Florida Advisory Council on Climate and Energy (FACCE)

Virtual Meeting Agenda

Tuesday, August 25, 2020

10:00 a.m. – 12:00 p.m.
Welcome and Roll Call

Kelley Smith Burk, FDACS Office of Energy
Overview of Chapter 7. Research, Development, Demonstration, and Deployment from the Florida Energy and Climate Plan

April Groover Combs, FDACS Office of Energy
Presentation on Research, Development, Demonstration, and Deployment

Dr. David Norton, Director of Florida Energy Systems Consortium and Vice President of Research, University of Florida

FACCE Virtual Meeting, Tuesday, August 25, 2020
Florida Energy Systems Consortium Members
Florida Energy Systems Consortium (FESC)

- FESC was created by Florida Statute in 2008 with $38 million in funding from the state

- Purpose: To unite Florida energy experts, including Florida’s 12 universities, so that the state leads in energy research and develops innovative energy systems

- To promote improved energy efficiency, innovative energy technologies, and expanded economic development
FESC – Collaborative Research Project

Southeast Partnership for Advanced Renewables from Carinata (SPARC)

- PI: David Wright, University of Florida
- Total Funding: $14.8 million
- Sponsor: USDA
- Goal: Establish a *Brassica Carinata*-based resilient and sustainable advanced jet fuel and bioproducts supply chain in the Southeast United States
- Link: http://www.sparc-cap.org/
Carinata
Foundations for Engineering Education for Distributed Energy Resources (FEEDER) Consortium

- PI: Dr. Zhihua Qu, UCF
- Total Funding: $3.2 million in 2013 and $1M in 2016
- Partners: FSU, UF, UC San Diego, U of SC, U of Pittsburgh, U of Hawaii, UT at Dallas, and more
- Sponsor: US DOE
- Goal: To develop the engineering capability to accelerate the deployment of distributed renewable energy technologies onto the electric utility grid
- Link: http://www.feeder-center.org/index.php
Foundations for Engineering Education for Distributed Energy Resources (FEEDER) Consortium

12 Universities

- University of Arkansas
- Auburn University
- The Florida State University
- University of Hawaii
- University of Kentucky
- University of Pittsburgh
- San Diego State University
- UC San Diego
- University of South Carolina
- UT Dallas
- UCF
- University of Florida

18 Utility Partners
2 National Labs (NREL and Los Alamos)
10 Supporting Industry Partners
FESC – Collaborative Research Project

Evaluation of Energycane for Bioenergy and Sustainable Agricultural Systems (EC-BioSALTS)

- PI: Hardev Sandhu, UF
- Total Funding: $4 million
- Partners: Argon National Lab, Lanza Tech, Commercial Aviation Alternative Fuels Initiative (CAAFI); Collaborators: USDA-ARS, Tifton, GA, FL Office of Energy, FESC
- Sponsor: US DOE
- Goal: To develop a bioenergy feedstock production system using an advanced energycane cultivar in marginal agricultural lands of the Southeast coastal plains
FESC – Collaborative Research Projects

Enhanced Resistance Pines for Improved Renewable Biofuel and Chemical Production

• PI: Gary Peter, UF
• Total Funding: $992,000
• Sponsor: US DOE
• Goal: To develop slash pine germplasm that contains increased wood terpene content and oleoresin flow to improve resistance to insect pathogens and increases terpene supply
A row of parabolic trough solar collectors
# Technology Commercialization FESC Spin off Companies

<table>
<thead>
<tr>
<th>#</th>
<th>University</th>
<th>Name of Business</th>
<th>Year Formed</th>
<th>Specialty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UCF</td>
<td>Garmor, Inc.</td>
<td>2012</td>
<td>Edge-Functionalized Graphene Oxide</td>
</tr>
<tr>
<td>2</td>
<td>UCF</td>
<td>HybridaSol, LLC</td>
<td>2012</td>
<td>PV-Thermo Electric Hybrid</td>
</tr>
<tr>
<td>3</td>
<td>UCF</td>
<td>Helicon Chemical Co, LLC</td>
<td>2012</td>
<td>Self-cleaning Coating Chemicals</td>
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<tr>
<td>4</td>
<td>UCF</td>
<td>Capacitech Energy, LLC</td>
<td>2016</td>
<td>Energy Storage in Cables</td>
</tr>
<tr>
<td>5</td>
<td>UCF</td>
<td>Advanced Power Electronic Corp.</td>
<td>2016</td>
<td>Solar Energy Conversion and Integration</td>
</tr>
<tr>
<td>6</td>
<td>UCF</td>
<td>HySense Technology, LLC</td>
<td>2012</td>
<td>H₂ Sensing Tape</td>
</tr>
<tr>
<td>7</td>
<td>UF</td>
<td>Florida FGT, LLC</td>
<td>2010</td>
<td>Energy Crops</td>
</tr>
<tr>
<td>8</td>
<td>UF</td>
<td>NanoPhotonica, Inc.</td>
<td>2010</td>
<td>Next Generation Optoelectronic Devices</td>
</tr>
<tr>
<td>9</td>
<td>UF</td>
<td>RedOx Power Systems, LLC</td>
<td>2010</td>
<td>Solid Oxide Fuel Cells</td>
</tr>
<tr>
<td>10</td>
<td>UF</td>
<td>Innovative Space Tech., LLC</td>
<td>2014</td>
<td>Solar</td>
</tr>
<tr>
<td>11</td>
<td>UF</td>
<td>SensorComm Technologies, Inc.</td>
<td>2014</td>
<td>Sensors to monitor NOx emissions</td>
</tr>
<tr>
<td>12</td>
<td>UF</td>
<td>Molekule Inc.</td>
<td>2015</td>
<td>Energy Efficient Air Purification</td>
</tr>
<tr>
<td>13</td>
<td>USF</td>
<td>T2C-Energy</td>
<td>2012</td>
<td>Landfill Gas to Liquid Fuel</td>
</tr>
<tr>
<td>14</td>
<td>USF</td>
<td>SunBorne Energy, LLC</td>
<td>2010</td>
<td>Solar Installations in India</td>
</tr>
</tbody>
</table>
Content-Rich Web Site

http://floridaenergy.ufl.edu/

FESC Bringing Energy Solutions to Florida,
the Nation and the World

The Florida Energy Systems Consortium (FESC) was created by the Florida State government to promote collaboration among the energy experts at its 12 supported universities to share energy-related expertise. The consortium assists the state in the development and commercialization of new energy technologies. It also performs research and development on innovative energy systems that lead to alternative energy strategies, improved energy efficiencies, and expanded economic development for the state. The legislation appropriated funding for research at five of the universities as well as support for education, outreach, and technology commercialization. The Consortium reports to and provides guidance on as needed back to the Florida legislature, Executive Office of the Governor, and the Florida Office of Energy housed in the Florida Department of Agriculture and Consumer Services.

Overarching to the Consortium’s research strategy is an energy systems approach to identify innovation opportunities, prepare an energy workforce, and guide economic development.

Through collaborative research and development across the State University System and the industry, the goal of the consortium is to become a world leader in energy research, education, technology, and energy systems analysis. In so doing, the consortium shall:

(a) Coordinate and initiate collaborative interdisciplinary energy research among the universities and the energy industry.
(b) Assist in the creation and development of a Florida-based energy technology industry through efforts that would expedite commercialization of innovative energy technologies by taking advantage of the energy expertise within the State University System, high-technology incubators, industrial parks, and industry-driven research centers.
(c) Promote a state-wide focus for objective energy systems analysis.
(d) Develop education and outreach programs to prepare a qualified energy workforce and informed public.
Facilitated Discussion on Research, Development, Demonstration, and Deployment

FACCE Virtual Meeting, Tuesday, August 25, 2020
Overview of Chapter 6. Expand Energy Education, Vocational Training, and Workforce Development from the Florida Energy and Climate Plan

Tony Morgan, FDACS Office of Energy

FACCE Virtual Meeting, Tuesday, August 25, 2020
Presentation on Energy Education, Vocational Training, and Workforce Development

Dr. Amy Albee-Levine, Dean of Workplace Development, Lake-Sumter State College

FACCE Virtual Meeting, Tuesday, August 25, 2020
TRENDS IN WORKFORCE DEVELOPMENT IN HIGHER EDUCATION

August 25, 2020

Dr. Amy Albee-Levine
Dean, Workforce Development
Lake-Sumter State College
Lake-Sumter State College

- Part of the 28 member Florida College System
- Serves Lake and Sumter Counties in Central Florida
- Average enrollment of 6,000 students in 18-19 and 19-20 academic years
- Approximately 15% of enrollment in workforce programs during the 18-19 and 19-20 academic years
Programs Offered

• 7 Associate in Science Degree programs
  • Business Administration
  • Computer Information Technology
  • Criminal Justice Technology
  • Engineering Technology
  • Health Information Technology
  • Management Technology
  • Nursing

• 1 Associate in Applied Science Degree program
  • Electrical Distribution Technology
Programs Offered Con’t

• College Credit Certificates
  • 15 Certificates offered in various disciplines
    • Business Administration
    • Computer Information Technology
    • Health Information Technology
    • Engineering Technology
    • Electrical Distribution Technology
COVID-19 Impact

• Pre-COVID
  • 70% of Instruction offered remotely
  • Clinical/Practicum/Internship experiences face-to-face
  • 60% of workforce students eligible for financial aid
  • Average program length 18 months
COVID-19 Impact

• COVID-19 Impact
  • 90% of instruction offered remotely
  • Increased demand for short term programs (12 weeks or less)
  • Continuing Education Articulation/Alignment
  • Software for remote clinical/practicum experiences
  • “Essential” worker programs become prevalent
  • Enrollment remains steady
COVID-19 Impact

• How is LSSC addressing changing landscape?
  • Rapid Credentialing Funding
  • New programming
  • Industry partner feedback
  • Articulation Agreements
Contact Information

Amy Albee-Levine, Ph.D
Dean of Workforce Development
Lake-Sumter State College
352-435-6331
albeelea@lssc.edu
Presentation on Energy Education, Vocational Training, and Workforce Development

Jennifer Szaro, President and CEO, Association of Energy Services Professionals

FACCE Virtual Meeting, Tuesday, August 25, 2020
TRENDS IN CLEAN ENERGY WORKFORCE DEVELOPMENT

JEN SZARO, PRESIDENT AND CEO, ASSOCIATION OF ENERGY SERVICES PROFESSIONALS
About the association of energy services professionals

Nearly 2,400 Members in the U.S. and Canada

A non-profit network of clean energy professionals

Accredited clean energy education and training

Focused on energy efficiency, demand response and distributed energy resources

www.aesp.org
ENERGY EFFICIENCY NOW EMPLOYS MORE WORKERS THAN THE FOSSIL FUEL INDUSTRY IN 41 STATES AND THE DISTRICT OF COLUMBIA.
14,802 Energy Efficiency Businesses

Firm Size

- 100 or more employees: 5%
- 20 to 99 employees: 19%
- 6 to 19 employees: 35%
- 1 to 5 employees: 40%

WORKERS EMPLOYED

- 2016: 108,670
- 2017: 112,620
- 2018: 118,412
<table>
<thead>
<tr>
<th>Area</th>
<th>Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cape Coral-Fort Myers</td>
<td>4,909</td>
</tr>
<tr>
<td>Deltona-Daytona Beach-Ormond Beach</td>
<td>2,446</td>
</tr>
<tr>
<td>Fort Walton Beach-Crestview-Destin</td>
<td>1,254</td>
</tr>
<tr>
<td>Gainesville</td>
<td>1,500</td>
</tr>
<tr>
<td>Jacksonville</td>
<td>8,326</td>
</tr>
<tr>
<td>Lakeland</td>
<td>2,051</td>
</tr>
<tr>
<td>Miami-Fort Lauderdale-Pompano Beach</td>
<td>42,375</td>
</tr>
<tr>
<td>Naples-Marco Island</td>
<td>2,686</td>
</tr>
<tr>
<td>Ocala</td>
<td>1,546</td>
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<tr>
<td>Orlando-Kissimme</td>
<td>12,015</td>
</tr>
<tr>
<td>Palm Bay-Melbourne-Titusville</td>
<td>3,145</td>
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<tr>
<td>Palm Coast</td>
<td>352</td>
</tr>
<tr>
<td>Panama City-Lynn Haven</td>
<td>1,021</td>
</tr>
<tr>
<td>Pensacola-Ferry Pass-Brent</td>
<td>2,416</td>
</tr>
<tr>
<td>Port St. Lucie</td>
<td>2,905</td>
</tr>
<tr>
<td>Punta Gorda</td>
<td>949</td>
</tr>
<tr>
<td>Sarasota-Bradenton-Venice</td>
<td>4,877</td>
</tr>
<tr>
<td>Sebastian-Vero Beach</td>
<td>1,004</td>
</tr>
<tr>
<td>Tallahassee</td>
<td>2,440</td>
</tr>
<tr>
<td>Tampa-St. Petersburg</td>
<td>15,286</td>
</tr>
<tr>
<td>Rural</td>
<td>4,910</td>
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</tbody>
</table>
PRE-COVID Solar photovoltaic job trends

Average Annual Growth Rate: 104.42%
Median Annual Wage: $39,490

U.S. SOLAR JOBS BY YEAR

BY MARKET SEGMENT, 2019

25% Non-Residential
56% Residential
19% Utility-Scale

Pre-Covid Solar job growth trends and challenges

Source: The Solar Foundation, Solar Jobs Census
Clean energy job losses by industry as of July 2020

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>MARCH</th>
<th>APRIL</th>
<th>MAY</th>
<th>JUNE</th>
<th>JULY</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Efficiency</td>
<td>-103,298</td>
<td>-309,584</td>
<td>-18,880</td>
<td>71,786</td>
<td>2,105</td>
<td>-357,871</td>
</tr>
<tr>
<td>Renewables</td>
<td>-23,739</td>
<td>-71,705</td>
<td>-4,272</td>
<td>17,287</td>
<td>591</td>
<td>-81,840</td>
</tr>
<tr>
<td>Clean Vehicles</td>
<td>-11,399</td>
<td>-35,070</td>
<td>-2,059</td>
<td>10,335</td>
<td>276</td>
<td>-37,917</td>
</tr>
<tr>
<td>Grid &amp; Storage</td>
<td>-6,517</td>
<td>-19,666</td>
<td>-1,166</td>
<td>4,561</td>
<td>132</td>
<td>-22,656</td>
</tr>
<tr>
<td>Clean Fuels</td>
<td>-2,186</td>
<td>-10,390</td>
<td>-657</td>
<td>2,351</td>
<td>91</td>
<td>-10,791</td>
</tr>
<tr>
<td><strong>INDUSTRY TOTAL</strong></td>
<td><strong>-147,139</strong></td>
<td><strong>-446,416</strong></td>
<td><strong>-27,035</strong></td>
<td><strong>106,320</strong></td>
<td><strong>3,195</strong></td>
<td><strong>-511,075</strong></td>
</tr>
</tbody>
</table>

Source: BW Research Partnership (E2, E4TheFuture, ACORE) August 12, 2020
## Clean job losses due to covid-19 by state

<table>
<thead>
<tr>
<th>State</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida</td>
<td>3,963</td>
<td>25,949</td>
<td>2,563</td>
<td>-5,832</td>
<td>-122</td>
<td>26,521</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State</th>
<th>Total Claims</th>
<th>Percent of Pre-COVID19 Workforce Unemployed</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>89,158</td>
<td>16.60%</td>
</tr>
<tr>
<td>Georgia</td>
<td>27,316</td>
<td>32.60%</td>
</tr>
<tr>
<td>Florida</td>
<td>26,521</td>
<td>16.00%</td>
</tr>
<tr>
<td>Texas</td>
<td>24,659</td>
<td>10.20%</td>
</tr>
<tr>
<td>Michigan</td>
<td>24,525</td>
<td>19.60%</td>
</tr>
<tr>
<td>North Carolina</td>
<td>21,214</td>
<td>18.80%</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>18,866</td>
<td>20.10%</td>
</tr>
<tr>
<td>Washington</td>
<td>18,444</td>
<td>21.70%</td>
</tr>
<tr>
<td>New York</td>
<td>17,239</td>
<td>10.80%</td>
</tr>
</tbody>
</table>

Source: BW Research Partnership (E2, E4TheFuture, ACORE) August 12, 2020
Regional Florida impacts

<table>
<thead>
<tr>
<th>REGION</th>
<th>TOTAL CE JOBS LOST</th>
<th>% DECLINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami/FTL/Palm Beach</td>
<td>13,509</td>
<td>22.2%</td>
</tr>
<tr>
<td>Tampa/St. Pete/Clearwater</td>
<td>5,288</td>
<td>24.0%</td>
</tr>
<tr>
<td>Orlando/Kissimmee</td>
<td>3,680</td>
<td>21.8%</td>
</tr>
<tr>
<td>Jacksonville</td>
<td>2,691</td>
<td>24.2%</td>
</tr>
</tbody>
</table>

Source: BW Research Partnership (E2, E4TheFuture, ACORE) August 12, 2020
Workforce education needs are evolving

Growing need for IOT-based technology skills (smart lighting, water heaters, HVAC, virtual load management)

Smarter refrigerators require smarter technicians

Consistent need for traditional EE, Solar and “Soft Skill” training

Demand for photovoltaics, building envelope, windows, heat pump water heaters, chillers, HVAC remains constant

Greater focus on cloud-based customer engagement

New technical skills required for load analysis, active load management and remote performance diagnostics

Technologies like energy storage, microgrids and electric vehicles/EVSE are rapidly changing workforce demands

New skills required to complete site assessments, installations and O&M required for both energy storage and EVSE (charging infrastructure)

Utility training needs are evolving to better handle Distributed Energy Resources and the Digital Grid

New planning and operational practices require training

Utilities need to adapt to the evolving needs of engaged “prosumers”
Next Steps

Kelley Smith Burk, FDACS Office of Energy

FACCE Virtual Meeting, Tuesday, August 25, 2020
Public Comment
Adjourn Meeting

Kelley Smith Burk, FDACS Office of Energy

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