

# Working for California's Clean and Sustainable Energy California State University

March 14, 2011

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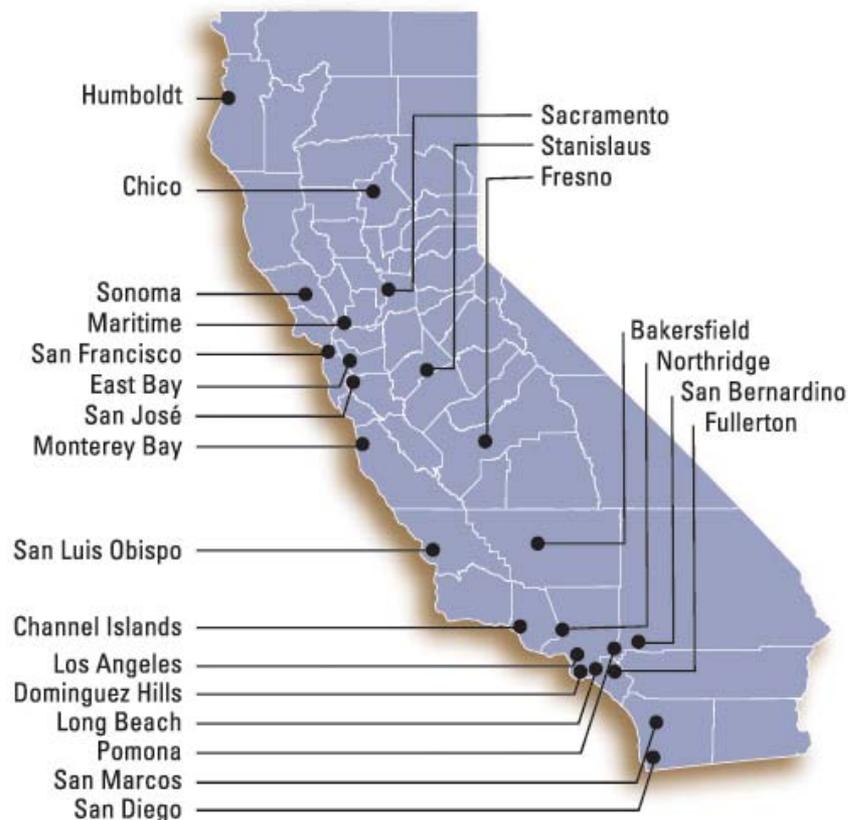
Assistant Vice Chancellor for Research Initiatives and Partnerships  
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## CSU's Size and Diversity Mean Large Contributions to California's Workforce

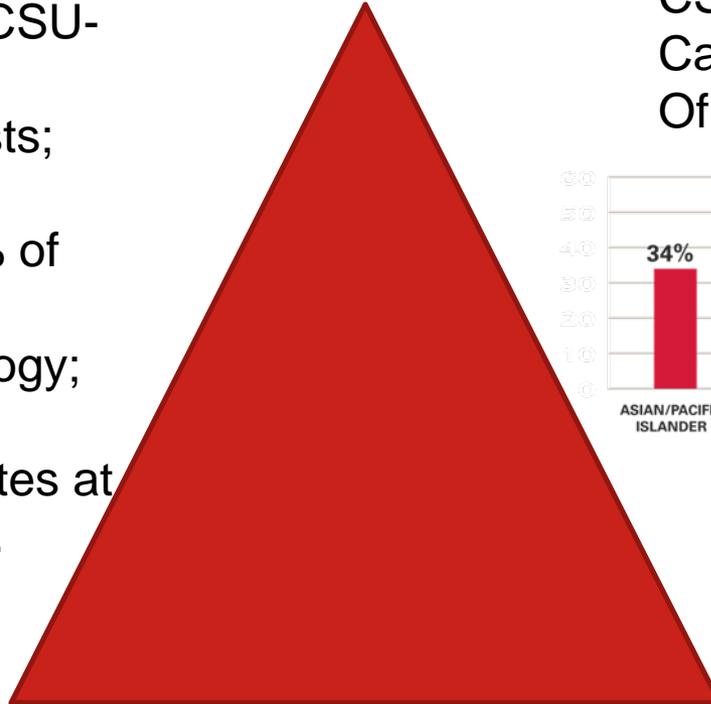
- CSU is the largest, most diverse, senior degree-granting public higher education system in the United States; it serves more than **430,000** students yearly
- CSU graduates more than **90,000** students per year
- Over 2.5 Million Alumnae
- CSU graduates more African American, Hispanic, and American Indian students than **all other** California universities combined
- More than 70% of CCC transfers are to CSU



# CSU Role in the NCCEW: Applied Research and Workforce Development

A Clean Energy Workforce is often CSU-Educated: 62% of agriculture specialists; 54% of business administrators; 44% of life sciences, which includes biotechnology; and 45% of all engineering graduates at the bachelors' level.

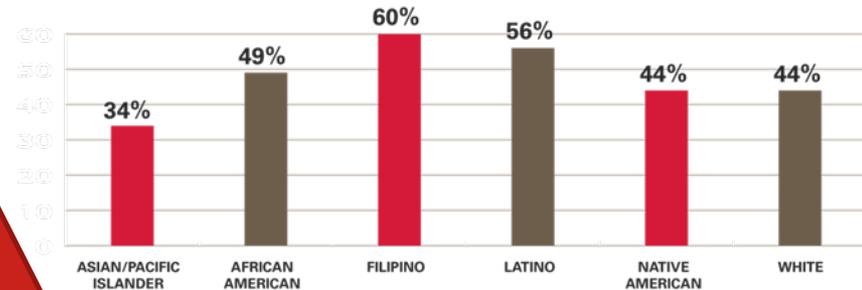
Renewable Energy



Energy Efficiency

Clean Energy Vehicles

CSU Graduates Mirror California's Diversity: Percentages Of Bachelor's Degrees Statewide



# CSU's Role in California's Clean Energy Economy

- **Educates the clean energy baccalaureate and Master's workforce**
  - Education Programs: Degree offerings in sustainability, alternate energy, transportation and Green Business Certificate programs
  - Applied Research and Innovation: Environmental Research and Clean-Tech Innovation Centers; partnership with SBDC's
  - Career Ladders: CCC to CSU and apprenticeship programs; connection with workforce investment as it relates to veterans, unemployed workers, career changers.
- **CSU's Commitment to Sustainability Creates Green Facilities and a Clean Energy "Culture"**
  - Energy: In April 2009, The U.S. Environmental Protection Agency recognized CSU in the Top 20 list of the largest national green power purchasers.
  - Sustainable Design: The CSU currently has 36 LEED™ certified/to-be-certified projects across 16 campuses
  - Alternate Fuels: Hydrogen fueling stations at Humboldt State and Los Angeles

# CSU and Sustainability: Helping to educate the **clean energy workforce** leaders of tomorrow

- – Increased course offerings in sustainability and Green Business Certificate programs  
*Examples: CSU Sacramento's Smart Grid research and educational programs*
  - Environmental Research and Clean-Tech Innovation Centers  
*Example: CSU Chico's Oroville Clean-Tech Innovation Center ; wind energy*
  - The CSU “Green Campus” program  
*Example: CSU staff work with faculty and students to monitor campus energy usage and improve efficiency; campus is a “living laboratory” of best practice*
  - CSU's commitment to CCC/CSU seamless transfer and Veterans programs  
*Example: Butte College to CSU Chico – Environmental Studies - Associate to Bachelor's to Professional Science Master's*

# CSU Los Angeles

- Center for Energy and Sustainability
  - NSF funded, 5 years
  - 14 faculty, 7 departments
  - Photovoltaic materials, direct methanol fuel cells, biofuels and combustion, carbon sequestration
- Hydrogen Research and Fueling Facility
  - Operation in 1/ 2011



## California State University, East Bay

- Collaborates with research partners in biofuels, solar technologies, fuel cells, and environmental remediation
- East Bay Green Corridor Partnership focused on expanding the supply of biofuels
- Site for PG&E Fuel Cell
- Interdisciplinary faculty team will evaluate performance and use of bio-fuel derived from campus wastes
- Sustainable Energy Management Certificate

## San Francisco State University

- Industrial Assessment Center funded by US Department of Energy since 1992; students are supported by Center projects
- Audits local manufacturing companies for energy usage, waste management and increased productivity
- Enhances writing, communication, and technical skills
- Students become Energy Engineers even before graduation!

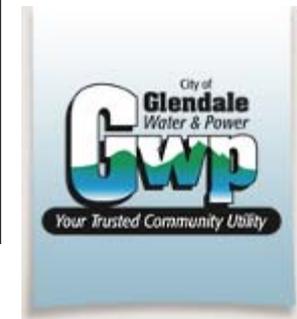
# CSU Program for Education and Research in Biotechnology (CSUPERB) – Biofuels Taskforce

- 45 faculty researchers and students working on biofuels research and development at 14 CSU campuses
- Partnerships for Next Generation Biofuels Production Places students in biofuel production settings - supported by industry and national laboratories
- *Example project:* CSUPERB funded a joint venture between Sonoma State and the City of Santa Rosa to build two digesters to transform harvested biomass into methane-rich biogas (picture on left).





**CSU**  
Partners with  
major Utilities  
in California



# California Smart Grid Center



## California Smart Grid Center California State University, Sacramento



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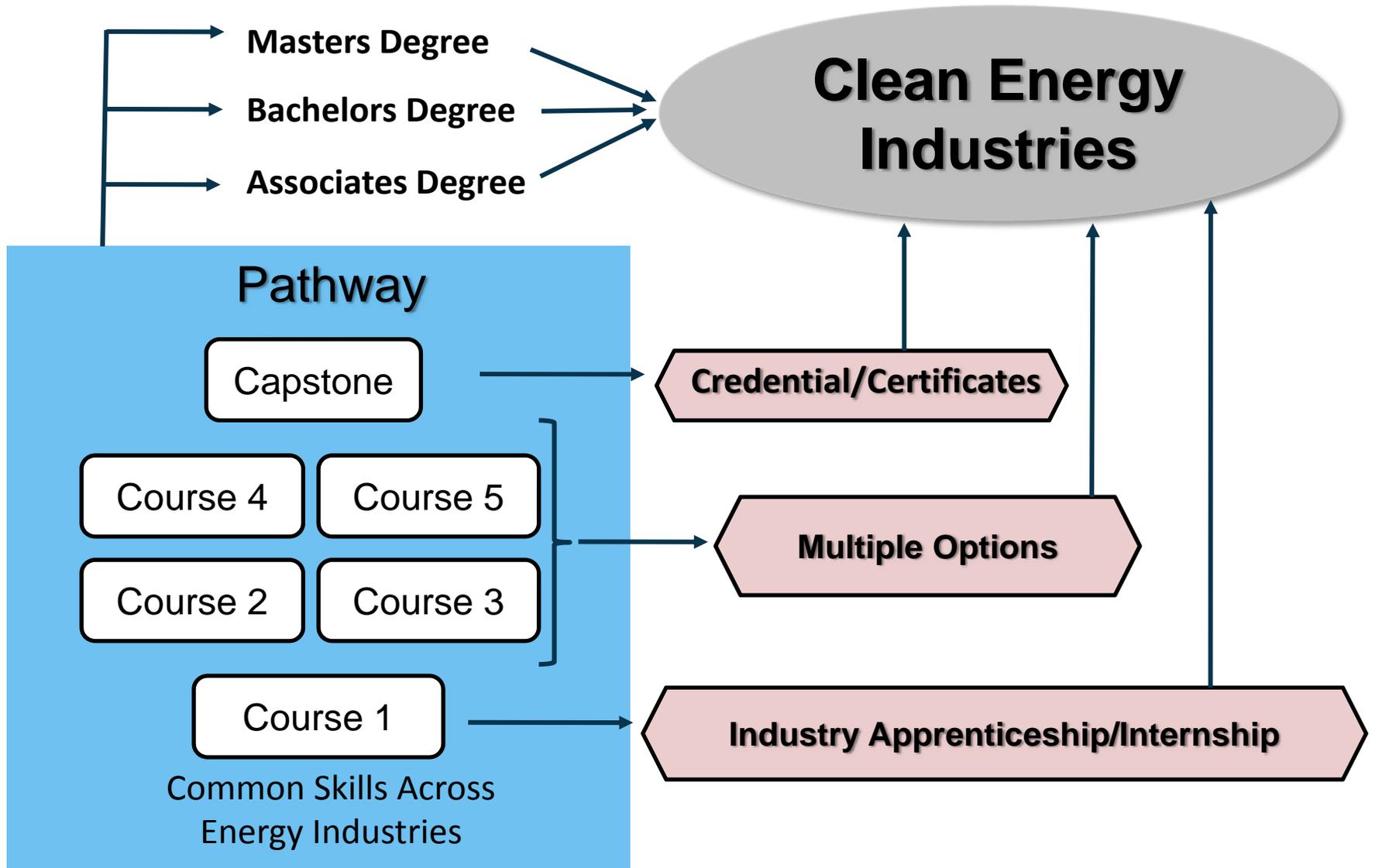


# CSC Sacramento Smart Grid Certificate

## Courses

<b>EEE 141 Power System Analysis</b>	<b>CSC 114 Digital Evidence &amp; Computer Crime</b>
<b>EEE 142 Energy Systems Control and Optimization</b>	<b>CSC 115 Internet Security and Law</b>
<b>EEE 144 Electric Power Distribution</b>	<b>CSC 138 Computer Networks</b>
<b>EEE 131 Electromechanical Laboratory</b>	<b>CSC 153 Computer Forensics Principles and Practices</b>
<b>EEE 135 Renewable Electrical Energy Sources and Grid Integration</b>	<b>CSC 154 Computer Attacks &amp; Countermeasures</b>
<b>EEE 136 Smart Electric Power Grid</b>	<b>CSC 250 Computer Security &amp; Privacy</b>
<b>EEE 143 Power System Laboratory</b>	<b>CSC 252 Cryptography</b>
<b>EEE 192 Electrical Power Design Project</b>	<b>CSC 253 Computer Forensics</b>
<b>EEE 255 Introduction to Future Power Systems and Smart Grids</b>	<b>CSC 254 Network Security</b>
<b>ME 156 Heating and Air Conditioning Systems</b>	<b>ME 159 High Efficiency HVAC</b>
<b>ME 157 Solar Energy Engineering</b>	<b>ME 154 Alternative Energy Systems</b>

# Online Education for ALL Californians



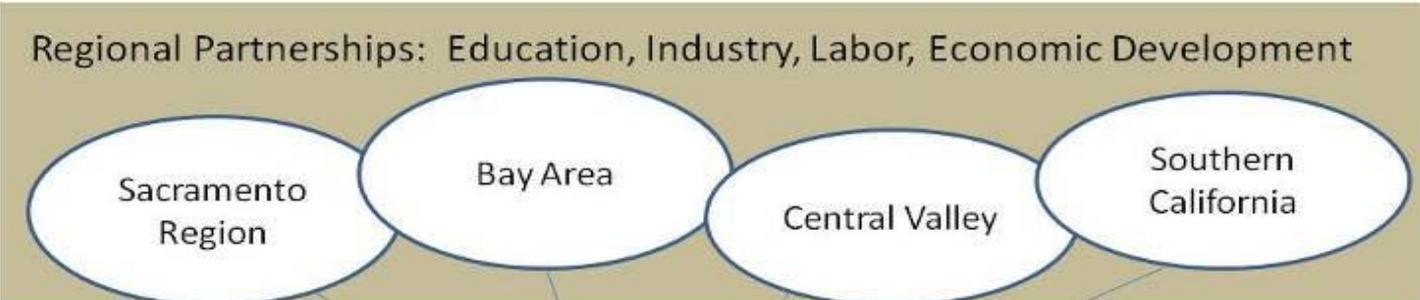


## Hands-on Education in support of California's Economic Development

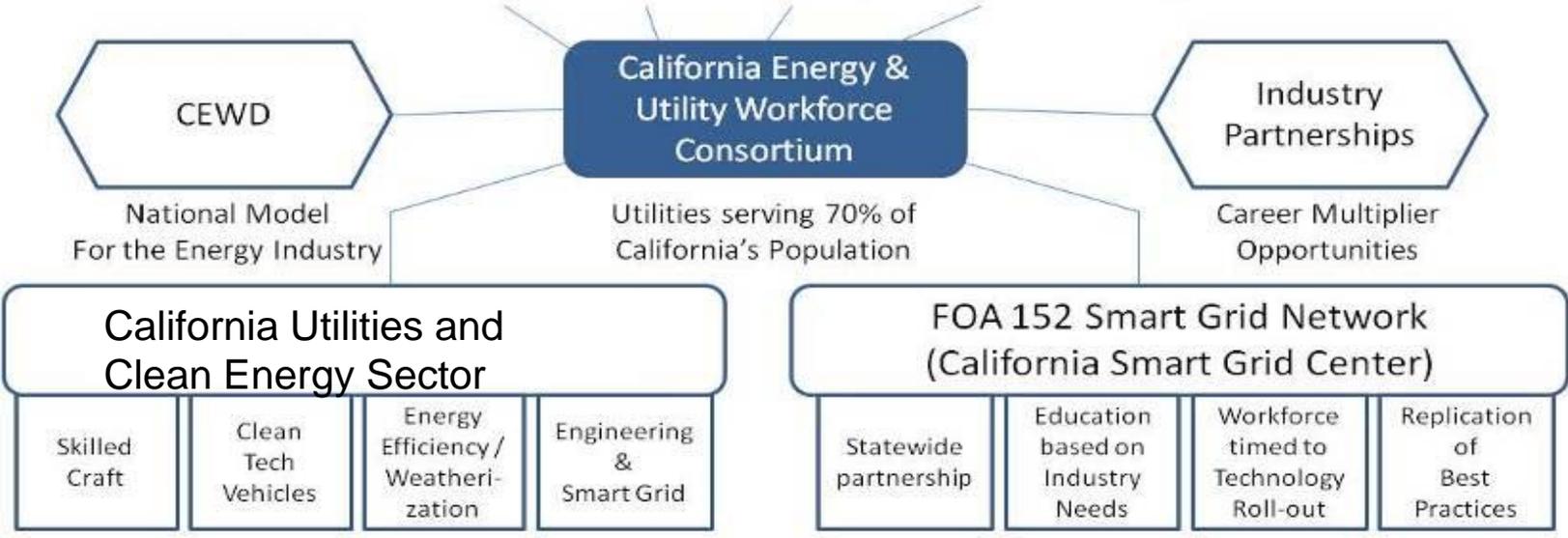
*Developing a Diverse and Talented Green Engineering Workforce*



# California Workforce Development Center



Execution within Strategic Framework & Responsiveness to Regional Needs



Strategic Framework  
(Funding from DOE and CEC)

# Thank you!