Community Colleges Building Sustainable Economies and Communities

VEC’s 10th Annual Environmental EXPO
Middlebury, Vermont
October 19, 2010
Outline

• Relationship of sustainability to industry clusters
• Roles of community/technical colleges in developing clusters and sustainable economies
• Exemplary practices at colleges and remaining challenges
Clusters is the current framework of choice for economic development

Clusters are geographic concentrations of interrelated companies and institutions of sufficient scale to generate external economies.
Vermont’s “Clusters”

- Environmental products, services, building, renewable energy
- Aviation, aerospace
- Financial services
- Information services, software design
- Micro-manufacturing (electronics, optics, nano)
- Natural resources, furniture
- Tourism, outdoor recreation, sport
- Value added agriculture, specialty foods
- Laminates, composites, plastics
- Creative economy
VT's Sustainable Food System Cluster

Suppliers
- Equipment
- Utilities
- Feed/seeds
- Fertilizers

Producers
- Farmers
- Orchards
- Sugaring
- Organic
- Nurseries

Processors
- Dairy processors
- Canneries
- Bottlers
- Meat processors
- Wineries/breweries
- Packaging

Storage & Distribution
- Cold storage
- Truckers
- Warehouses

Markets
- Wholesalers
- Exporters
- On-site
- Farmers markets
- Coops
- Mass retail
- Restaurants
- Local stores

Support infrastructure
Associations, services, research, educational institutions, banks

Helping people and places innovate, collaborate, and prosper.

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Challenge: Getting Clusters to pursue triple bottom line outcomes

Equity
Social justice, Economic opportunity, Income Equality

Economy
Economic growth & Efficiency

Environment
Environmental protection

Resource conflict
Property conflict
Developmental conflict
50 clusters and triple bottom line outcomes

**Type**

- 7 wood/furniture
- 8 durable goods
- 6 creative sectors
- 3 tourism/culture
- 4 transportation equipment
- 5 technology
- 7 agriculture/food/marine
- 5 textile/apparel
- 5 energy/environment

**Location**

- 4 Northeast
- 7 Midwest
- 13 South
- 9 West
- 17 Non-US

Source: Generating wealth, opportunity, and sustainability through rural clusters, RTS, 2009
Our analysis of TBL Outcomes of 50 rural clusters

• 36 of 50 had measurable social outcomes (good and bad)
• 24 of 50 had measurable environmental (good and bad) outcomes
• Most common interventions affecting social and environmental outcomes were related to workforce development
What are community colleges?

- post-secondary institutions that offer mainly less-than-baccalaureate credentials
- have multiple missions—including economic development
- are open to everyone and affordable
- are community based and focused
Characteristics of Community Colleges

• 1 in 3 students is over 30 years of age
• 41% work full time
• 57% are enrolled in courses for credit
• 61% attend part time
• 35% have dependent; 17% are single parents
• 45% are first generation college students
• 34% of those in credit programs are pursuing 1-2 year degrees, 17% BA/BS, 30% job skills, and 19% personal enrichment
• Average annual tuition $1,734 (4 yr, $18,273)
Community colleges positioned to influence sustainability

Equal Opportunity
Open access, remedial programs, on-going support

Economy Development
Customized training, Business & industry Programs, work force

Environment
Skills and values of work force, services

Community Colleges

Value conflict
Job opportunity conflict
Hiring preference conflict

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American Recover and Reinvestment Act Stimulus $

- $500 billion for workforce, mostly to community colleges
- Targeted to low income, displaced workers
- Colleges pursue $$, but find few jobs
Distribution of Jobs in Clean Energy Economy, 2007

Source: Pew Charitable Trust
## Energy employment in Appalachian region, 2009 and projected for 2013

<table>
<thead>
<tr>
<th>Source</th>
<th>2009</th>
<th>2013</th>
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<tbody>
<tr>
<td>Biomass</td>
<td>37,380</td>
<td>35,304</td>
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<tr>
<td>Solar</td>
<td>30,313</td>
<td>29,134</td>
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<tr>
<td>Efficiency</td>
<td>421,108</td>
<td>474,288</td>
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<tr>
<td>Fuel Cells</td>
<td>1,830</td>
<td>1,465</td>
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<tr>
<td>Geothermal</td>
<td>7,014</td>
<td>6,261</td>
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<tr>
<td>Hydroelectric</td>
<td>7,161</td>
<td>7,015</td>
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<tr>
<td>Wind</td>
<td>106,911</td>
<td>111,471</td>
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<tr>
<td>Nuclear</td>
<td>25,195</td>
<td>26,509</td>
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<tr>
<td>Coal</td>
<td>122,873</td>
<td>125,399</td>
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<tr>
<td>Gas Oil</td>
<td>210,037</td>
<td>217,139</td>
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</table>
Enrollments in Community Colleges
Classes in Appalachia

<table>
<thead>
<tr>
<th>Topic</th>
<th>Credit Enrollment</th>
<th>Colleges</th>
<th>Non-credit Enrollment</th>
<th>Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Efficiency</td>
<td>1,207</td>
<td>18</td>
<td>394</td>
<td>23</td>
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<tr>
<td>Renewable Energy</td>
<td>198</td>
<td>6</td>
<td>344</td>
<td>18</td>
</tr>
</tbody>
</table>

Based on RTS survey of 114 institutions, 2010
But need for green job skills requirements much larger than “green economy”

- Building trades and architecture
- HVAC (Heating, ventilation, air cond.)
- Automotive and transportation
- Chemical & biotech technicians
- Agriculture and food processing
- Tourism and hospitality
Examples of colleges stepping up: community college sustainability centers

- Lane Community College, Eugene, OR
  Northwest Energy Education Center

- Eastern Iowa Community College District
  Advanced Technology Environment & Energy Center

- Santa Fe Community College, NM
  Sustainable Technology Center

- Hudson Valley Community College, NY
  Center for Energy Efficiency & Bldg Science

- Mesalands Community College, AZ
  North America Wind Research & Training Center

- Columbia Gorge Community College, OR
  National Clean Energy Workforce Innovation Center
Macomb Community College, Michigan: Hybrid and electric auto program

- Center for Alternative Fuels
- Courses in electric vehicles partnering w/Wayne State U
- NSF $ for Center for Advanced Automotive Technology
- Training in hybrid vehicles
Hocking College, Nelsonville, Ohio

- HC Energy Institute founded in 2003 for AAS in advanced energy and fuel cells.
- 107 credit hours on fuel cells, solar, wind, hydroelectric
- Articulation agreement with U of MN-Crookston for BS Ag systems w/minor in renewable energy
- Regenerative agriculture to be started in 2010
Alfred State College (SUNY), New York

• School of Applied Technology since 1968
• Integrates energy efficiency, solar, wind into Associate of Occup. Studies degrees (build trades, elect construction, HVAC)
• 3 photovoltaic systems 4 wind turbines on campus
• Hands-on approach with students building 50 houses, latest to Energy Star standards, geothermal plumbing
• Exploring commercial wind farm on campus
Kentucky’s Green Initiative

- KY Cabinet Secretary created Green Energy Corps
- Promote energy savings, environmental protection, and civic engagement
- “Shovel-ready” platform for new green collar jobs
- Building Products Institute (BPI) to certify KY green initiative
- State curriculum for energy auditors
- Jefferson CTC lead college for state system, 8 BPI Centers at other colleges
- Signatory to University and College President’s Climate Change Initiative
- Board Approved Sustainability Plan
  - Green Task Force
  - Sustainability Steering Committee
  - Sustainability Across the Curriculum Committee
- Sustainable Technologies Center (STC)
  - Business Plan Developed
  - Trades and Advanced Technology Building
Sustainable Technologies Center
“Where Trades Meet Advanced Technology”

21st Century Trades:
- Construction
- Electrical
- HVAC
- Mechanical
- Plumbing
- Welding

Advanced Technologies and Green Curricula:
- Biofuels
- Biomass
- Green Building
- Small Wind
- Smart Grid
- Solar
- Water Conservation

Credit Programs (AAS Degrees and Certificates)
Non-Credit Courses and Workshops
Customized Training
Industry and Technology Demonstration Space
“Let’s Talk Green” Lecture Series
Transitioning Sønderborg from Farming to Knowledge to ...ZEROcarbon

- fresh seawater
- great nature
- tourism
- experience economy
- farming
- industry
- university / knowledge
- visions
- Danfoss HQ

- 77,000 citizens, 440,000 pigs, 250,000 hens
- 500 km² area
- District heating networks
- Natural Gas pipeline
Strong partnership with EUC-Syd

• Participatory programs
  – ZEROfamily
  – ZEROcompany
  – ZEROshop

• Learning programs
  – House of Science
  – Vocational upgrade training for plumbers, electricians, carpenters, ...
  – New energy focused training programs

• Walk your talk - new school building as best practice
  – Building in high energy class, with green energy supply, energy savings, displays, ..
"We don´t want to have a knowhow Center in Energy
- We want to be a knowhow Center within Energy"
Activities implemented

Energy Fair
- Open to all

Topical Professional Conference

Network:
- Former students
- Collaborator
- Companies

New education:
- Energy technologist

Internal development group:
- Analyse own knowledge

Collaboration:
- Business Board
- Local authorities
- Institutes of education

Propagation:
- Press coverage
- Event
- Film project
Cleveland State Community College
Moving Towards Zero Energy Homes in the Tennessee Valley

High School Program
- Introduce Zero Energy Objectives
- Construction Materials
- PV Panel Installation
- Solar Water Heating Installations
- Prepare Students for CSCC Programs

Construction Technology Program
- 1 Year Certificate Program
- 2 Year Degree Program
- Scholarships for One Year Program
- Groundwork for PV Installation Certification

Architectural
- Drawing
- Commercial Planning
- Engineering
- Computer Aided Design
- Construction
- Techniques and Methods
- Cost Estimating
- Standard Building Codes
- Renewable Energy
- PV Panel Installation
- Energy Efficient Construction
- Contracting

Cleveland State is offering a community based job training program through a grant from the U.S. Department of Labor to promote energy efficient residential construction technologies and practices.

Industrial Technology
- Measurements & Calculations
- Introduction to Technology

Other
- English Composition
- Math
- Physics
- Public Speaking
- Humanities & Social Science Electives

Cleveland State is partnering with Habitat for Humanity to provide opportunities for hands-on experience with many construction materials and methods.

*Habitat for Humanity*
The Integration

- **Vision** – “Every graduating student will develop a ‘mode of thinking and making decisions that considers the natural, cultural, and built environments as an integrated whole.”

- **Support of the Leadership**
  - Establish committees
  - Support events
  - Promote with Faculty, Staff, & Students

- **Sustainability Committee**
  - Focus efforts
  - Expand membership

- **Technology Curriculum > All Curriculum?**
Galway Mayo IT at Letterfrack: Skills for Sustainability

- Knowledge of sustainable materials and processes
- Sustainable design
- Sustainable manufacture
- In ‘touch’ with materials
- Creative thinking and Problem solving
- Understanding technology
- Hands-on practice in manufacture
- Appreciation of the total supply-chain
- Awareness of total energy requirements
Sustainable Design & Manufacturing

- Products with extended durability, enhanced material recyclability and reduced material content
- Creating more value with less impact
- Lean and green – waste elimination
- Waste re-use, recycle, reprocess
- Sustainable material options
- Energy use measurement – embodied energy, carbon footprints
Alliance for Sustainability colleges

- Arkansas State University-Beebe, AR
- Arkansas State University-Newport, AR
- Ashland Community and Technical College, Ashland, KY
- Bevill State Community College, Jasper, AL
- Bridgemont Community College, Montgomery, WV
- Cleveland State Community College, Cleveland, TN
- Eastern Iowa State Community College District, Davenport, IA
- EUC-Syd Technical College, Sønderborg, Denmark
- Hocking College, Nelsonville, OH
- Holmes Community College, MS
- Louisiana Delta Community College, LA
- Mississippi Delta Community College, MS
- Mountain Empire Community College, Big Stone Gap, VA
- Northeast Wisconsin Technical College, Green Bay, WI
- Patricia Hannaford Career Center, Middlebury, VT
- Robeson Community College, Lumberton, NC
- Southeast Kentucky Community and Technical College, Cumberland, KY
- Walters State Community College, Morristown, TN
- Wilson Community College, North Carolina
- West Virginia University-Parkersburg, Parkersburg, WV
Goals

• expand or improve programs supporting employment in sustainable companies
• attract and retain students in programs that lead to employment opportunities businesses that support sustainability
• support entrepreneurial education and opportunities
• integrate knowledge of renewable energy and conservation into all business and industry programs
• build or expand partnerships with local government, community based organizations, and extension services to strengthen programs and services
• increase use of energy efficiency and renewable energy in college facilities
Alliance Project for 2011

• Teams of students and faculty from US member colleges will work with team of students for EUC-Syd to build zero carbon house.
• EUC-Syd travel to US in winter 2010-11 to explain process
• Faculty from US rural colleges visit Sønderborg
• Result: combines best practices from both places, providing community college faculty and students with opportunity to learn about other approaches to sustainability
Lessons

• The majority of demand for “green” skills can be met through existing occupations

• Many of the new economic opportunities in green jobs are entrepreneurial

• Support in terms of time, resources, and recognition from college administrators essential

• Community colleges have pulse of community, understand local needs and biases, and can respond and influence them

• Effective programs understand market constraints and accommodate a wide range of students

• Cross-fertilization among colleges in different regions accelerates innovation
Challenges

- Ensuring open access and career pathways in the absence of a true community college system
- Projecting labor market demand
- Meeting industry standards
- Providing support services
- Measuring success consistent with triple bottom line goals
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