

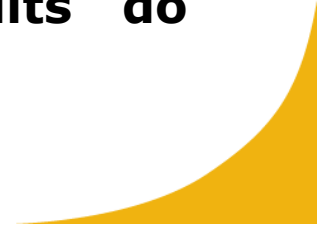


***Renewable Energy Education and Training at the Energy Institute
Strategic Space Forum
Rice University
July 1, 2011***

***John K. Galiotos MS, PhD, FAIC
Professor, Science & Engineering Technology Division Chair, Energy Institute Director
Houston Community College-NE Energy Institute
555 Community College Drive
Houston, Texas 77013***



Concern

- **Growing and dynamically changing businesses**
 - **Economic hardships**
 - **Potential employees are not properly trained and do not have basic evolving professional development opportunities**
 - **Need of skilled energy workforce critical mass**
 - **Consolidated training effort does not currently exist within our area**
 - **Retirement of current energy workforce**
 - **Considerable gap between ready to retire workforce personnel and next generation (35-55 years of age)**
 - **Outsourcing**
 - **Safety**
 - **Renewable and sustainable energy resources not well defined**
 - **Industry develops its own training (time/\$/effort/technology evolution/operation demands)-results do not measure with profits and safety**
 - **Not enough graduates**
- 



“Green” Jobs and Sectors in Texas-Profiles

Clean Energy

- Solar Power
- Wind Power
- Geothermal power
- Biogas
- Biomass
- Hydrogen Power
- Hydroelectric Power
- Power Plant

Conservation and Planning

- Soil Conservation and Forestry
- Environmental Planning
- Environmental Consulting
- Corporate Compliance

Texas Green Jobs Guide Book 2010

Texas Workforce Commission

Green Building

- Green Building
- Green Building Practices and Retrofits

Transportation

- Automotive
- Transportation Systems

Waste Management

- Waste Treatment, Recycling, and Waste Reduction

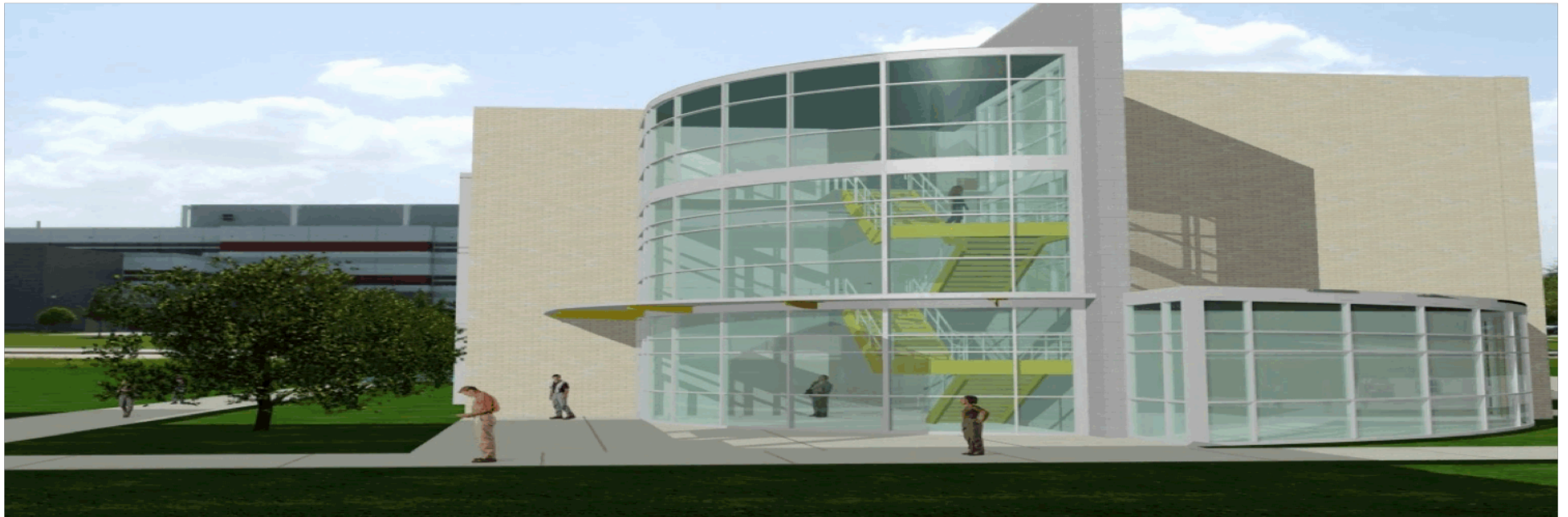
Water Resources

- Water resources management and Supply
- Wastewater management

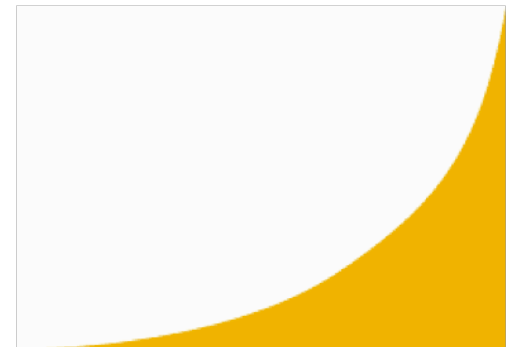




HCC-NE Energy Institute *“Vested Interest Partnerships with Mutual Benefits”*



- Housed at a 50,000 sf building
- State-of-the art equipment
- Technology for disseminating and receiving educational and training excellence globally
- Excellent faculty and staff





Workforce Education

AAS Degrees

- **Biomedical Engineering Technology**
- **Biotechnology**
- **Chemical Laboratory Technology**
- **Chemical Engineering Technology**
- **Drafting and Design Engineering Technology**
- **Electronics Engineering Technology**
- **Instrumentation & Controls Engineering Technology**
- **Petroleum Engineering Technology**
- **Power Engineering Technology**
- **Process Technology**

Certificate Degrees

- **Biotechnology**
 - **Chemical Laboratory Technology**
 - **Polymer Technology**
 - **Process Operator's Certificate**
 - **Solar Energy Technology-PV**
 - **Solar Energy Technology-TH**
 - **Wind Energy Technology**
 - **Instrumentation & Controls Engineering Technology**
 - **Petroleum Engineering Technology**
- 

Facilities

Lab 111 Power Engineering Technology

- **Solar Photovoltaic Systems**
- **Solar Thermal Systems**
- **Wind Nacelle System**
- **Motor Control System**
- **Solar Panel Installers Training System**

Lab 211

- **Solar Battery Operating System**
- **Solar Electricity Generating System and Electrical Training Device**
- **Mechanical Equipment for Drilling, Circuits Build up, and Instrumentation System Devices**
- **House Compressed Air**
- **Bench electrical and Special Equipment Outlets**
- **Bench Compress Air Systems**

Lab 225

- **Plumbing Center**
- **Wiring Center**
- **Solar (PV, TH) Wind Units**

Lab 317 Power Engineering Technology

- **Solar Thermal Power Generation System**
- **Wind Power Generation Training System**
- **Hydraulics Training System**
- **Wind (Turbine and Nacelle) Training Units**
- **Material Stretching Analysis System**
- **Weatherization Training Systems**

Lab 105 Chemical Engineering Technology

- **Distillation Tower**
- **Bio-Fuel (Bio-Ethanol) Generator and Trainer**
- **Cooling Tower**
- **Process Automation Mechatronics System**
- **House Compressed Air**

Lab 226, 229 Biotechnology

- **Biofuels generation and characterization instruments**

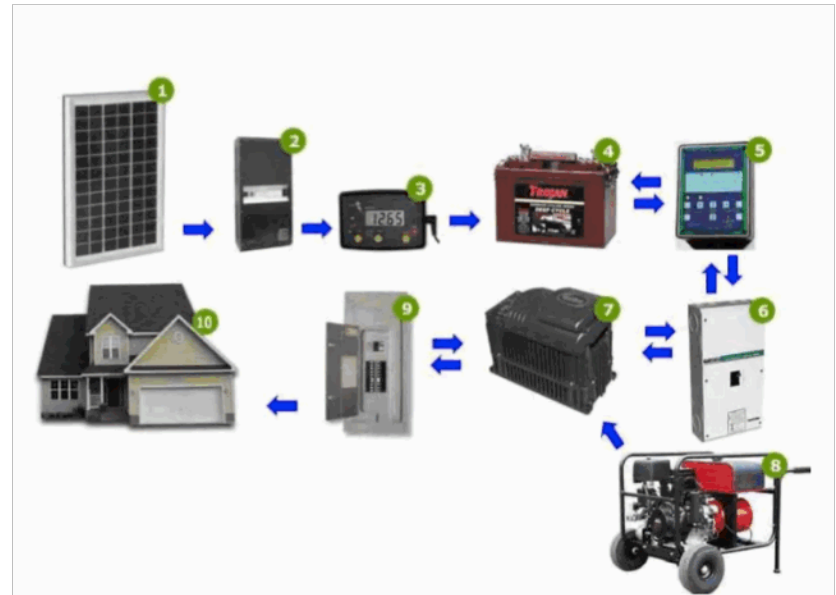
Lab 212

- **Motor Controls System**
- 

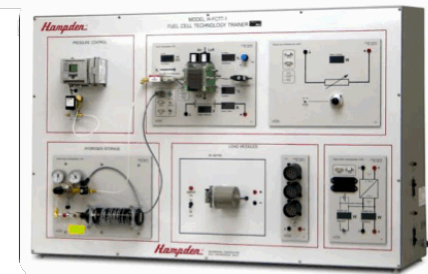
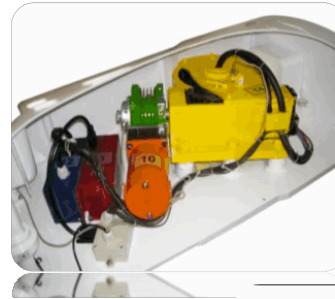


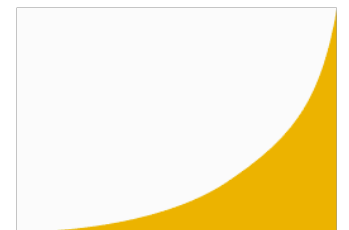
- 1. Energy source – solar panels
- 2. Array DC disconnect
- 3. Charge controller
- 4. Deep cycle battery
- 5. System meter
- 6. Main DC disconnect

- 7. Inverter
- 8. AC breaker panel
- 9. Kilowatt per hour meter
- 10. Grid
- 11. Household loads



- 1. Energy source – solar panels
- 2. Array DC disconnect
- 3. Charge controller
- 4. Deep cycle battery
- 5. System meter
- 6. Main DC disconnect
- 7. Inverter
- 8. Generator
- 9. AC breaker panel
- 10. Household loads

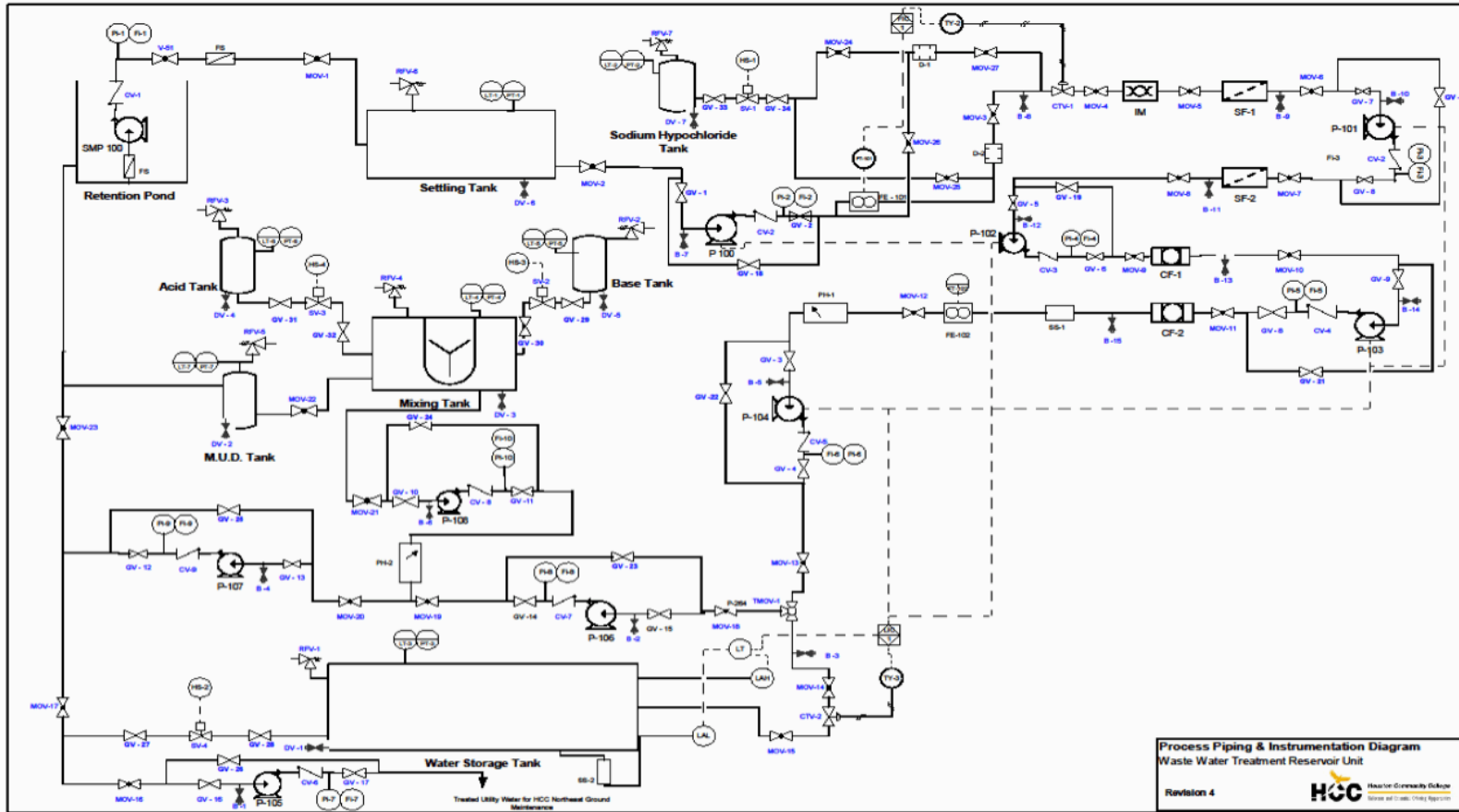






Waste Water Treatment Plant

Chemical Engineering & Process Technology
Student Capstone Project
Professor Homer Stewart Advisor
Industry Advisory Committee Approved






Funding

- ***Gulf Coast Workforce Board
Recovery ACT
Houston Galveston Area Council
Houston Community College Green
Job Training
Green Jobs-\$1,169,940***
- ***The US Department of Energy
Solar Energy Technologies Program
South Central Solar Training
Consortium
\$3,566, 058***
- ***State Energy Conservation Office
Texas Renewable Energy Education
Consortium
\$39,000***
- ***National Science Foundation/Advance
Technology Education
Gulf Coast Technology Articulation
Partnership
\$300,000***
- ***JET/SECO (Jobs and Education for
Texans/State Energy Conservation Office
Equipment for training
\$330,000***
- ***SECO State Energy Conservation Office
Green Education, training, and equipment
\$465,000***
- ***INDUSTRY-equipment, scholarships,
training needs, program support***
- ***NSF/ATE Planning Grant Co-PI
\$64,500***





“Green” Benchmarks

- ***Currently, EI is the only entity of its kind at the community college level in the nation***
 - ***Over 1,700 enrollments (fall 2011)***
 - ***The PET, PWET and CHET are the only engineering technology programs of their kind in the US***
 - ***PTAC spring 2011 Graduating Class-100% placement***
 - ***Enrollment growth 32% overall annually***
 - ***The TREEC Leadership and Trailer***
 - ***Most funded DOE project (SITN)***
 - ***Urban Energy Career Academy (North Forest HS)***
 - ***George I. Sanchez HS/Shell/HCC EI for PTAC/ChET***
 - ***Chemical Engineering Technology Center of Excellence (Wheatley HS)***
 - ***Green Energy Academy (Furr HS)***
 - ***Chancellor’s “Green” Committee & Co-author of the Chancellor’s Green Best Practices Report***
 - ***MMI summer institute-biofuels/solar/wind/forensics***
- 



HCCEI (in-house) Centers of Excellence

- *Center for Safety Education and Training*
- *Lab-Volt/ATC and HCC-NE EI Center for Sustainable and Renewable Energy Education and Training*
- *Hampden Engineering and HCC-NE EI Center of Engineering Training and Education*
- *Center of Excellence in Chemical Engineering Technology and Process Operations Education and Training*
- *Center of Capstone Applied Research*
- *Center for Geophysical and Seismic Measurements-in progress*
- *Center for Power Engineering Technology Education and Training-in progress*
- *Shimadzu Center for Analytical Instrumentation and Measurements Education and Training*
- *Center for Internships, Cooperative Education, Externships, and Industry Relations*





NASA/HCC-EI Current and Potential Future Collaborations

Current

Training and education in Petroleum Engineering Technology, Process Technology, Chemical Engineering Technology, Instrumentation & Controls Engineering Technology , Power Engineering Technology, Solar, Wind

Training Centers of Excellence (DOE SCSTC/SITN & SECO TREEC)

Future

Virtual Reality Lab

Creation of the Green Energy Center for Education and Training

CEU Courses-such as: Distribution Systems, SMART Green Energy Applications, Energy Building Code Compliance , Power quality Monitoring

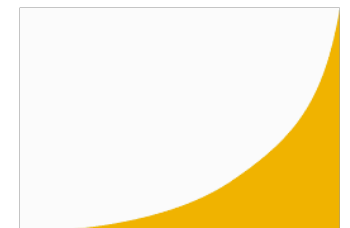
Proposed Partners: NASA, HCC-EI, Hi-Tech, EATON, TAMU, Puffer Sweiven, Cooper, Shell

Proposed Funding Agencies Approach: TWC, NSF/ATE, DOL, DOE

A yellow decorative shape in the bottom right corner of the slide, consisting of a curved line that starts from the left and goes up to the right, forming a partial triangle.



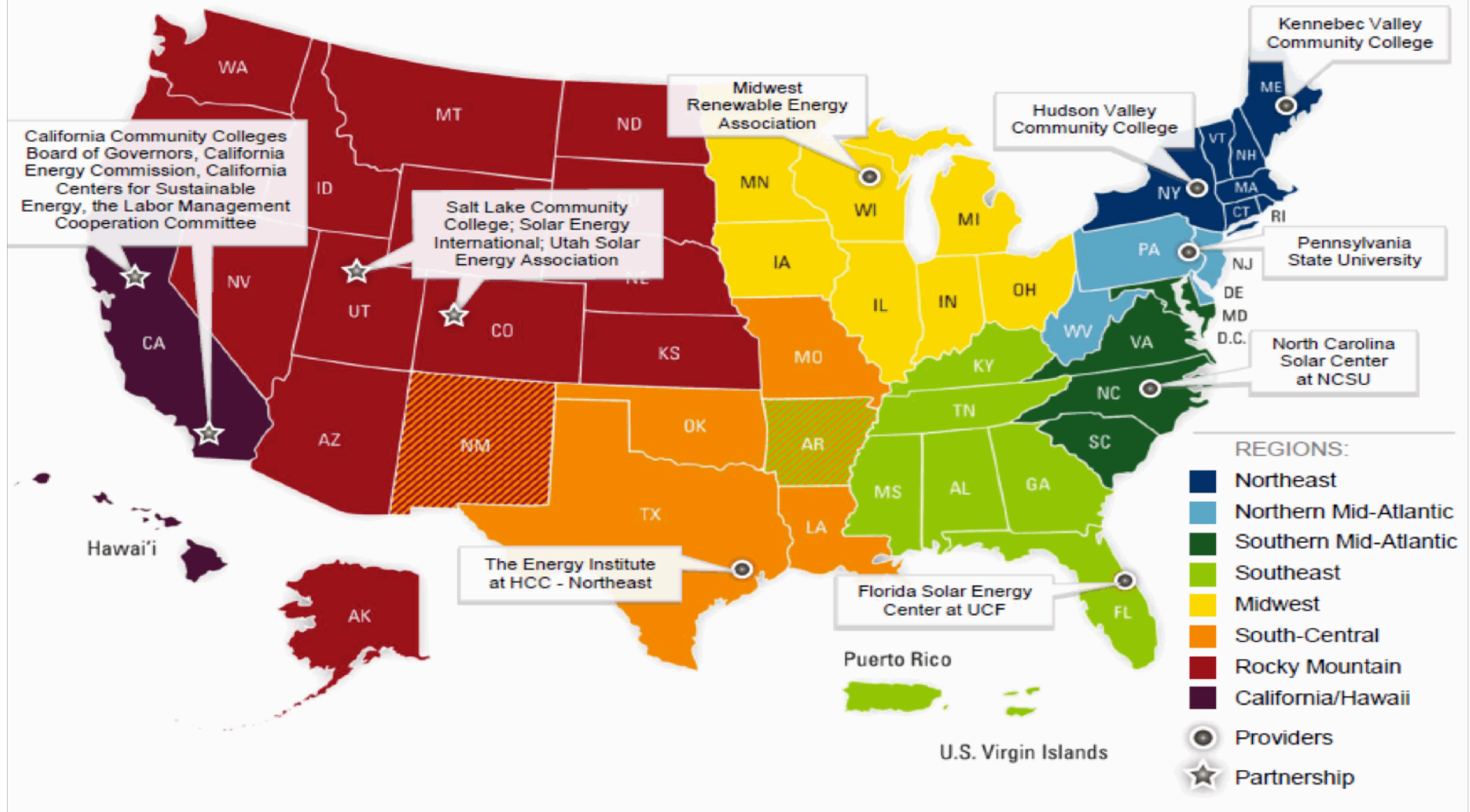
Texas Renewable Energy Education Consortium





Solar Instructor Training Network

8 Regions, 9 Regional Resource and Training Providers





U.S. DEPARTMENT OF
ENERGY

Solar Instructor
Training Network

South-Central Region



Cedar Valley College
DALLAS COUNTY COMMUNITY COLLEGE DISTRICT

SERVING THE COMMUNITY
CROWDER COLLEGE
NEOSHO, MISSOURI



NM STATE
DACC
NMSU Doña Ana Community College



ST. PHILIP'S COLLEGE



Delgado
COMMUNITY COLLEGE
New Orleans, Louisiana



A M E R I C A N
YOUTHWORKS





U.S. DEPARTMENT OF
ENERGY

Solar Instructor
Training Network
South-Central Region





Desert Wind and Solar



**KAESER
COMPRESSORS**

Built for a lifetime.™

dawco

Home Builders LLC



A Division Of Villarreal & Sons Enterprises, Inc.
8A and Service Disabled Veteran Owned

DEWALT



SunWize



**[e] enphase
ENERGY**

LOWE'S
Home Improvement Warehouse™



Acknowledgement



Hi-Tech Systems, LLC

