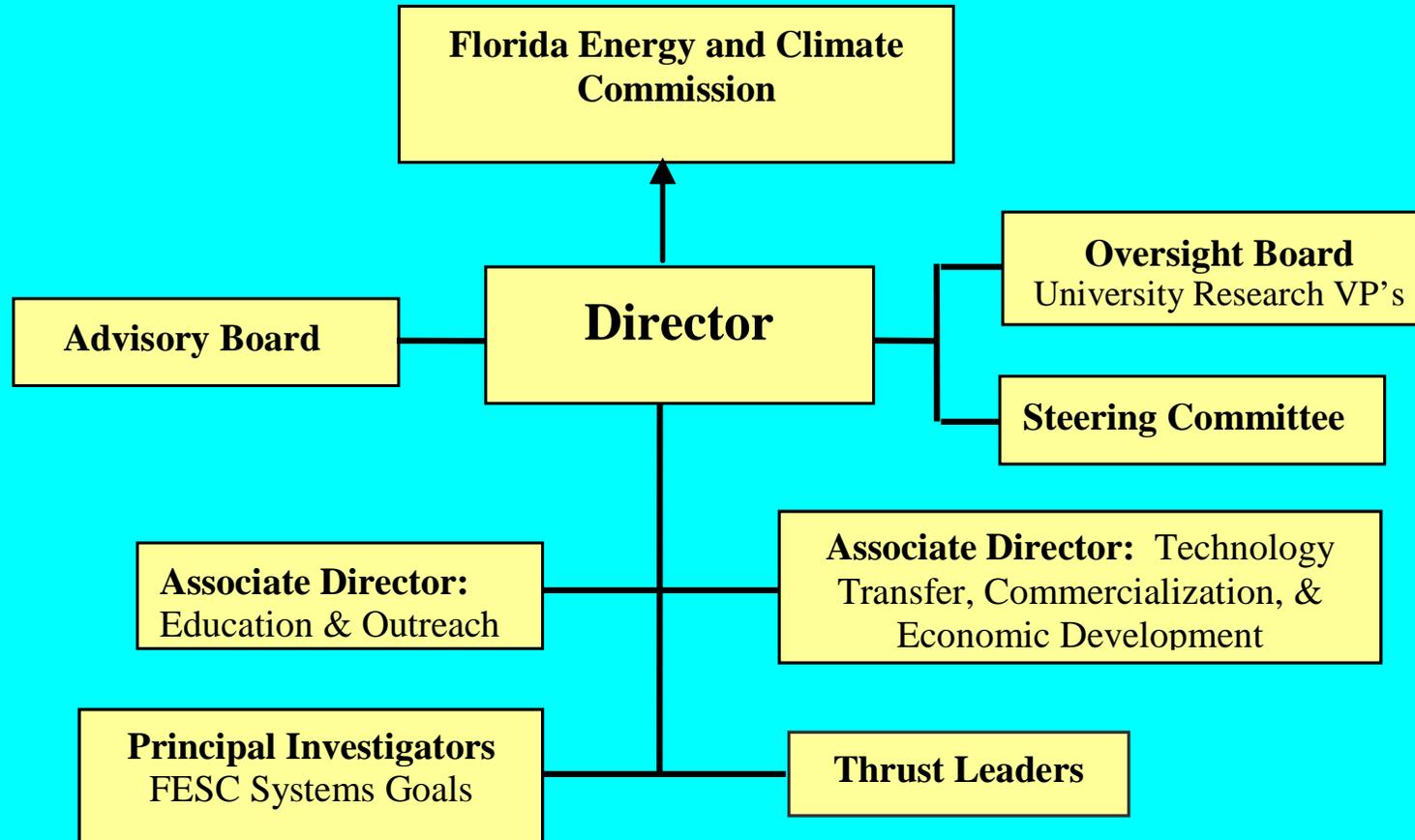


FESC Goal and Thrust Areas

- ❖ *Goal: Become a world leader in energy research, education, technology, and energy systems analysis*
- ❖ *Thrust Areas:*
 - *Developing Florida's Biomass Resources*
 - *Harnessing Florida's Solar Resources*
 - *Ensuring Nuclear Energy & Carbon Constrained Technologies for Electric Power*
 - *Enhancing Energy Efficiency and Conservation*
 - *Securing our Energy Delivery Infrastructure*
 - *Energy Systems and their Environmental and Economic Impacts – overarching*



FESC Management Plan





The Florida Energy and Climate Commission

- ❖ 9 members appointed by the Governor (7), the Commissioner of Agriculture (1), and the Chief Financial Officer (1)
- ❖ Created within Executive Office of Governor
- ❖ Intent is to:
 - promote management of energy problems
 - centralize energy coordination responsibilities
 - pinpoint responsibility for conducting energy programs
 - ensure accountability for implementation of state energy policy



Oversight Board

- ❖ The oversight board consists of the Vice President for Research or other appropriate representative appointed by the university president of each member of the consortium (11 State Universities).
- ❖ Responsible for the technical performance and financial management of the consortium



Steering Committee

❖ Role

- Provides guidance on vision and direction to the Director
- Facilitates communication with each member university
- Recommends future efforts of FESC
- conducts *comprehensive performance evaluation and accountability measurement and assessment.*

❖ Identify candidates for positions

- Steering Committee (7 members: FAU, FIU, FSU, UCF, UF, USF and FECC)



Advisory Board

❖ Role

- facilitates collaboration with industry and other affected parties
- ensures input from the external stakeholders

❖ Two members classifications

- *Affiliated* (significant financial contributor)
- *Associated Members* (significant technical contributor)



Associate Directors

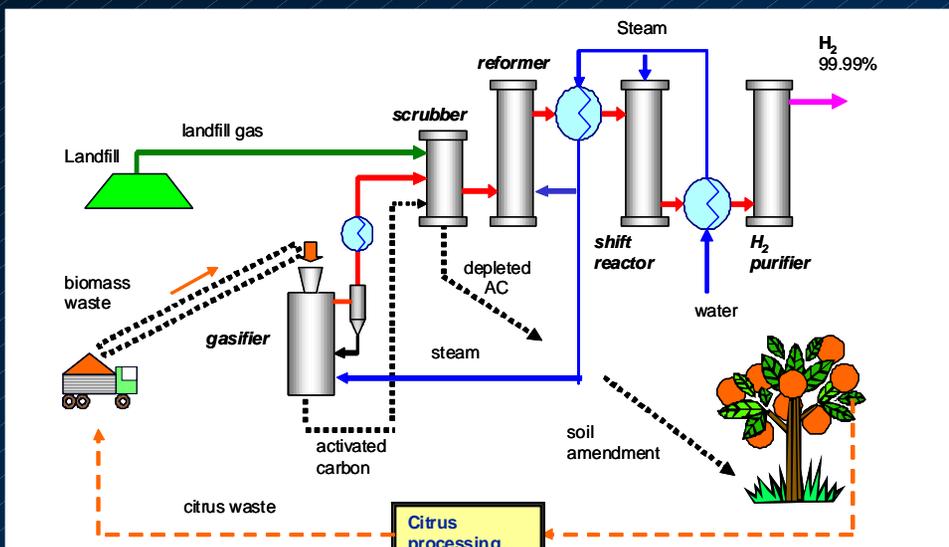
- ❖ Associate Director for Technology Transfer, Commercialization, and Economic Development: *oversees external partnerships and works to maximize impact on the Florida energy market*
- ❖ Associate Director for Outreach and Education: *coordinates activities in energy education, the preparation of an educated workforce, and outreach to both the public and private sectors*



Task 1: An Integrated Florida Bio-Energy Industry

PIs: Lonnie Ingram (UF), William Lear (UF), Ali Raissi (UCF),
Anjane Krothapalli (FSU), Babu Joseph (USF)

Deliverable: A Pilot-Scale Plant that integrates hydrogen and synthetic fuels and/or feedstocks from biomass and solid waste.





Task 2: PV Plug-in Hybrid Vehicle;

PIs: Eric Wachsman (UF), Issa Batarseh (UCF), Jim Fenton (UCF), C. Edrington (FSU), S. Reich (USF)

Deliverables: PV covered parking spot at UCF Orlando and FSEC





Task 3: Solar Thermal Power for Bulk Power and Distributed Generation

PIs: Yogi Goswami (USF), David Hahn (UF), Bob Reedy (UCF), Anjane Krothapali (FSU)

Deliverables: Two Modules of Solar Thermal Electric. Expanded Solar Thermal Testing Facilities for Domestic Hot Water.





Task 5: Florida Based Low Cost Manufacture of Photovoltaic (PV) Systems

- ❖ **PIs:** Tim Anderson (UF), Bob Reedy (UCF), D. Morel (USF)
- ❖ **Deliverables:** CVD Equipment



Task 6: Advanced PV Device Program

PIs: Bob Reedy (UCF), Neelkanth Dhere (UCF) C. Ferekides (USF)

Deliverables: 3 New Lab Facilities at FSEC; 4 Net Zero Energy Portables at FSEC; PV covered parking spots at UCF Orlando and FSEC w/ plug in hybrids

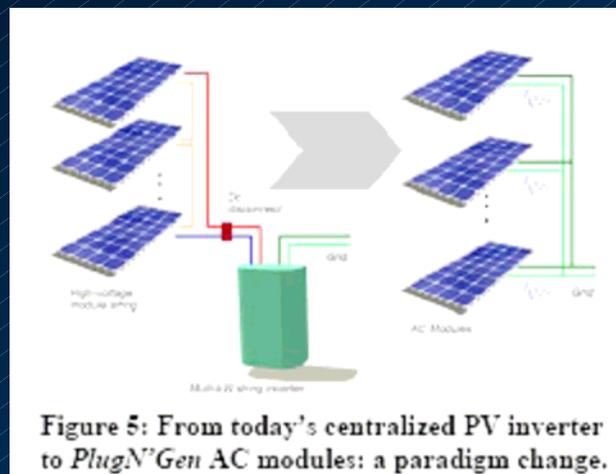




Task 7: PV Energy Conversion and System Integration

PIs: Issa Batarseh (UCF), E. Stefanakos (USF), John Shen (UCF), Jenshan Lin (UF), H. Li (FSU)

Deliverables: PV on Portables with integrated power electronic inverters





Task 8: Integrated PV/Storage and PV/Storage/Lighting Systems

PIs: Issa Batarseh (UCF), John Shen (UCF), Dr. Franky So (UF), E. Stefanakos (USF)

Deliverables: A PV covered parking spot at UCF Orlando with a PV/Storage/Lighting System





Task 9: Solar and Biomass Fuels to Fuel Cell Emergency Power Backup

PIs: Jim Fenton (UCF), Dr. Juan Ordenez (FSU), Y. Goswami (USF)

Deliverables:

5 kW PV/Water Electrolysis/Hydrogen Storage/Fuel Cell Powerplant

PV to Water Electrolysis for H₂ Production for Fuel Cell Research Lab



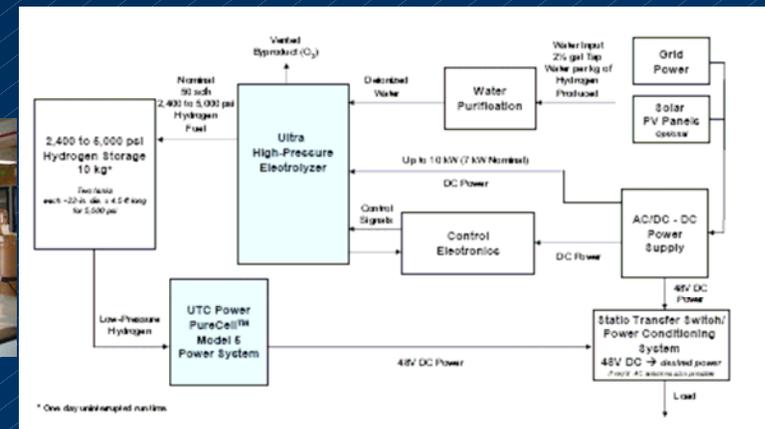
PV at FSEC



UTC Pure Cell Model 5



Fuel Cell Lab at FSEC

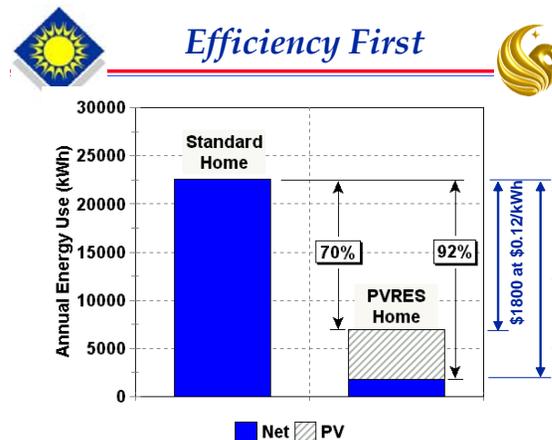




Task 10: Energy Efficient Building Technologies and Zero Energy Homes

PIs: Philip Fairey (UCF), Subrato Chandra (UCF), Dr. James Heaney (UF), J. Ordonez (FSU), Brenton Greska (FSU), S. Russell (USF), Y. Goswami (USF)

Deliverables: 3 Side-by-Side Homes, Energy Efficiency Studies





Task 11: Establishing an Efficient and Reliable Energy Delivery Infrastructure

PIs: David Cartes (FSU), A. Domijan, (USF), Philip Fairey (UCF), Robin Vieira (UCF)

Deliverables: Optimization Study



Task 12: Carbon Capture and Sequestration

PIs: Lonnie Ingram (UF), Ali Raissi (UCF), Nazim Muradov (UCF), M. Stewart (USF)

Deliverables:

