Community Colleges as Living Laboratories
September 10, 2013

*Moderator: Todd Cohen*

*Director, SEED Center (a program of the American Association of Community Colleges)*
Thank You to our Sponsors & Partners

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- National Council for Science and the Environment
  - Improving the scientific basis for environmental decision-making
- NALGEP
- American Association of Community Colleges
- APA
- AASHE
- Horinko Group
- Nature Generation
- Sustainable Cities
- ICLEI
- American College & University Presidents’ Climate Commitment
- National Brownfield Association
- SEED
- American Public Health Association
- National Association of Manufacturers
- Second Nature
- American Institute of Architects
Energy Efficiency Program Design, Marketing & Communications

• Why You Should Care:
  – Rising energy demands threaten energy security, economic growth, and the environment
  – Energy efficiency provides a low-cost, diverse, stable, and environmentally sound resource base
  – Consumers often don’t embrace the need to reduce energy use and don’t know how to do it

• What Are Your Next Steps:
  – Tailored energy saving programs that benefit the economy, reduce supply uncertainties, and mitigate climate change
  – Marketing that touches consumers, helps transform the marketplace for energy efficient products

• Cadmus Can Help:
  The Cadmus Group, Inc.:
  – Facilitates collaborative decision-making among multiple agencies and stakeholders
  – Factors in cost-effectiveness, economic stimulus, and reduced greenhouse gas emissions
  – Conducts market research to inform program design and consumer marketing
  – Orchestrates communications campaigns to produce sustained energy efficient choices
  – Evaluates the effectiveness of program and marketing initiatives

• Contact:
  – Linda Dethman, Linda.Dethman@cadmusgroup.com | (503) 467-7146
Socially Relevant, Practice-Oriented Graduate Study

- MBA in Sustainability
- MS & PhD in Environmental Studies
- Sustainable Development & Climate Change (A Professional Science Master’s Degree)
- MEd in Educating for Sustainability
- Resource Management and Conservation
- Environmental Education or Science Teaching
- Advocacy, Conservation Biology, and more

800.552.8380  www.antiochne.edu
LOCAL SOLUTIONS: Northeast Climate Change Preparedness Conference

May 19, 20 and 21st 2014
The Center of New Hampshire • Manchester, NH

Local Solutions (Days 1 & 2)
Educators’ Summit (Day 3)

www.antiochne.edu/climate-prepare
Develop practical solutions to minimize the consequences of climate change in the areas of the built environment and food and natural resources.

Develop and advance solutions that mobilize and integrate science and technology with appropriate financing, policy, and education.

Emphasize putting ideas into action – moving forward on policy and practice.
Gehrlicher Provides PV-Centric Energy Solutions©

- Engineering Procurement Construction (EPC\(^+\))
  - Gehrtec Engineered Solution©
  - Micro-grid and storage ready

- Project Finance Services
  - Gehrlicher Finance Link©

- Operations & Maintenance (O&M)
  - Gehrlicher Services©
Eaton Energy Solutions

To operate in today’s challenging energy environment you need a partner recognized as a global technology leader in diversified power management solutions that allow systems to operate more efficiently, effectively, safely and sustainably…

…you need Eaton

Our flexible and comprehensive approach to engineering that can help you sustain results.

- Energy Management & Strategic Planning
  - Facility Commissioning
  - Building System Optimization
  - Energy Audits/Analysis/Modeling
  - Energy/Building Master Planning
  - Water Resource Management
- High Performance Green Building Design:
  - Control, Automation & Metering
  - Retrofit & Renovation
  - LEED Certification/Consulting/Management

Eaton’s superior performance is measured by a proven track record in the industry:

- Certified ESCO by Department of Energy and National Association of Energy Service Companies (NAESCO)
- #2 commissioning agent – Consulting-Specifying Engineers MEP Giants 2010
- 1,500 engineers, specialists, LEED certified, and technicians organized around a combination of national Innovation Centers and local operations centers.
- Over 35 years experience as a Total Energy Solutions provider and ESCO
- Eaton Electrical equipment installed in over 30% of federal buildings.

- Turnkey Projects:
  - Financial Solutions and Bonding
  - Power Purchase Agreements
  - Integration of Tax Credits
  - Utility Programs
- Government/Military
  - Energy Surety
  - Expeditionary
Todd Cohen, Director, SEED Center, launched and directs all aspects of the American Association of Community Colleges’ (AACC) national Sustainability Education and Economic Development Center (SEED), a multi-million dollar clean energy sector initiative aimed at supporting 470 community college members in advancing education and training program to align to industry needs.
Session Agenda

• Introduction to the Panel: Todd Cohen
• Panel Presentations
  ➢ Bryan Albrecht, President, Gateway Technical College (WI)
  ➢ Stephanie Sklba, Gateway’s VP for Community and Government Relations
  ➢ Brian Lovell, Co-Principal Investigator, National Science Foundation's Building Efficiency for a Sustainable Tomorrow (BEST) Center (former faculty member at Georgia Piedmont Technical College)
• Discussion Questions
• Audience Questions: Send your questions through the chat box
• Summary Points
• Thank you!

Please fill out the audience exit survey
Dr. Bryan Albrecht has served as Gateway Technical College’s President since 2006. Serving as the college’s chief executive, Dr. Albrecht oversees the college’s 65 academic programs, 15 educational facilities, and a comprehensive $160 million budget and a progressive $4 million college foundation. Gateway represents Kenosha, Racine, and Walworth counties and has an economic impact of more than $400 million annually.

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Supporting community colleges in educating for and building a green and sustainable economy
All the tools your college needs to educate for and build a clean economy

**LEADERSHIP DEVELOPMENT** (president-to-president mentoring; sustainability messaging)

**EDUCATION & TRAINING RESOURCES**
(curriculum, best practices on clean tech career pathways; industry engagement, etc)

**SUSTAINABILITY ASSESSMENTS**
(institutional sustainability benchmarks; national awards program)

www.theseedcenter.org
Campus as a Living Lab: New Guide!

Released summer 2013 in partnership with USGBC’s Center for Green Schools
Campus as a Living Laboratory: A Core 21st Century College Strategy

- Makes curricula relevant through experiential learning
- Reduces the carbon footprint
- Uses institutional resources efficiently
- Serves as a core college completion strategy
Campus-as-a-Living Laboratory: Underutilized as a Practice

80% of institutions of higher education have conducted at least some green retrofits and operational improvements*

<5% of community colleges have considered using these opportunities as student learning opportunities**


**2013 SEED member survey
Eight Elements to Building a Campus Living Lab

1. Engage the right campus participants
2. ID key collegiate programs
3. Build credibility through engagement and data
4. Integrate into curriculum
5. Expand beyond individual programs of study
6. Build partnerships with industry
7. Engage support beyond campus
8. Open your labs to the community
Stephanie Sklba,  
VP-Community + Government Relations  

Bryan Albrecht  
President  

SUSTAINABLE GATEWAY
Sustainability: A catalyst for change

Governance
- Presidents Climate Commitment – Board signature
- AACC / SEED
- Local sustainable focused organizations

Program
- Student and staff interest drives change
- Community outreach drives change
- Program development drives change

Community
- Positive brand identity
- Industry partnerships
- ROI – envelope efficiency
### Gateway Technical College
#### Sustainability Dashboard Measures

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<tr>
<th>Utility Usage</th>
<th>Fiscal Year 2010</th>
<th>Fiscal Year 2011</th>
<th>Fiscal Year 2012</th>
<th>Fiscal Year 2013</th>
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<tbody>
<tr>
<td></td>
<td>Electric Sq Ft</td>
<td>Kwh</td>
<td>Gas Thers</td>
<td>Electric Sq Ft</td>
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<tr>
<td>Racine</td>
<td>270,917</td>
<td>4,410,800</td>
<td>134,786</td>
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<tr>
<td>Per Sq. Ft</td>
<td>16.28</td>
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<td>0.53</td>
<td>15.88</td>
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<td>Per Sq. Ft</td>
<td>13.76</td>
<td>0.67</td>
<td>0.61</td>
<td>13.72</td>
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<td>Walworth</td>
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<td>Per Sq. Ft</td>
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<td>Burlington</td>
<td>55,767</td>
<td>380,107</td>
<td>13,894</td>
<td>55,767</td>
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<td>Per Sq. Ft</td>
<td>6.82</td>
<td>0.25</td>
<td>0.25</td>
<td>7.94</td>
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<tr>
<td>Total All Buildings</td>
<td>761,313</td>
<td>10,522,388</td>
<td>421,414</td>
<td>761,313</td>
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<tr>
<td>Per Sq. Ft</td>
<td>13.82</td>
<td>0.55</td>
<td>0.55</td>
<td>13.60</td>
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### Renewable Energy Projects:

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<td></td>
<td>Kwh</td>
<td>$ Value</td>
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<td>Horizon Center</td>
<td>2006</td>
<td>$216</td>
<td>5,209</td>
<td>$572</td>
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<tr>
<td>Racine Solar Wall</td>
<td>-</td>
<td>-</td>
<td>657</td>
<td>$72</td>
</tr>
<tr>
<td>Ctr. for Sustainable Living</td>
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<td>-</td>
<td>-</td>
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</tr>
</tbody>
</table>

Four Winspires Estimated annual generated of $200 per unit, $800 per year total.

Solar Hot water - Elkhorn Estimated savings of $350 per year.

Solar Hot Water - CSL Estimated savings of $200 per year.
What does a Living Campus Look Like?

• Demonstrates the commitment
• Serves as a model for your community
• Expands faculty engagement and awareness
• Changes habits
• Practical application of knowledge and skill
• Connects students and staff with the campus facilities and builds pride
Examples at Gateway
Sustaining Results

Students
- Green scholars
- Sustainable student organization
- Service learning
- Technical skills in emerging industries

College
- Data tracking
- Re-Investment of resources
- Core Competencies
- Enrollment impact

Community
- Campus beautification recognition
- Service club partnerships
- Positions Gateway as a community resource
Our Sustainability Website

Sustainable Gateway

A college’s job is to educate, but also to lead – for our students, faculty, staff and communities. Today, that includes leadership in sustainability – creating a culture around saving energy, reducing our carbon footprint, recycling more, wasting less and generally doing our part toward building a greener, cleaner world.

In 2009, Gateway Technical College President Bryan Albrecht along with the Gateway Board of Trustees signed the American College and University Presidents’ Climate Commitment, thus committing Gateway to create a plan to achieve carbon neutrality – emitting net zero greenhouse gases.

In this continued commitment to protect the environment, the college strives to continually become more sustainable in its operations and provide education and training for emerging green industry careers. Gateway also collaborates locally and nationally on a number of environmentally beneficial initiatives.
Georgia Piedmont Technical College
Living Laboratory
Joined GPTC in 2007 to build new programs

Fall 2007 – HVAC students & instructors notice heating / cooling systems running concurrently

Students & instructors began tracking chillers / boilers (4 months) in three buildings (each approx. 30,000 sq. ft.)

Study revealed systems ran 24/7 while college only occupied 6AM – 9PM M-TH, 6AM – 2PM Sat (68 hours per week) systems ran 168 hours/week
Living Labs @ GPTC: From Simple Project to Full Integration

- Instructors presented findings to president, VPAA, division chair, facilities director & staff, HR director. Focused on improved student learning opportunities AND campus energy savings

- Outcome: Approval for comprehensive and integrated living laboratory activities in C-building:
  - Activities must be ID’d in syllabi
  - Students must have had a safety course prior to participation
  - Coordination with facilities staff for access and reporting
  - Student supervision at all times

- Students began in-depth studies of building performance, lighting assessments, heat gain & loss calculations, building shell investigations, mechanical systems inventories

- Studies informed 3 grant proposals later funded in 2009

Why Campus Building Automation Systems as a Campus Living Lab Starting Point?

- Present in virtually every building
- Analogous to central nervous system in the human body – Have connections to all major building equipment & systems
- Provide ideal means of tracking building operating conditions & collecting data. Examples: temperature, humidity, pressure, outside air conditions, energy consumption, etc.
- Web-based controls allow system access from virtually anywhere
- Provide excellent means of limiting student access through software
- Low cost to implementation in the classroom when partnered with facilities staff
• BAS students expanded project by installing sensors, networks, controllers throughout C-building

• System disassembled each semester & then re-designed & installed by students to include physical equipment, devices, controls, communications networks & software as part of graded assignments in each BAS course
Living Labs Expansion: Cross-Disciplinary & Real World Project

• Starnes Center: 2 miles from GPTC main campus

• Students from: BAS, HVAC, Drafting, Commercial Refrigeration, Accounting, and Georgia Perimeter College Engineering students (with other disciplines engaged)

• Energy model & audit; BAS system design; Load calculations; Building systems inventory; Small business management

• Used Collaborative Operating System (COS) to gain faculty alignment, facilitate productive meetings, focused planning
Assignments for Each Discipline of Students (examples):

- **Building Automation**: automation systems assessment, design, installation
- **History**: essay on history of renewable energy sources and uses prior to industrial revolution
- **Accounting**: capitalization of installation equipment needed; cost analysis; ROI; overall project management
- **Engineering**: Level III energy audit and energy conservation measures
Living Labs @ GPTC: Outcomes

- **Students**: learning improvements (on core principles re: subject areas gained thru student assessments)
- **Students**: many gained employment with corporations involved in GPTC living lab curricular work
- **Faculty**: cross-collaboration/team teaching and improved relevancy of curriculum
- **Campus**: building efficiencies better understood and acted upon
- **Campus**: $$ to expand to other parts of campus
- **Area Companies**: Students with improved technical and soft skill sets (and credentials in fast growing industry areas)
Living Labs @ GPTC Lessons Learned

- Absolutely dependent upon relationship between faculty and facilities director

- **Take the low-hanging fruit first** – Energy audits, building usage patterns, equipment runtime, data-logging, heat gain calculations: all non-invasive/non-threatening to facilities representatives

- **Capture and present data:**
  - Campus energy savings
  - Student outcomes (pre and post cognitive assessments)

- **Form and present to comprehensive campus-wide leadership group (need their buy-in)**
  - Motivated Instructors
  - Facilities Director
  - Division Chair
  - Dean or VPAA
  - HR Director
Address Liability / Safety Issues

- Student work needs to be clearly documented / defined within course materials
- Supervision of students at all times
- Institution of safety course prior to student participation

Celebrate success—Celebrating the students’ efforts through on-going end-of-semester presentations open to students, faculty, and industry
National Science Foundation
Advanced Technology Education

BEST Center slides contributed by
Center Principal Investigator
CTE Dean Peter Crabtree
Laney College, Oakland, CA
1. Build and transform the instructional capacity of community colleges in the field of building systems technician education

2. Engage industry stakeholders in a national collaboration with community colleges to support high quality instructional programs for new and incumbent building technicians

3. Strengthen the national STEM pipeline for educating building technicians and engineers, starting in high school
Tools for Success

Useful Resource

Links & Contact Info.

- The AACC SEED Center
  www.theseedcenter.org
- The NSF BEST Center
  www.bestcte.org
- The Collaborative Operating System
  www.thecos.org
- Project-Based / Scenario-Based Learning
  www.learnpbl.org
- The Watt Doctors, LLC
  www.thewattdoctors.com
  brian.lovell@thewattdoctors.com
• Where do you get the expertise? How do you tap into local expertise?
• Is it an investment or a reasonable payback?
Audience Questions
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National Council for Science and the Environment
Improving the scientific basis for environmental decisionmaking

solutions mapping

American Public Health Association

Sustainability Education & Economic Development
For free video archive access join the
The Security and Sustainability Forum
www.securityandsustainabilityforum.org/membership

A Conversation with Vancouver’s Deputy City Manager, Sadhu Johnston
September 20, 2013 1:15 pm – 2:15 pm ET
www.securityandsustainabilityforum.org/events