Learning the Way to a Clean Energy Economy:
The role of community colleges in green economic development

by

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Chapter I
The Role of the Community College in Green Economic Development

The transition to a clean energy economy is rich with promises for a country suffering the consequences of a deep economic recession and several decades’ worth of change in the national and global economies. The manufacture of clean energy technologies and equipment offer the country a chance to reestablish its competitiveness in goods-producing sectors, thereby rescuing the country’s emaciated manufacturing sector and its displaced workers. Further, the fields of energy efficiency and weatherization have been heralded for their ability to put thousands of low-income individuals to work in the service of lowering household energy expenditures.

Jobs in clean energy fields are often referred to as green-collar jobs for their ability to provide individuals with high-quality, career track jobs that provide a family-supporting wage. The choice of the term “green-collar” is a clear reference to the “blue-collar” jobs of earlier decades—skilled and semi-skilled jobs in homegrown industries that offered long-term job security and decent wages. Blue-collar jobs, which built the country’s middle class in the decades following World War II, have largely disappeared as a result of global economic restructuring—a disruptive set of processes that have included technological change, the globalization of markets, shortened production cycles and competition from foreign companies and labor markets.

The explosion of interest in clean energy industries and green-collar jobs has manifested itself in a proliferation of funding for green-collar job training programs. Some of the most prominent green jobs advocacy organizations and coalitions that have emerged in the past few years all count on the strong involvement of organized labor. Unions have a powerful role to play in promoting the transition to a clean energy economy because many union jobs can become
green-collar jobs by being integrated into green products and processes and because many unions have well-developed training and education programs (including apprenticeship systems).

Unfortunately, alliances with organized labor for green-collar job advocacy and training are not a solution for all states and regions. Whereas unions have traditionally been strongest in urban areas, many rural areas are now pinning their hopes on green-collar jobs and clean energy industries as a tool for economic revitalization. Further, differences in labor laws—right to work versus forced unionization—create vast differences in unionization rates and the environment that surrounds organized labor. This is a particularly salient issue for green jobs efforts in the southern United States.

In light of these differences, community colleges in rural and nonunionized areas can assert themselves as leaders in promoting green-collar jobs and supporting emerging clean energy—or green—industries. In fact, the role of community colleges as green job advocates and allies is enhanced by the mandate that most community colleges have to support local economic development. This mission is typically fulfilled in one or more of several ways: through education in technical and occupational fields, delivered to enrolled, degree-seeking students; by offering training, often customized, to new and incumbent workers of local firms; and by providing business support services and resources (e.g. incubation, small business counseling).

Community colleges that seek to cultivate a position in promoting the green economy must do so with respect to and for the local, regional and statewide frameworks in which they operate. They must be sensitive to the institutional, industrial and environmental legacies that surround them, recognize the opportunities and constraints that these legacies pose for green job...
development and growth, and position themselves accordingly within and in relation to these frameworks.

Sensitivity to context is not a mandate unique to efforts to promote green-collar jobs and green sectors, but it has an added layer of importance because of the broad scope of the clean energy sectors—and the multiple career pathways that these sectors can create. Not all clean energy sectors are universally viable, or compatible with the resources—human, natural and infrastructural—of a given area. Places that seek to use clean energy products or processes as a driver of economic development and growth must be strategic, narrowing their focus to specific subsectors, sectors and niches that can be built off of existing regional assets (Center on Wisconsin Strategy, 2008).

This paper presents case studies of Cleveland State Community College and Hocking College, two community colleges that are positioning themselves as leaders in the transition to a green economy by offering unique and innovative training programs focused on preparing students to work in green-collar jobs in both traditional sectors and industries and newer, green industries. The purpose of offering these two studies is to draw out the way in which local circumstances affect the approach of the community college to preparing workers for green industries and occupations. The similarities between the two institutions—and the resulting similarities in how they have structured their programs—offer promising practices for community colleges in rural and distressed areas that are seeking to undertake green economic development. The differences between the two highlight ways in which the programs are adapted to their unique circumstances—and what prospects this offers for each program to play a role in furthering appropriate green economic development: that is, the pursuit of economic recovery and growth through the promotion and support of clean energy sectors and industries.
Background

The case studies presented in this paper are part of a larger project being carried out by Regional Technology Strategies, Inc., a nonprofit economic development consulting firm based in Carrboro, North Carolina, in partnership with Penn State University. The project is funded by the Appalachian Regional Commission, (ARC), a federal government agency created by an act of Congress in 1965 to address the persistent poverty in Appalachia, the largely rural region that stretches from New York to Mississippi. The goal of the project is to assess the workforce trends and training requirements of the region’s energy sector, project energy workforce growth, and assess the capacity of the region’s community colleges and universities to train workers to meet expected industry needs. Traditional and renewable energy sources are both of interest, particularly in light of new mandates and opportunities for renewable energy and cleaner forms of traditional energies as a result of enabling legislation and available federal funding.

The idea of an economy built on and around energy production is both old news and a new challenge for Appalachia. For all regions, instability in the global energy market has had ripple effects in the economy, affecting the costs of transportation fuels, residential and commercial heating, electricity for productive sectors of the economy, and operating costs for businesses and public agencies. In light of this, securing affordable and reliable sources of energy, and ensuring their efficient use, is a building block of economic development. Compounding this is the unique position of energy in Appalachia. The Appalachian region has a strong legacy in coal mining and while this sector has declined in importance as an employment opportunity, energy production is still part of the region’s economic base: Appalachia remains a net exporter of coal- and nuclear-generated energy. The region possesses abundant coal resources, as well as varying degrees of potential in natural gas, biomass and wind and solar energy (Appalachian Regional Commission, 2006).
Strengthening, diversifying and greening the region’s traditional energy sectors are understood as a way creating jobs and economic opportunities throughout the ARC region (Appalachian Regional Commission, 2006). Since 2006, the ARC has supported a number of projects that have produced in-depth analysis of the opportunities and constraints facing the traditional and renewable energy sectors in the region, including the study on workforce needs from which this paper is derived.

The ARC’s service area covers 205,000 square miles and 420 counties in parts of 12 states and the entire state of West Virginia. There are close to 25 million residents of the ARC region and 42% of the population is rural (compared to 20% for the entire United States). Because of the size and spread of the region, there is a great deal of variability between the counties and sub-regions of the ARC area in terms of economic profile, but generally speaking, the region exhibits lower labor market participation, lower median income and lower educational attainment rates than the nation as a whole. Also, with several exceptions, the Appalachian counties of each state fare worse than the state as a whole in terms of annual average labor market change, annual average employment change and unemployment rate. In 2007, per capita personal income was 20% lower in Appalachia than in the nation as a whole (Appalachian Regional Commission, 2009).

Cleveland State Community College (CSCC) in located in Cleveland, Tennessee, thirty miles northeast of the city of Chattanooga. The school’s service area covers a five-county area in the southeastern corner of the state, and borders North Carolina to the east and Georgia to the south. Southeastern Tennessee sits within the Tennessee Valley, and as a result, is under the authority of the Tennessee Valley Authority (TVA), the nation’s largest publicly-owned power company. The TVA is a federally-owned corporation formed in 1933 to modernize the
Tennessee Valley region, which was particularly hard-hit during the Great Depression, through comprehensive planning and economic development efforts.

In 2010, four out of five of CSCC’s service area counties were classified by the ARC as transitional, and one as at-risk, under an ARC system of classification that consists of four categories: distressed, at-risk, transitional and competitive. Average per capita market income across the five counties was $18,397 in 2006, and poverty rates ranged from 12 to 18% (Appalachian Regional Commission, 2009). Unemployment rates in November 2009 ranged from a low of 9% in Bradley County to a high of 15.8% in Monroe County (Bureau of Labor Statistics, 2010), compared a statewide rate of 10.7%. Despite national and regional decline in the industry, an estimated 30% of the areas jobs are remain in manufacturing; construction accounted for nearly 5% of all jobs in 2008 (Bureau of Labor Statistics, 2010a).

Hocking College (HC’s) is located in Nelsonville, Ohio, a town of approximately 5,000 people. The college’s service area includes Athens, Hocking and Perry counties. These counties are part of southeastern Ohio, an area that remains rural despite proximity to Columbus; HC’s main campus is located 60 miles southeast of the state capital. As is typical of the Appalachian region, natural resources have long been a cornerstone of the southeastern Ohio economy, particularly coal, clay, and wood; Hocking County was, at one time, home to the largest brick producing company in the country on account of the rich clay deposits in the Hocking Valley (Rinehart, 2010). Agriculture has also been a mainstay of the Appalachian Ohio economy: several of the region’s counties are among the state’s leaders in the production of oats, hay, soybeans, cattle and sheep (Governor's Office of Appalachia, n.d.).

In 2010, Athens County was classified by the ARC as distressed, Hocking County as transitional and Perry County as at-risk. In 2006, average per capita market income across the
three counties was $17,175 and poverty rates ranged from 11.8% in Perry County to 27.4% in Athens County, a stark figure considering that Athens County is also home to Ohio University (Appalachian Regional Commission, 2009). Unemployment rates in November 2009 ranged from a low of 8.7% in Athens County to a high of 12.9% in Perry County; as a point of reference, statewide unemployment was 10.8% (Bureau of Labor Statistics, 2010).

About the Case Studies

As both programs are young and relatively small, the purpose of this paper is not to judge which is more effective or to evaluate whether either or both are destined for success in reinvigorating their local or regional economies. Rather, by drawing out the most salient aspects of each program, this paper highlights the ways in which community colleges can be part of green economic development and a national clean energy transition, as well as some of the barriers that they face in doing so. Broad questions that guided the case study development are: how does the presence or absence of supportive strategy and policy affect the way in which community college training programs work and how students find their way into the workforce? What prospects are there for greater coordination between community colleges, employers and industry, and local and state economic development actors to support green industry development?

Cleveland State Community College

Cleveland State Community College (CSCC) offers a course of study in energy efficient residential construction (EERC), which emphasizes skills in home energy use assessment and rating and includes courses in renewable energies as well. The program, funded with an initial grant by the U.S. Department of Labor made in 2005, is part of the industrial technology division of the college. Students can enroll as degree-seeking candidates who receive an associate of applied science degree (A.A.S.) in construction technology, certificate-seeking candidates who
complete the sequence of six courses focused on energy efficiency, or non-credit students who can take classes on a one-off basis.

The EERC program offers several lessons pertinent to the conversation on green-collar jobs and the role of job training in supporting the movement toward a clean energy economy. The first, and the most overarching, has to do with the stance that CSCC and the EERC faculty has had to adopt in order to make the EERC program relevant to the region. CSCC is embedded in region where traditionally low energy prices have led to some of the highest rates of residential energy consumption in the country (Southern Alliance for Clean Energy, n.d.). Though the state has Tennessee has taken steps toward supporting the transition to a clean energy economy as part of its economic development strategy, the regulatory environment that would support increased energy efficiency is largely absent (Tennessee Department of Labor and Workforce Development, 2008) (Building Code Assistance Project, n.d.).

As a result, EERC lacks the luxury of being able to plug its students into a well-defined subsector of the construction industry upon program completion. Instead, the EERC program stands out for the efforts of its faculty and staff to catalyze change in the local construction industry and in consumer behavior, as a means of promoting energy efficiency and in doing so, creating a more robust market for the skills that EERC teaches students.

In light of this, a picture of CSCC as a central actor in green job and industry development emerges and with it, a clearer picture of the institutional stance that a community college must adopt: that is, that of an outward-facing ambassador, spokesperson and advocate for energy efficiency. In light of this, ongoing outreach and continuing education for industry, consumers and households becomes just as important a role for the CSCC program to play as the classroom instruction and training that the EERC program provides.
A second lesson offered by CSCC is on the nature of green-collar jobs, and the resulting placement of green job training initiatives within any given community college and their relationship to the regional workforce development system. The decision to embed the EERC curriculum within the traditional construction technology curriculum reflects the reality that not all green-collar jobs are, or will be, new jobs; rather, in many cases they are traditional jobs using new or different inputs (Chapple, 2008). Stand-alone green-collar job training programs run the risk of being too narrow to give students mobility in the job market, and training them for specific jobs, subsectors or technologies that do not yet offer substantial employment opportunities.

In contrast, embedding green jobs training within broader technical or occupational training programs ensures that students gain a base of general skills in a certain trade or industry. This has positive implications for the many American industries that rely on skilled trades workers—industries that are facing a worker shortage as a result of declining vocational education at the primary and secondary levels and the pending retirement of their current skilled workforce.

Related to this, the flexibility in enrollment that the EERC program offers means that the courses provide incumbent workers in the construction industry with the opportunity to upgrade or enhance their existing skill sets. This can be a way of contributing to increased firm competitiveness, as energy efficiency is a relatively low-cost way of setting individual firms apart from their peer firms—particularly important in an economic recession and a soft market for construction.

In these ways, the case of CSCC’s energy efficient construction programs demonstrates how green job training can be a tool for greening existing industry from within, as well as a way
of responding to broader challenges faced by regional economies—challenges unrelated to green issues but for which a green focus may serve to reenergize interest in and perceptions of the industry.

Finally, the CSCC case shows how community colleges can use their green job training initiatives to respond to the current economic recession. In partnership with the local workforce investment agency and with federal funding made available through the American Recovery and Reinvestment Act of 2009, CSCC is offering its EERC curriculum—in a condensed format—to two cohorts of displaced workers. This supports the idea that in order to have the greatest impact, green job training programs should build off of existing workforce development networks, institutions and excess demand for jobs (Chapple, 2008).

**Hocking College**

Hocking College offers a two-year associate of applied science degree in advanced energy and fuel cells through the Hocking College Energy Institute (HCEI). HCEI was founded in 2005 to serve as a focal point for the college’s involvement in promoting training and demonstration projects in renewable energy sources. HCEI also offers a two-year associate’s degree in fuel cells and hybrid automotives, and in fall 2010 will add a degree in regenerative sustainable agriculture. Hocking College has a history of unique programs and a focus on experiential learning that continues to draw students from beyond the college’s service region, including students from every Ohio county and many other states (Hocking College, 2009). HCEI is no different: despite its short period of existence, in the 2009-10 school year there were students from five other states (Hutton, 2010).

In contrast to CSCC, which is at the center of efforts to promote clean energy in its region, Hocking College is one node within a multilayered strategy to harness renewable energies as a driver of economic revitalization and development. Whereas CSCC is and will
likely continue to be the center of green economic development efforts in its region, HC is central—that is to say, an important asset—to a more developed and established set of green economic development efforts. In other words, CSCC is asserting its influence in the emerging green economy by turning outwards to effect change amongst industry and consumers, while HC enjoys relationships and partnerships with a number of institutional actors that are more reciprocal or two-directional—involving flows of resources and information into and out of HC.

Thus, one of the key points that emerge from the HC case is that of the importance of broader green economic development strategies in creating synergistic relationships for HC to exploit to the benefit of its students. Ohio has a statewide fuel cell (FC) cluster strategy that dates back to the early 2000s. After an initial stakeholder analysis, in 2002 then-Governor Taft announced an Ohio Fuel Cell Initiative and in 2004, the Department of Development released the Ohio Fuel Cell Roadmap, which was updated and rereleased in 2009 to track progress (Valente, 2010). The original roadmap identified Ohio’s potential to take a leadership role in advancing the development, commercialization and use of fuel cells. This potential was based on the state’s core competencies in automotive manufacturing and specialized materials, the presence of a manufacturing supply chain that includes assembly lines, workers, distributors and sales channels, and the presence of end-use sectors likely to be early adopters of different fuel cell applications (particularly vertically-integrated utilities, and heavy truck transportation).

A statewide strategy for promoting and supporting the development of a fuel cell cluster means that there are a significant number of companies throughout the state that are already involved in fuel cell development. The most obvious benefit to this is that there is a critical mass of companies that can provide internship and employment opportunities for students. On the
other side of the coin is the benefit to firms of proximity to an educational institute focused on building the pipeline of workers with the skills to meet their industry-specific needs.

Further, in the context of Ohio’s fuel cell cluster strategy, training workers to fill mid-skilled, technician positions—as HC does—may serve to anchor fuel cell companies in place. Because Ohio aims to become a leader in the manufacture and use of fuel cells, preparing a workforce that can fill production and maintenance roles is a critical step toward ensuring that the green-collar jobs of the industry are not outsourced with only the professional and research functions remaining in the United States, as has been the case with many other knowledge-intensive industries (Lowe, 2007). To this end, as states and municipalities compete to attract renewable energy firms, focused green job training program can be a way of moving the recruitment race beyond subsidies and tax breaks—which often create uneven benefits and negative consequences—to include education and training, which are incentives that can have broader social and economic benefits.

A third lesson drawn from the HC case is about how community colleges can be important assets and partners in local green economic development. At the local level, HC has developed a close partnership with Logan County’s economic development actors and together, the institutions are working to promote the growth of more green companies as well as a vision for sustainable energy for Appalachia. For Athens County, where alternative energy is one of three sectors that the public economic development agent is focusing their efforts on bolstering, Hocking College is one of several existing assets that can be used to attract new alternative energy firms and support existing ones.
Methodology

The case studies that form the basis of this paper are informed by collection and analysis of interviews with primary sources and analysis of data from secondary sources. Thirteen phone interviews were conducted in February and March of 2010 with individuals who represented a range of perspectives on each program and fell into the following categories: faculty and staff of the community college; former students of the programs; company owners in relevant industries; and employees of economic and workforce development agencies. Initial contacts with the head of the curricular program of interest were made through Regional Technology Strategies, Inc. and most other potential interview subjects were identified by these initial contacts. Several subjects were identified as appropriate contacts based on their association with organizations whose web-based resources—web sites and reports—served as important secondary sources: namely, the Ohio Fuel Cells Coalition and the Athens County Economic Development Corporation.

Other secondary sources were literature from the academic and professional bodies of work on economic and workforce development; reports and analyses from green economy advocacy groups and think-tanks; and news media coverage.

Orientation to Report

Chapters 2 and 3 of this report present the in-depth case studies for Cleveland State Community College and Hocking College, respectively. Each case study includes a discussion of the ways in which the program of interest reflects the context in which the program operates, along with analysis of how the ways in which program has adapted offer lessons about the role of community colleges in green job training and green economic development. Each case also concludes with a brief discussion of challenges or gaps in each program, in terms of achieving
greatest impact with respect to the job creation and economic revitalization promises of the green economy.

Chapter 4 draws out the similarities between the two programs. These similarities are largely left out of the discussion of the individual case studies, but are important in gaining a fuller picture of each program as well as a more general understanding of what may be promising practices for all green job training programs.

Chapter 5 discusses, briefly, some possible future directions for each program as a response to the barriers and gaps they face currently. These recommendations are guided by an analysis of how each program can deepen its impact so as to bring their contributions to green local and regional economic development to a greater scale.
Chapter II
Energy Efficient Residential Construction at Cleveland State Community College

The story of Cleveland State Community College (CSCC), located in southeastern Tennessee, and its program in energy efficient residential college (EERC) is that of a community college at the helm of efforts to transform the way energy is used in its region. This case study demonstrates how community colleges can use the emerging green-collar job paradigm to effect change in both the local construction industry and individual behavior.

The specific question that guided the development of this case study was: how can green-collar job training programs succeed in delivering economic and job benefits in an institutional and regulatory climate that is weak in its support for clean energy usage and energy conservation? The answers provided by CSCC and the EERC program are what follows. In short, CSCC uses energy efficiency as a way of reenergizing a traditional curriculum in construction technologies, and attracts students and companies who see the economic benefit in using energy efficiency to set them apart in the marketplace. Concurrently, ongoing education and outreach efforts become a critical part of what the college must do in order to create a receptive market for the services that EERC program students can offer—and by doing so, change the way in which individuals and industries understand and use energy.

Background

Cleveland State’s program in energy efficient residential construction (EERC) started with a grant of $861,840 from the U.S. Department of Labor in 2005. The grant was one of 70 Community Based Job Training Grants (CBJTG) made nationally, and was to support the
The CBJTG program was designed to build off another federal initiative, the High Growth Job Training Initiative, which in 2004 identified fourteen sectors that were projected to add a lot of jobs and/or stimulate growth in other industries, and experience change as a result of emerging technologies. Construction was one of the targeted sectors. The CBJTG grants were awarded with the purpose of building community college capacity to prepare workers for the high growth sectors.

The project that CSCC designed for the CBTJTG grant funding had 4 elements: incorporating concepts of green building, energy efficiency and sustainability into the existing construction technology curriculum; outreach to schools and the local education community; purchase of equipment and technologies to support classroom learning; and continuing education (by way of workshops and seminars) with local contractors and members of the construction industry.

One result of the DOL grant was the creation of six courses in topics related to energy efficiency and alternative energy. These courses can be taken either as part of the A.A.S. degree in construction technology, as a stand-alone certificate program called the Zero Energy Home Certificate, or individually on a one-off basis, with students taking only the classes that are interesting or relevant to them. The six courses and a brief description of the topics they cover follow:

- **Renewable Energy** provides an introductory overview of the issues associated with fossil fuel use in energy production as a springboard to introducing alternative renewable energies, including direct solar photovoltaic (PV) electrical generation, active and passive solar thermal energy generation, wind power generation, harnessing ocean actions,
biomass conversion, and hydrogen fuel cells, with an emphasis on the site-specific suitability, economics and regulations of each. The course then turns to a consideration of residential energy use and the concept of a "zero energy home", with a focus on solar PV panel electricity generation, solar thermal hot water generation, geothermal heat pumps and structural issues in insulation, framing and foundations that have an effect on energy use.

- **Solar Photovoltaic (PV) System Design and Installation** provides a basic overview of how to size a PV installation to meet expected energy needs; covers techniques rooftop installation techniques; and how to customize installations to meet site needs and convert the variable DC energy generated by solar to uniform AC electricity.

- **Energy Efficient Residential Elements** is a foundational course that teaches the techniques, methods and practices of energy efficient construction and remodeling for residential and commercial applications. The course covers energy use in buildings, building materials and methods including insulation, air leakage and quality, site management, solar hot water installations and specialized solar grid-tied electric codes.

- **Ground Source Heat Pumps** focuses on the use of ground sourced heat pumps as an energy efficient choice for heating, ventilating, and air conditioning (HVAC), and emphasized the energy intensity of inefficient HVAC systems.

- **Home Energy Rating System** teaches students to use computer software and rating criteria to evaluate and score homes according to Home Energy Rating System (HERS) Index set forth by the Residential Energy Services Network (RESNET).

**Service Learning** affords students the opportunity to apply many of the concepts they have learned in their courses by participating in a Habitat for humanity build. Habitats
for Humanity’s construction guidelines for U.S. affiliates encourage the incorporation of the ENERGY STAR guidelines for residential construction; ENERGY STAR is program of the U.S. Environmental Protection Agency and the Department of Energy.

In summarizing the launch of the EERC curriculum, Allan Gentry said that the greatest challenge was figuring out how to package the concepts and elements of renewable energy in a way that makes sense for the region in which the program operates: southeast Tennessee. There were several layers to this challenge.

The first is the culture of energy supply and demand. Tennessee is part of the East South Central census division, which also includes Alabama, Kentucky and Mississippi. In 2008, this census division had the highest average monthly energy consumption—twice that of the New England—and Tennessee had the highest of the group with 1,302 average monthly kilowatt hours. Furthermore, even with one of the lowest average retail prices per kilowatt hour, at 8.92 cents, the average monthly residential electricity bill was $116.02.1

For this reason, a large part of what the EERC program aims to do--both in the classroom and through its outreach activities--is raise awareness about the concepts and benefits of energy efficiency (EE) and renewable energy (RE).

A second layer to the challenge of packaging renewable energy for the region was to determine which energy sources should be emphasized based on their potential for the region given its climate and local economic conditions. For example, Gentry noted that the popular image of renewable energy is that of wind turbines, but wind is not a viable option in the Tennessee Valley because of local climate conditions. Nevertheless, CSCC has a wind turbine installed on campus. “It doesn’t spin much,” says Gentry. “Basically we spent three to four

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thousand dollars to show people something that doesn’t work for this area” (Gentry, 2010). On the other hand, the local climate does make solar energy a viable option, particularly in conjunction with energy efficient construction because the solar installation can be downsized as a result of a building’s reduced energy demand.

The choice to emphasize energy efficiency is, at once, both obvious and ambiguous. On the one hand, as a strategy for reduced fossil fuel use and stimulating economic activity, energy efficiency is a green economy sector that has no geographic constraints. For the United States as a whole, and Tennessee specifically, energy efficient construction is thought to be the fastest and cheapest way to reduce fossil fuel use and resulting greenhouse gas emissions. Further, energy efficient construction and retrofitting is estimated to create 18 times more direct and indirect jobs than the renewable energy sectors in the United States (Center on Wisconsin Strategy, 2008) (Tennessee Department of Labor and Workforce Development, 2008). By this token, and when combined with the trends of high energy consumption and low energy costs in Tennessee, there is a clear rationale for a training program that emphasizes EE construction.

However, the lack of supportive policies and incentives for residential energy efficiency at the state level make it so that the faculty and students of CSCC’s energy efficient residential construction program are faced with the challenge of making the program—and the skills it teaches—attractive and relevant to the construction industry and the public. How CSCC is addressing this challenge is discussed in the following section.

Community College as Catalyst

As one of four areas of activity funded by the grant that launched the EERC program, outreach has always been an important part of what the faculty of the program does. Part of the initial DOL grant that CSCC received to launch the EERC program was used for outreach to the
local construction and utilities industry by way of seminars and workshops. The focus of these events was to highlight the benefits of EE construction, as well as the negative effects of inefficient construction on energy consumption. Some of this outreach was channeled through the Ocoee Region Builders’ Association (ORBA), a local chapter of the National Association of Homebuilders.

ORBA maintains a connection to the EERC program as a result of the individual interests that several prominent members of the organization have in green construction methods, and the organization’s involvement with the local chapter of Habitat for Humanity. ORBA sponsors seven to eight Habitat for Humanity (Habitat) houses a year. Because of the EERC program’s service learning requirement, students and builders often work side by side on these projects, simultaneously gaining experience in EE construction techniques because of Habitat’s commitment to green building and energy efficiency.

EERC is also involved in ongoing efforts to educate people about the need for energy efficiency and the opportunities for energy savings afforded by renewable energy sources. The school owns a trailer that is equipped with a solar panel array; Gentry takes the trailer to career fairs and events with a focus on green living as a way of raising interest in the program and providing a visual representation of the idea of green jobs and clean energy that most people have heard of through the media. At one recent event held at a local mall, called “Save Green, Go Green”, CSCC staff gave brief presentation on how having an energy efficient home and making changes to energy-use behavior can save homeowners and renters money. At this particular event, Gentry was joined by Kristi Strode of the Local Workforce Investment Area 5, the agency with which CSCC is partnering to offer its courses to displaced workers; this was
done a way of raising awareness about the training opportunity that the two organizations are offering jointly (Strode, 2010).

The entire event was organized by the Tennessee Saves coalition, and was focused on teaching people how to manage their own financial resources. While one of the other presenters was focused on making rain barrels (and presumable, saving money on water bills as a result), the presenters were focused on more mainstream household finance issues: tax preparation, buying a car or home, and saving money. The inclusion of CSCC into such a program reflects the way in which Gentry has found it most effective to sell the idea of energy efficiency: as an economic benefit. In his opinion, appeals based on the environmental benefits of energy efficiency—particularly related to climate change—are less effective than those based on the financial savings that can be realized because while there is a lot of doubt about climate change, “everyone has a utility bill” (personal communication, 2010).

Faculty and staff of CSCC are not the only ones who are raising awareness about energy efficiency in the southeastern Tennessee region. When asked about the existing demand for their specialized services in energy efficient construction and retrofitting—as a means of determining the absorptive capacity of the region for graduates of the EERC program—former students of the program all stated that it is up to them to create demand through outreach and education, both formal and informal. For students of the program who are incumbent to the construction industry—as about two-thirds of them are (Gentry, 2010)—colleagues, subcontractors and clients are all audiences for delivering the message about energy efficiency.

Jim Cucciare is one such former student. He is the owner of Jim Bob Construction, a full service remodeling, repair and maintenance company that serves the same geographic area as
CSCC and employs between 12 and 15 workers. Cucciare is in his fifties and has worked in construction his whole life; his company was founded in 1989.

Cucciare learned about the EERC program from a seminar put on by Allan Gentry, presumably as part of the CBJTG project. Together with one of his employees, Joe completed all six of the energy efficiency classes over the course of about two years. He says that what he learned in the program has fundamentally changed the way he does things in his business—even the way he writes estimates for contracts. This change to the way he works translates to a need to educate his clients about the techniques he is using, as well as the small ways in which they can alter their behavior and their homes to decrease their utility bills. Furthermore, he is in the process of launching a new website for his company that will highlight his use of green materials and equipment to clients.

John Chinelli is another example of a former EERC student taking on the task of education in the service of promoting energy efficient construction. Up until a few years ago, Chinelli was a real estate broker and developer in Florida who had developed an interest in how environmentally-friendly buildings could be more affordable to consumers. After the real estate market collapsed in 2008, he took the energy efficient residential elements and home energy rating systems courses that the EERC program offers and in late 2009, passed the test to become a certified home energy rater under the Residential Energy Service Network (RESNET).

While Chinelli is hoping to build a business for himself doing home energy ratings, he is also trying to carve out another niche in educating the real estate industry about the different ways in which home energy rating can be used to make energy efficient construction more affordable to homeowners. As of February 2010, he had already held one seminar for a group of realtors on the subject of energy efficient mortgages and the role of home energy ratings in...
helping homebuyers access the economic incentives for choosing energy efficient homes (Chinelli, 2010). RESNET home energy ratings are recognized as an eligible third-party verification of energy efficiency that is required in order for homes to earn the ENERGY STAR label. Energy ratings are also accepted by the mortgage industry as verification on home energy savings to determine eligibility for energy efficient mortgages.

Together, these examples make the point that the weak supportive environment for energy efficiency in Tennessee shapes the role that EERC students and faculty must assume. Beyond being skilled and knowledgeable practitioners of energy efficient construction, they must also be advocates and educators for the benefits of energy efficiency.

**Embedding Green Job Training in Existing Curricula**

The decision to integrate coursework on energy efficiency into existing curricula reflects what is considered a best practice in designing industry-specific training, and has also been recommended as an appropriate approach to green job training. Teaching green job skills in the context of broader existing curricula has benefits for individual students and firms, as well as local and regional industries and labor markets. Namely, this “added skills” approach (Weissman J. V., 2009) can enhance worker mobility and employability by giving them a broader base of skills; it can contribute to increased firm competitiveness by training workers in competencies that can set their firms apart from peer firms; and it can improve local and regional industry performance by filling critical gaps and shortages of skilled trades workers that are industries across the country are facing.

At the most basic level, the rationale for embedding EE courses into the construction technology program is that the job descriptions of traditional construction jobs and energy efficiency construction and retrofitting jobs are not very different (Center on Wisconsin Strategy,
2008). In fact, in response to the overwhelming enthusiasm over the promises of green jobs, more cautious analysts have warned that many green jobs are not new jobs—they are traditional jobs using new or different inputs (Chapple, 2008).

In many ways, in the case of EE construction, this is true. Largely, the differences between traditional and energy efficient construction are differences in materials, equipment and techniques, the use of which does not require a different set of technical competencies but rather awareness and knowledge of how to apply them. For example, the way a house is framed has an effect on the way it can be insulated which in turn influences the energy savings that can result from better insulation. The energy efficient framing technique does not require a different set of basic competencies for a framer, but it does mean that a framer needs additional or different knowledge to build an energy efficient home (Spors, 2010). For this reason, a large part of the EERC program focuses on familiarizing students with green building materials and technologies such as ground source heat pumps, which are more energy efficient than traditional HVAC systems, teaching them the contexts in which to apply them, and giving them hands-on experience in installing them(Gentry, 2010).

James Peterson, an experienced builder who teaches the Energy Efficient Residential Elements course in the EERC program, emphasized that the course teaches building science: the idea that buildings are a system and in order to build more efficient buildings, it is necessary to understand how the different pieces of the system work together. This is critical for all students because it will give them the knowledge they need to build better homes—regardless of whether or not they find themselves working in for a project or a company that is explicitly focused on energy efficiency (Peterson, 2010). This is to say that CSCC’s curriculum aims to ensure that students gain the basic set of skills and competencies that are applicable to the construction
industry: another reason for embedding the EERC courses within the more general program in construction technology.

General education is critical for the success of national efforts to green existing and new building stock, but it is also necessary in order to respond to the imminent shortage of skilled workers. This pending shortage is the consequence of a number of converging factors: the growth trajectory of the construction industry; the advent of transformative technologies and innovations; and the retirement of the incumbent workers who are members of the Baby Boom generation. These challenges are not exclusive to the construction trades but are shared by a number of important sectors, including energy, information technology and health care, and are generally understood as a consequence of underinvestment in science, technology, engineering, and mathematics (STEM) curricula at the primary education level (Center on Wisconsin Strategy, 2008) (U.S. Department of Labor, 2009).

Because energy efficiency techniques and principles are taught within the context of a construction curriculum, and the program has flexible enrollment options, the EERC sequence of course at CSCC is being used by some incumbent construction industry workers as a means of upgrading their skills. The average age of students at CSCC, and in the EERC program, is 28 to 29 years old. In the case of CSCC's EERC program, the higher average age reflects the reality that students are coming at the program "from both sides", as Allan Gentry says (personal communication, 2010). Gentry estimates that approximately two-thirds of the students in the program are incumbent workers from the construction industry--owners and employees of local construction and building companies (personal communication, 2010).

Generally speaking, skills upgrading for incumbent workers is understood as a way of improving worker welfare and mobility, particularly for low-wage workers (Osterman 2008);
(Osterman 2009). Of particular importance to increasing worker mobility are skills standards and certifications which serve to evaluate worker knowledge and competencies to prospective employers. With the growth of interest in renewable energies and EE, there has also been a call from industry representatives and green job advocates for certification of skills as a means of building a strong workforce and ensuring safety and quality in the application of alternative technologies (Weissman J. M., 2010). The increased visibility of credentials for individual practitioners, such as those offered under the LEED system and the North American Board of Certified Energy Professionals (NABCEP), are a testament to this trend.

The EERC program responds to the related needs for improved worker mobility and increased legibility of green job training efforts by preparing students to become RESNET Home Energy Rating System (HERS) through the content covered in two of the six EERC courses. Amongst the limited sample of instructors and former students interviewed for this study, a common belief was that EERC training was a way of gaining advantage in the labor market. Several people also noted that they thought the weak job market, combined with the buzz around green jobs, was helping to attract students who wanted to “get in on the ground floor” of the EE construction industry (Peterson, 2010). In this sense, participation in the program is anticipatory of changes that seen as inevitable in the construction industry. Some of the students are also enrolling with the idea of pursuing opportunities for contracting and self-employment in the areas of weatherization and energy auditing and rating (Peterson, 2010) (Proffitt, 2010).

For other students, who may already be self-employed or business owners in the construction industry, gaining new skills related to energy efficiency is a way of expanding the scope of services they can offer clients. Further, building these competencies is a low-cost way of improving firm competitiveness—particularly important in an economic downturn.
John Proffitt, the outreach coordinator for the EERC program, noted that when the national housing boom was at its height, it was harder to get people to slow down enough to listen to pitches about the benefits of energy efficiency. Now, when the market for new construction is soft, energy efficiency is seen as a way of distinguishing one’s products and services from those of other firms. Although some of firms have disappeared as a result of the recession, Proffitt senses that the ones that remain are there to stay, and sees the value in continuing to educate them about the importance of EE construction because of the lasting influence they will have in the region (personal communication, 2010)—another example of how the EERC program is transforming, or greening, the construction industry.

In conclusion, the decision to embed the EERC course sequence within an existing program in construction reflects the number of ways in which green job training programs can contribute to economic development that benefits individuals as well as firms. By relating and responding to the needs of both industry and worker, green job training programs can be integral-parts of economic development strategies that use the lens of “green” as a way of leveraging and refocusing existing regional assets and efforts.

Participation in a Workforce Development Network

Much of the excitement over green-collar jobs is due to the employment opportunities they offer for disadvantaged workers—those individuals facing institutional or personal barriers to employment, as in the case of inner-city youth with low-levels of employment and social capital, or workers in rural areas who have been displaced from their jobs as a result of economic stagnation and global economic restructuring (Jones, 2008). In light of this, community colleges have a role to play in green-collar job training because they have traditionally offered training to
disadvantaged workers—often with funding from the federal government (Garmise, 2006) (Rosenfeld, 1995).

CSCC is responding to the needs of displaced workers by working in partnership with the local workforce investment agency to offer their EERC courses as a series of modules that lead to a certificate. The Southeast Tennessee Development District, which administers Local Workforce Investment Area 5 (LWIA 5), an eight-county area that overlaps with CSCC’s service area, received $115,000 in ARRA funding for the purpose. While the LWIA 5 has a long history of partnership with CSCC, CSCC’s leadership within the state in promoting the concept and application of energy efficient residential construction has proven particularly serendipitous for the agency because green energy was one of three high-growth sectors identified by the local workforce investment board. Further, the availability of federal funding made it possible for LWIA 5 to explore ways to get displaced workers into jobs in these sectors with a quick turn-around time (Strode, 2010).

The current group of students in the modules has a diverse professional background that includes some displaced construction and manufacturing workers—who have been targeted for the program in the wake of several big job loss events at local manufacturing firms—as well as people who worked on vineyards, were in the Army, worked in sales, and one person who came from a long line of moonshiners (Proffitt, 2010) (Strode, 2010).

Each of the EERC courses—typically taught over a 15-week quarter—are offered as a 40-hour, weeklong class. The program follows a week-on, week-off schedule that allows for the classes to be taught to two cohorts, at two locations, over the same 10-week time period.

Because they are clients of LWIA 5, there is also a case management aspect to student involvement in this program. Students receive training in soft skills such as communication and
self-presentation, counseling and job placement services. For Kristi Strode, an employee of LWIA 5 who has been involved in recruiting students for the program with CSCC, the main challenge of the program now is in showing students that there are employment opportunities available in the field of EE construction and retrofitting—but that taking advantage of the opportunities requires an entrepreneurial approach and in many cases, becoming an independent contractor. Therefore, the importance of the soft-skill training that the LWIA 5 offers in addition to the specific skills that the EERC courses teaches is in preparing students to be entrepreneurial and represent themselves in a professional manner (Strode, 2010).

The added services that LWIA 5 are typical of workforce intermediaries, a subset of labor market intermediaries with a mission to serve disadvantaged groups and help them overcome barriers to employment (Giloth, 2003). By partnering with an organization that assumes the role of workforce intermediary network, CSCC is helping to fulfill the promise of the green jobs agenda—which is that green and clean energies can create jobs for our nation’s most disadvantaged labor market sectors and those displaced by declining industries.

**Challenges: Continued Outreach and Strengthened Links to Industry**

As the EERC program continues to grow and develop, there are three issues to be addressed in order to strengthen the impact of the program and its value to the region as a tool of green economic development. These issues are presented here briefly, and potential solutions are presented in Chapter 5 as part of the discussion on future directions for program growth.

The first issue is that of connections to industry as a means of creating employment opportunities. For students who are not incumbent workers, finding a job after program completion is of central concern. Further, the degree to which technical training programs are able to develop strong ties with local industries—engaging them in curricular design and in
exchange, securing hiring commitments for their students—is often considered a metric of success for training initiatives (Giloth, 1998).

The EERC program is still young enough and small enough that it is unreasonable to expect to find a formal job placement service or a measurable impact on the regional construction labor market in terms of infiltration by former EERC students. Enrollment in EERC courses has grown each year but the program remains quite small—in the fall of 2009, there were 32 students enrolled in at least one of the EERC courses. Because many of the students are adults who work full-time, it can take several years to complete the sequence of courses (if that is the student’s goal), so the pool of people who have taken all or some of the EERC courses remains quite small. This small pool, combined with the fact that many program participants already work in the construction industry, the limited staff resources of a small program and a soft job market, are ample explanations for why the program has no formal job placement service and why, as of now, the connections between program and industry remain largely informal. As the program grows, there may be a convincing case for more formalized connections between program participants and local construction firms.

The second and third issues are related, and have to do with the skills that the EERC program teaches. The program’s focus is on hard skills and knowledge—that is, the technical skills and know-how for students to diagnose residential energy use, and design and implement retrofits and new construction that minimize energy use. However, the nature of the work that the EERC program prepares students to do lends itself well to entrepreneurship—launching new ventures, adding new services to existing businesses, or seeking contract employment for home energy rating and retrofitting work available through government agencies (with federal money),
nonprofit organizations and utilities. This suggests the need for CSCC to provide EERC students with parallel training and support in skills related to entrepreneurship and business management.

Similarly, EERC program graduates are faced with the challenge of raising awareness of and demand for energy efficient construction on the part of homeowners, renters and builders. The EERC program, through its dedicated staff, does an admirable job of reaching outside of the college and targeting different populations with its message of energy conservation and efficiency: the general public through participation in fairs and other events; high school students, through partnerships with schools with vocational education programs in fields related to construction; and the construction industry, through seminars that were held as part the initial grant-funded project that launched the EERC program. However, given that the outreach capacity of the EERC program is limited by the size of its faculty, there is an argument to be made for preparing students to be ambassadors for the program and for energy efficiency, in general. This would require training in soft-skills related to public speaking and presentation, and marketing. It would also require the creation of new venues for outreach activities so that EERC students can find channels through which to promote their skills and the EERC program can reach a wider audience with its message about energy conservation.
Chapter III
Advanced Energy and Fuel Cell Technology at Hocking College

In contrast to the case presented by Cleveland State Community College, Hocking College and its advanced energy and fuel cell program are located within an institutional setting that is much more mature in its adoption of clean energy technologies as a driver of economic development. Whereas in Tennessee, interest and movement toward attracting and supporting renewable energy has only taken off in the past two to three years, a statewide strategy for fuel cell industry development has been developing over the past ten years and builds off of the state’s strengths in research and the legacy of automobile manufacturing. In addition, the counties surrounding Hocking College have recognized the economic opportunity that clean energy offers, and have shifted the focus of their economic development strategies to reflect this and the existing clean energy assets that the area has.

As a result, the story of Hocking College and its Hocking College Energy Institute, through which all of the school’s programs related to clean energy are offered, is that of a community college as a partner to green economic development efforts throughout the state. Hocking College demonstrates the integral role that community colleges have to play in building and anchoring clean energy firms and clusters by training a mid-skilled workforce that can meet industry needs. The school also illustrates how a community college, as a prominent local asset in a distressed rural area, can encourage the growth of clean energy-related firms, and thus encourage local economic development built around qualitative values and measures rather than quantitative indicators of growth.
Background

Hocking College (HC) offers its associate of applied science degrees in advanced energy and fuel cells, and automotive hybrids through the Hocking College Energy Institute (HCEI), which was founded in 2003. A degree in regenerative sustainable agriculture, to be offered through HCEI, is planned to begin in the fall of 2010.

While the institute and its course offerings are still relatively new, the roots of HCEI and Hocking College’s leadership in clean energy dates back to the early 1980s when Dr. Jerry Hutton—who grew up on a farm in southeastern Ohio and had been a student at HC seven years earlier—helped start what was called the International Energy Center at HC, based on the main campus. The International Energy Center had a program focused on natural gas-powered vehicles: the school had nine wells that students drilled, and a filling station which remains today, although the International Energy Center no longer exists (Hutton, 2010).

After establishing the program, Hutton left HC to pursue a career in industry. In the early 2000s, he was working for Quantum Technologies in California—a company that produces fuel cell systems and other advanced energy technologies. But Hutton maintained ties to the southeastern Ohio region and to Hocking College’s then-president, Dr. John Light. Based on his knowledge of where the fuel cell industry was heading, Hutton recalls telling Light, “You really ought to be thinking about starting a program in [fuel cells]” (personal communication, 2010). In 2002 Light called Hutton and asked him to start up the fuel cells program. In 2003, HCEI’s curricula in advanced energy and fuel cells and automotive hybrids were launched “with three students and a briefcase”. In the fall of 2009, the programs enrolled 61 first-year student—twice the number who had enrolled the previous year.

The associate of applied science degree in advanced energy and fuel cells requires completion of between 102 and 107 credit hours, of which approximately 60 percent are
technical courses. These technical courses cover the fundamental theories and practice of energy and energy components for a range of alternative and advanced energy sources—fuel cells, solar, wind and hydroelectric, and cryogenics—as well as the fundamental processes and technologies associated with these sources—batteries, instrumentation and controls.

Though the remaining 40 percent of required classes are considered general education requirements, they have a clear relationship to the technical content of the curricula and the general emphasis of community colleges on preparing students for the workforce. General education requirements are split between courses that cover the fundamentals of STEM education—physics, engineering, chemistry, algebra, geometry and trigonometry—and those that address skills and qualities considered requisite for most jobs: verbal and written communications, supervision and leadership, and computing skills.

HCEI’s program is focused on training students so that they have the understanding and skills to provide maintenance and servicing of installed fuel cells, or to act as technical assistants in a research setting. The course of study covers the basics of FC technology and the range of settings in which they can be used (residential and commercial, industrial power, and vehicles), the specific requirements for testing, configuring, assembling, and troubleshooting single and stacked FC systems. HCEI graduates fill a critical need for the existing and future FC industry in Ohio, because the industry requires more workers to service fuel cells than it does to manufacture them (Valente, 2010). Further, the availability of service providers will be particularly important given that Ohio seeks to stimulate the demand and use for fuel cells by end-user industries within the state.

While the name of the program includes the term “fuel cells”, program graduates are actually prepared for technician positions that support a range of renewable energy sources and
systems: solar, geothermal, biofuels, and hydroelectric. This is an important distinction because the rest of the case study explores the relationship between HCEI’s programs and economic development strategy at two levels—the local and the state. At the state level, there is a tie-in to a well-defined cluster strategy for the fuel cell industry. At the local level HCEI relates to a more general strategy to promote alternative energy and green companies, and a concentration of local solar and wind installation companies is the major influence on job opportunities for students.

Supporting and Anchoring Cluster Development

Community colleges have an important role to play in strategy that aims to develop new or strengthen existing clusters, as Ohio’s Fuel Cell Initiative does. At its most basic level, the appropriateness of the fit between community colleges and clusters is based on the community college’s core competency in training students to fill the ranks of the mid-skilled labor force, defined as those occupations and jobs that require less than a four-year degree (Grubb, 1996) (Rosenfeld S. A., 2002).

Mid-skilled labor is understood as the most important external economy for clusters—and the firms that comprise them—because it is the segment of the labor market segment that consists of the technicians, operators, and administrators that have the occupation- and industry-specific skills to provide daily, routine manpower as well as troubleshooting for unanticipated issues, and the knowledge to apply these skills in a specific work environment setting or industry. Unlike roles in leadership, management and innovation, which are often filled through national and global recruitment efforts—and can often be performed remotely in light of advances in telecommunications—the mid-skilled labor pool is understood to be less mobile, and bounded geographically by the distance people are willing to commute (Grubb, 1996) (Rosenfeld S. A., 2002) (Rosenfeld S. A., 2003). In light of this, to the degree that they can be reasonably
flexible to reflect the needs of a local industry, training can be used as a way to anchor firms—and the jobs they create—in place by building a reliable pipeline of workers (Lowe, 2007).

Part of the rationale behind Ohio’s decision to pursue fuel cell cluster building as an economic development strategy is the state’s manufacturing history, particularly in the automotive industry. Accordingly, Ohio’s goal of becoming a leading site fuel cell manufacturing is also a bid to restore job opportunities to the workers displaced as a result of contraction of the domestic automotive market which hit Ohio particularly hard. The establishment of fuel cell curricula at HCEI and Stark State Community College, in North Canton, are a way of preparing displaced workers for the emerging fuel cell industry. Accordingly, Jerry Hutton estimates that 35% of students enrolled in HCEI’s FC programs are displaced, adult workers, while the younger students represent the next generation of Ohio’s workforce.

As with any training initiative, though, there is a fine line to walk between preparing students for future job opportunities, in anticipation of industry development, and training them for jobs that do not yet exist—thus jeopardizing the intended effects of increased employment for trainees. Currently, jobs in research and development outnumber those in manufacturing though this is predicted to change, as the end-goal is for Ohio to be a leader in fuel cell manufacturing (Ohio Department of Development Technology Division, 2009). To date, HCEI has not had trouble placing students in jobs in the fuel cell and advanced energy industries. This is probably due to the small size of the program so far, and the fact that there are already a number of fuel cell firms in the state; however, this could change if the program continues to grow at a pace mismatched to the growth in relevant job opportunities in the fuel cell industry (Hutton, 2010).
Beyond training students for existing employment opportunities, though, HCEI is playing a critical role in encouraging and anchoring the growth of the fuel cell industry in Ohio. The existence of HCEI’s training program—and a similar one offered at Stark State—is a powerful signal to fuel cell companies because it demonstrates the commitment of the state to developing a mid-skilled workforce that will meet the needs of the nascent industry. By building a local supply of mid-skilled labor, Ohio is sending a clear signal to new and existing fuel cell firms that it is committed to encouraging and retaining fuel cell manufacturing within the state, rather than seeing these blue-collar opportunities shipped overseas.

Further, Ohio is giving teeth to whatever incentives it may use in attracting new firms to the state, encouraging Ohio firms to diversify production into fuel cell components, and national or international firms—some that may already have a presence in the state—to locate the fuel cell part of their operations in Ohio. By way of example is the case of the successful recruitment of Rolls Royce’s fuel cell operations to Ohio. Ohio Fuel Cell Coalition Executive Director Patrick Valente was the deputy director of the technology division of the Department of Development when the state entered into recruitment discussions with Rolls Royce. At that time, Rolls Royce had operations in Ohio, but none of its fuel cell work was there and they were considering two other states as locations to headquarter this work. Valente recounts that the president of the division said to him, “I’m not interested in the [financial] incentives that you have. Let’s talk about the other things I need,” and proceeded to list half a dozen issues that he considered critical, including available training programs and providers (Valente, 2010).

Thus, programs like the one at HCEI are a way of moving the discussion of support to and recruitment of firms, as an economic development strategy, beyond the contentious debate around incentives to include a consideration of how states can use their business recruiting
activity to address social and economic welfare issues. This is important, since even the most vocal critics of incentive-granting as a tool of economic development concede that the equity of incentives can be improved if they can address social welfare issues, such as chronic unemployment (Bartik, 2005). For early-stage firms or nascent industries that are knowledge intensive (as the fuel cell industry is), economic and workforce development practitioners will do better in delivering these social welfare benefits through industrial recruitment if they can push firms to think about their long-term workforce needs—beyond the start-up phase, which favors professional and managerial workers, to the phase of operations and production, which provides opportunities for entry-level and mid-skilled workers (Lowe, 2007). HCEI is helping in this effort by tailoring its fuel cell-specific programs to prepare workers to support the operation and maintenance of fuel cells—a phase of fuel cell industry development that is still, largely, in the future.

**Encouraging Local Green Growth**

At the local level, HCEI benefits from being located in a multi-county area that has embraced the movement towards clean energy as an opportunity for economic development and job creation. HCEI’s plays two roles in these efforts. The first is as an institutional asset which can bolster efforts to attract and retain clean energy industries by guaranteeing access to skilled workers. The second role that HCEI plays is as a partner in local efforts, working with economic development actors and firms to promote the transition to a clean energy economy.

Hocking College’s main campus is located in Nelsonville, but since its inception HCEI has been located at a satellite location—the Logan-Hocking Industrial Park in the town of Logan. The relationship between HCEI and the Logan-Hocking Industrial Park (LHIP) is indicative of how HCEI fits into a broader picture of local economic development strategy. The LHIP opened
in 2003 and is owned and operated by the Hocking County Community Improvement Corporation (CIC). The CIC is a private economic development entity that covers its operating costs from its investments: two industrial parks it operates as well as a number of other properties and office and industrial space.

Until recently, the CIC’s approach to recruiting was to go after “every and any company” (Rinehart, 2010). In 2009, the CIC commissioned a study from the Voinovich School of Leadership and Public Affairs at nearby Ohio University to determine the feasibility of adopting a green focus for the marketing and recruitment strategy for the LHIP. The study confirmed the instinct that the CIC leadership had: that there was an opportunity for the LHIP to brand and market itself as a green industrial park because of what makes the LHIP unique—its relationship with HCEI. LHIP can offer companies access to a prepared workforce, as well as the prospect of increased visibility by virtue of proximity and informal affiliation with HCEI, which is attracting a lot of attention and visitors for its unique programs and its new, LEED-certified building which stands out for its distinct look and features (Preston, 2010) (Go Green, 2009).

The relationship between HCEI and LHIP is not just one born by proximity, and it is much deeper than that of tenant and landlord. Around 2003, the Hocking County commissioners approached Bill Rinehart, executive director of the CIC, with the idea of pursuing a grant in partnership with Hocking College. The commissioners’ thinking was that having a college with a workforce development mission located in the county would be a tool to attract companies to the area. Six years later, $1.6 million in funding from the Economic Development Administration (EDA), nearly $200,000 from the Appalachian Regional Commission and a matching amount raised through bonds issued by the CIC came to fruition with the opening of the HCEI LEED-certified building.
The HCEI building, where classes are taught, is located on HC-owned land, across the road from the existing LHIP building. This building still houses HCEI’s administrative offices, as well as two local start-up companies, both of which fit with the new green strategy of LHIP. As Hutton says, the three tenants are “growing up together” (personal communication, 2010). EMEGA Technologies is actually two research and development companies with the same owner and a shared mission of producing advanced, sustainable materials that can facilitate “near-zero energy use” for homes and buildings.

The other tenant, Spark Production, produces a rack system used for solar installations. The story of how the company got started and its progress to date are entwined with HCEI. Patrick Preston is the founder of the company and one of its two employees. Preston lived in the area but his career in building specialized machinery was done mostly on contract for clients outside of the state. After attending a seminar offered by the state of Ohio on alternative energy, and talking to some solar installation companies within the state, Preston saw a need for racking that would fit the needs of the local solar installation industry: since most of the mounting equipment that these installers used came from the West Coast, it was not suited for Ohio’s winter weather conditions, and installers were having some trouble with getting timely deliveries.

Working closely with Dovetail Solar and Wind, a solar and wind installation firm headquartered in Athens, Ohio, Preston has designed racking systems for a number of their solar installations projects. The collaborative process has allowed him to continually refine his product and in effect, each installation to date has been customized but Preston is hoping to move into mass production. Preston’s leased space at the LHIP includes about 5,000 square feet of
workshop space, which he thinks will be enough to meet his needs for when he starts fabrication at a larger scale.

Proximity to HCEI has had multiple benefits for Preston and his young company. The first has been assistance in building his pipeline of interested customers as Jerry Hutton frequently brings visitors to HCEI over to Preston’s offices to give them a more complete picture of what is going at LHIP (Preston, 2010). Preston has also used HCEI as an educational resource by taking a one-week, 40-hour course in solar photovoltaic energy offered occasionally at HCEI. In a nice bit of synergy the participants in the course used Spark Production’s racks to install a full solar array on the roof of HCEI as a hands-on learning experience (Preston, 2010).

Though EMEGA Technologies and Sparks Industries are small, they hope to be able to provide some internship opportunities for students in the near-term. More importantly, though, is the importance of having firms like EMEGA Technologies and Spark Production in Logan: no matter how small the firms, retaining these companies in southeast Ohio increases the opportunity to effect change in the local economy, provide much-needed employment opportunities, and help stem the tide of workers who commute an hour each way to Columbus (Hutton, 2010) (Rinehart, 2010).

HCEI and its neighbors at LHIP are not the only elements of an emerging green economic development strategy in southeast Ohio. The efforts underway at and around HCEI are in sync with what is going on in neighboring Athens County. Athens County is where the main campus of HC is located, and is also the home of Ohio University.

Alternative and sustainable energy is one of the three target industries of the Athens County Economic Development Council (ACEDC), a public entity that serves as an umbrella group for the numerous local and regional economic development organizations at work in
Athens County. The focus on alternative and sustainable energy emerged approximately five years ago and reflects both the culture and assets of the county, as well as its needs: In addition to the asset that HCEI represents, the county is home to several companies involved in the alternative and advanced energy sectors, has faced chronic unemployment issues, and there is a general interest and support for alternative energies and moving away from reliance on coal (Shelton, 2010).

Specifically, there are five solar and wind installation companies in Athens County—not insignificant for a rural county of approximately 63,000² (Shelton, 2010). These companies are essentially the same in their service offerings, and most serve markets broader than Athens County. The critical mass of these firms is important to HCEI because it can potentially provide employment opportunities for HCEI students and graduates.

Related to this, both CIC and ACEDC are focusing their efforts on providing support to existing and aspiring local clean energy firms to help them grow in place. The ideas of growing companies in place and the importance of small- and medium-sized firms for regional economic prosperity have spawned a proliferation of public, private and university-based business support services and delivery models, including incubators. In particularly, incubators have been a popular tool for encouraging growth of technology-based businesses (Tamasy, 2007).

Athens County Economic Development Corporation is an anchor tenant at the Innovation Center, the OU-sponsored incubator that counts Third Sun Solar and Wind and Sunpower, two local firms involved in the solar industry, among its clients. At the time of writing, CIC had retained the services of a consulting group to study the feasibility of launching an incubator at LHIP. In both cases, incubation is a proactive approach on the part of Athens and Hocking

Counties to support the growth of local firms that can contribute to their respective economic development strategies. The purpose of incubation is to provide the support that will “fill the gaps” (Rinehart, 2010) that may exist in firms between technological know-how and product innovation and application, and the fundamentals of business and growth management, including access to financing and patenting.

For HCEI, county-level support to businesses is promising because it is an effort to ensure that existing solar and wind companies in the area survive and continue to grow. As with Spark Production, the potential incubator at LHIP can use proximity to HCEI’s resources, physical plant and students as an extra benefit of being a tenant. On the other side of the equation, HCEI’s students will continue to benefit from the opportunities for learning and exchange, whether formal or informal, that proximity to new firms can provide. Finally, the presence of an incubator could also provide encouragement and support for HCEI graduates to pursue self-employment or entrepreneurship as an option once they complete their course of study.

Further, HCEI’s presence helps shape the qualitative nature of economic development in the region, acting as a resource and support for firms looking to establish themselves and grow in southeast Ohio—where, because of the region’s economic distress, there are a number of financial incentives from the federal government for business establishment and job creation. HCEI’s presence has an influence on the types of firms that are attracted to the region, which is important for economic development actors that are concerned with not just the quantitative measures of economic growth (e.g. jobs and tax revenue), but with the qualitative aspects of economic development such as job quality and industry environmental impact.
Challenges: Increasing Access and Opportunity

As they are now, HCEI’s associate degree programs function more like a residential four-year college than most community colleges. Students come from a broader service area, and courses are offered during the business day. This creates barriers to access to people who work full-time, as well as those who cannot relocate to the Hocking College area to seek full-time training or lack transportation from urban areas.

Further, because the curricula is taught in a community college setting, HCEI is inadvertently excluding individuals that have struggled within the institutional setting of public education, and are therefore unlikely to seek training at a community college. These populations are the same ones that the green-collar job advocacy movement seeks to create opportunity for—minorities, high-school dropouts, and other disadvantaged groups.

To date, HCEI has not had trouble with students not being able to find jobs though Jerry Hutton notes that this could change, as the program has grown faster than expected (personal communication, 2010). Interestingly, though, as the fuel cell industry moves toward greater maturity in Ohio, training programs—like HCEI’s and the one at Stark State—will likely need to be brought to scale to train the number of workers that are necessary to maintain and service fuel cells once installed. This scaling-up may call for expansion of the curricula to other schools, a repackaging of the curricula for delivery through different channels (e.g. distance learning) or the distillation of the broad fuel cell curriculum into shorter certificate-granting programs focused on different technologies (e.g. solid oxide fuel cell technology versus porous exchange membrane technology) or end-uses of fuel cells (e.g. transportation versus utilities). This repackaging of curricula is well within the realm of the community college’s core competencies as flexibility in adopting new and adapted curricula is one way that community colleges have been understood to be strong partners to industry, traditionally. (Rosenfeld S. A., 2003).
Repackaging the associate degree curriculum into credentials that can be delivered through a variety of venues and over shorter periods of time is also an opportunity for HCEI to deepen the impact of its programs as an instrument of green-collar job opportunity. In other words, innovation in the way programs are offered is a chance for HCEI to pull down the ladder of opportunity, extending it to the populations who face the strongest barriers to pursuing higher education in a college setting.
Chapter IV
Shared Strengths

Cleveland State Community College and Hocking College provide two compelling cases of how community colleges have taken an early leadership role in advancing the transition to a green economy. Both schools offer relatively unique training programs that are assets to the areas and regions in which they operate, and as such, can give those areas an advantage over other places that are trying to insert themselves in the emerging green economy.

The previous two chapters drew out program features that represent differences between the two programs and by doing so, highlight the ways in which green-collar training programs can adapt to reflect the environment in which they operate. By doing so, they can forge a place for themselves in local or regional economic development strategy that is built upon green industry and clean energy.

This chapter highlights the commonalities between the two schools’ programs and by doing so, suggests these commonalities as lessons or promising practices to be offered to other schools and regions seeking to use training as a way of stimulating green economic development. Namely, it suggests the potential of green-collar jobs to revive vocational education and mid-skilled career pathways; the importance of an institutional viewpoint that is broader than just the niche of the clean energy economy that the green-collar job training program caters to; and the necessity of leveraging resources and partnerships to deepen the impact of each program.

Building Educational Linkages

Though many green-collar jobs are not, at base, different from traditional blue-collar jobs, the excitement and buzz surrounding green jobs and clean energy is a vast opportunity to
reignite interest in the skilled trades. In addition to underinvestment in science, technology, engineering and mathematics (STEM) education, the national shortage of a pipeline of skilled and semi-skilled workers is often attributed to the erosion of vocational education at the high school level. This in turn has created a lack of awareness on the part of students and teachers about the level and quality of employment opportunities available to workers with less than a four-year degree. Both Cleveland State Community College and Hocking College are using outreach to high schools as a way of building interest in their respective green-collar job training programs—but also as a way of revitalizing the interest in and relevance of the vocational education model.

Part of the initial Department of Labor grant that launched the EERC program at Cleveland State Community College—and an ongoing part of the program’s work—was to conduct outreach to the eleven high schools in CSCC’s service area. John Proffitt, who previously worked as a marketing manager for the Tennessee Valley Authority, is now employed as an instructor and the outreach coordinator for the EERC program. In his outreach capacity, he visits each high school two or three times a semester and tries to keep in close contact with their teachers, particularly in the schools that offer vocational education programs in the building trades or related areas (for example, drafting and mechanical drawing). The general content of the talks he give during his visits is to introduce the basic concepts in energy efficiency and sustainability—for example, the idea of a building envelope that prevents energy leakage—as well as some of the more advanced equipment for diagnosing energy efficiency (e.g. blowers and infrared cameras).

The Hocking College Energy Institute has established articulation agreements with five high schools throughout the state to deliver pre-college curricula that will introduce students to
fuel cell technology and renewable energy sources. These curricula will also give students hands-on experience in some of the basic technical skills and competencies that HCEI’s technical degrees require (Hutton, 2010). This can be a way of decreasing the already-steep learning curve for students and enforcing student commitment to the program, similar to the way in which some of the traditional energy sectors have developed pre-apprenticeship programs to introduce prospective entry-level workers to the demands of the job as a means of increasing worker retention. One common example is a pole climbing boot camp for prospective electrical lineman that has used by utility companies throughout the Appalachian region, in collaboration with community colleges; these programs seek to give prospective workers an idea of the physical demands of the job and the opportunity to figure out whether or not they are suited for that type of work (Howell, 2010).

Backward linkages to high schools are an important way of building career ladders and pathways for students who would otherwise find themselves limited in their job opportunities by having only a high school degree. Though the most important point of CSCC and HCEI’s outreach is that individuals can access green-collar jobs with less than a four-year degree, both programs also have transfer agreements with four-year colleges and universities for students. EERC students can transfer to the Bachelor of Science degree program in construction management at the University of Tennessee at Chattanooga. HCEI students can transfer to the University of Minnesota at Crookston to earn a Bachelor of Science degree in agricultural systems management with a focus on biofuels and renewable energy technology, and HCEI is exploring a similar arrangement with nearby Ohio University.

From one perspective, these transfer arrangements might seem to undercut the message that an associate’s degree is sufficient to improve individuals’ positions in the labor market. On
the other hand, the option to pursue a bachelor’s degree from a technical associate’s degree might be opening doors to four-year institutions for students who would not have considered going to college. In this regard, the green focus of the programs at CSCC and HCEI becomes a hook—a way of drawing students into the higher educational system and helping them navigate the system with the end goal of qualifying for professional or managerial-level employment.

In both cases—backward and forward linkages—community colleges with energy-related training programs are using the green focus of their programs to increase interest in higher education. While there is a positive effect on this for green industries, who can count on a pipeline of qualified workers in the future, the more direct benefit is to individuals who can translate their interest in clean energy into credentials and skills which will improve their position in the workforce.

**Promoting a Broader Vision**

Cleveland State Community College (CSCC) and Hocking College (HC) both share an institutional commitment to the broad idea of sustainability, and their respective energy-related programs are just one way that these commitments are demonstrated. Both colleges have inserted themselves into regional and national conversations about the role of the community college in promoting and educating for sustainability, and have launched college-wide initiatives aimed at reducing negative environmental impacts of their operations.

This broad view of sustainability is reflected in the curricula of each college being broad enough in its content to prepare students for multiple career pathways with the clean energy and green economies. For example, although Cleveland State Community College and Hocking College have a different focus to their green-collar job training programs—energy efficient construction, and advanced energies and fuel cells, respectively—both require students to take
courses that cover solar, geothermal and wind energy technologies, and in both cases, anecdotal evidence suggests that students from each program are pursuing solar installation as a career pathway.

Beyond the curriculum, the vision and commitment to sustainability is reflected in the campus-wide sustainability initiatives that each college has undertaken, as well as the schools’ outward-facing activities related to sustainability. For example, in 2009, both colleges joined the Community College Alliance for Sustainability, a recently-convened network of 15 community and technical colleges sponsored by the Ford Foundation as part of a greater initiative for promoting wealth creation and economic sustainability in rural areas.

At CSCC, the EERC curriculum is one leg of what CSCC President Karl Hite describes as the three-legged stool of the college’s commitment to sustainability. One of the other legs is to decrease the college’s environmental footprint through energy conservation, renewable energy use and recycling. The other leg is an effort to make sustainability an overarching theme of all courses of study at CSCC so as to ensure that all students, regardless of their major, see ways to improve the environmental impact of their lives and their work, whether or not they work in a green job or industry. In Hite’s view, “all jobs can be green jobs” if students can be taught ways in which to improve a firm’s environmental performance from within (personal communication, 2010).

At Hocking College, the Office of Sustainability is undertaking a number of initiatives aimed at fulfilling the college’s goals and commitments as signatory to the American College and University Presidents’ Climate Commitment. As one part of the office’s work, Office of Sustainability Director Joe Wakeman is working with the college’s School of Natural Resources
and its students to devise a management plan for the school’s forest that will be certified to the standards of the Sustainable Forestry Initiative (Wakeman, 2010).

These activities are important because they demonstrate the understanding that the colleges’ leadership understands what is required in order to make a transition to a clean energy and green economy: comprehensive efforts and wholesale change in the way Americans live, work, and learn. This is to say that while each college has chosen to pursue green-job training programs as one way of preparing for this transition, they recognize that training alone will not fulfill the promises of clean energy as a source of equitable, restorative economic development. Rather, both schools see the interconnectedness of different types of energies, behaviors, and policies in creating a more sustainable society and they pursue activity at all of these levels.

To this end, both schools are launching initiatives that recognize the relationship between agriculture and energy—an important connection for rural areas, because of the economic potential for farmers in the production of biofuels crops. HCEI already has a biofuels laboratory and its program in regenerative sustainable agriculture, to be launched in fall 2010, will presumably emphasize the importance of how biofuels crops are managed so as to avoid environmental degradation. CSCC is in the planning and fundraising stages for a niche incubator that will provide space for existing biofuels producers, including a switchgrass farmer and a bamboo farmer.

By taking this wider view of the clean energy economy, HCEI and CSCC are providing a better service to their students than stand-alone green training programs that may fail to connect their students to the bigger picture of a clean energy economy—teaching them the skills they need as well as an understanding of where the skills they are trained in fit into a green economy agenda. This wider view also makes the respective institution more integral actors in local,
regional, and federal green economic development efforts, rather than confining themselves to the narrow niches of the clean energy industry that their training programs serve.

**Entrepreneurial Behavior**

The early successes of both colleges in establishing and expanding their green-collar job training programs are due, in part, to their entrepreneurial behavior. Here, the term entrepreneurial is used less to relate each program to a business than it is to describe the programs’ ability to leverage diverse resources and relationships and promote itself in order to create opportunity for institutional growth and deeper program impact.

Since it received its initial grant from the Department of Labor, the EERC program at Cleveland State Community College has received approximately five more grants to fund innovation and expansion in the program’s delivery methods. One of the grants is to develop a modified distance learning program. Developing capabilities for “anytime, anywhere” delivery is considered a best practice for community colleges involved in training that is specific to a certain industry or business cluster because it allows a greater number of people to access training (Rosenfeld S. A., 2003) and it allows more flexibility in scheduling, especially for incumbent workers and small firms who cannot afford the time or expense of their workers take time away from work to attend trainings.

Under the arrangement envisioned by CSCC, students would take online courses to learn the general and basic knowledge that the EERC courses cover while hands-on learning would be provided by means of a trailer owned by the program that is equipped with a full solar photovoltaic array. The trailer, which Gentry jokingly called the “solar road show” (personal communication, 2010) is already in use as a way of promoting the EERC program: Gentry takes it to college and career fairs to spark interest in the program.
The idea to develop this combination of distance and hands-on learning was spurred by the inquiries that Gentry was receiving about the program from a geographic area broader than CSCC’s service area. Gentry attributes this spread of information about the program to the fact that CSCC’s service area is part of the Tennessee Valley Authority (TVA) region, which encompasses parts of seven states. In this way, grant funding is being used to reach a broader audience with the EERC’s programs message about energy conservation and efficiency, and grow a regional workforce with skills and knowledge in energy efficiency.

While CSCC’s entrepreneurial behavior is helping the program expand, HCEI is leveraging resources and partnerships to deepen its program’s relationship to the fuel cell industry. In 2009, HCEI and NexTech Materials collaborated to apply for grant funding from the state’s Third Frontier Initiative. NexTech is a developer and supplier of fuel cell materials and components based in Lewis Center, Ohio. The $1.49 million grant, awarded in December 2009, funds a project entitled Improving Manufacturing Readiness of NexTech’s Single Oxide Fuel Cell Stack. The partnership with HCEI and OU will set up tape casting machinery on the HCEI campus. Tape casting is one method for preparing some of the advanced material components that fuel cells require: in this case, ultrathin ceramic or metallic films that can withstand high temperatures.

The project was pitched as a step toward improving the state’s infrastructure for the design, fabrication, testing and manufacturing of fuel cell stack technology. At the same time, the presence of NexTech on the HCEI campus will be a boon to the program and its students, who will gain exposure to fuel cell development and manufacturing processes. Because the tape casting material equipment will be housed at HCEI, application for funding required that HCEI and NexTech enter into a joint-use agreement whereby HCEI owns the equipment and NexTech
is leasing it for use. This will allow the equipment to be a resource for other companies in the fuel cell cluster. Patrick Valente, Ohio Fuel Cell Coalition Executive Director, credits Jerry Hutton for embracing this opportunity, which many other organizations and companies have seen as too cumbersome (personal communication, 2010).

At the systemic level, this type of entrepreneurial behavior is critical to overcome fragmentation in the existing workforce development funding and delivery system, and the barriers that this fragmentation causes for individual workforce development training programs in bringing their programs to scale (Giloth, 2003). At the level of the individual community college, this behavior helps young programs sustain themselves in the context of limited institutional budgets and resources. More importantly, for the purposes of helping the transition to a clean energy economy, leveraged resources and partnerships help expand the scope of training activities and build relationships between community college and industry that are mutually beneficial in promoting green economic development.

Conclusion

While it is too early to chalk these similarities between programs up to lessons learned or best practices for clean energy-related training programs at community colleges, that there are similarities that can be drawn out between programs that operate in such divergent institutional contexts is, in itself, suggestive. The similarities presented in this chapter suggest that green-collar job training programs call for community colleges to simultaneously deepen their roots and expand their boundaries: strengthening their position as technical education providers by reviving vocational education, while they take an active stance to promoting a forward-looking vision of green economic development and the role of mid-skilled workers in ensuring prosperity in a clean energy future.
Chapter V
Opportunities for Increased Impact

Having looked at the ways in which Cleveland State Community College (CSCC) and Hocking College Energy Institute (HCEI) have established their energy-related programs in relationship to the local and regional frameworks for green economic development, this chapter now turns to a short discussion of ways in which each program can address the barriers it faces, discussed briefly at the end of each case study. Addressing these barriers will deepen the impact of these community college-based training programs in achieving the main goals of green economic development: that is, increased opportunity and prosperity for workers and revitalization of domestic industries as a result of reduced dependence on non-renewable energy sources.

Specifically, this chapter presents ways in which CSCC can formalize connections to employers and contracting opportunities, as well as prepare students to be spokespersons for energy efficiency—all as a means of increasing the demand for energy efficient construction and retrofitting in an area that lacks supportive policy or regulation that would make energy efficiency more mainstream.

For Hocking College Energy Institute, statewide and local strategies for economic development built around clean energy create mutually-reinforcing growth opportunities for HCEI’s academic programs and the industries that they support. In light of this, future program growth should include efforts to repackage curricula so as to be more accessible to a diverse audience of potential workers—possibly in partnership with a workforce intermediary. By doing so, HCEI can make a greater contribution to realizing the social equity benefits promised by green-collar job proponents.
Cleveland State Community College  
*Formalizing and Supporting Connections*

As noted in Chapter 2, connections between CSCC’s energy efficient residential construction program and the local construction industry are numerous, largely due to the enrollment of incumbent construction workers as a means of skills upgrading. The program’s small size, in terms of students and faculty, has meant that any connections that are made between students and potential employers have been informal—not the result of any job placement services or organized networking. However, there are several issues that point to a need for greater formality in these connections as the program grows.

For one, there is a case to be made for the EERC program to create some sort business-to-business information-sharing network. By way of demonstration, Chris Spors Custom Homes fills the role of general contractor and Spors—the firm’s owner and a member of the advisory council to the construction technology program at CSCC—relies mainly on subcontractors to carry out the physical construction of his projects. Because of his firm’s focus on green and energy efficient construction—born out of Spors’ personal interest and self-education—Spors has found that he has had to educate the subcontractors that he works with. To his knowledge, none of them have employees that have gone through the CSCC program—but Spors noted that it would be great if they did, or if he could find out about those incumbent workers from other firms who had (personal communication, 2010). Given this example, it is easy to see how a simple directory could lead to greater employment and business opportunities for EERC program participants by matching contractors with subcontractors who are skilled in energy efficient construction techniques.

There is also a case to be made for the EERC program—or other actors within CSCC—to provide EERC students with guidance and support in securing contract work, particularly the
opportunities available through the Tennessee Valley Authority (TVA). The TVA’s In-home Energy Evaluation Program (IHEE) relies on contractors to do energy evaluations; weatherization and installation work at the request of TVA customers. For residential energy customers, in-home energy evaluations are the first step toward receiving financial incentives and rebates for the installation of EE windows and HVAC units, repair and replacement of ducts and insulation, air sealing (including weatherstripping and caulking), and general rehabilitations and repairs that will reduce energy leakage. In-home energy evaluations must be made by a member of the TVA’s Quality Contractor Network. Membership in this network is attained by having a set of contractor credentials and insurance, and by attending an orientation session.

Cleary, there is great potential for EERC program participants and graduates in becoming linked into the IHEE program. However, there are practical limitations to participation in the IHEE programs and to the full realization of the economic benefits for EERC students: namely, the degree of awareness and perceived accessibility of incentive programs by homeowners, and related to this, the absorptive capacity of the existing network of TVA-approved energy evaluators and contractors. Also, TVA is the country’s largest public power utility and as with many programs run by public entities, there are many restrictions, specifications and paperwork involved with the performance of work contracted through the IHEE program. These can act as real and perceived barriers to participation for self-employed contractors and companies who may lack the experience or time to navigate these procedures. Workshops and seminars that provide an overview of how to navigate the TVA and other state and federal contracting programs could be a step towards increasing EERC student opportunity in this realm; similar efforts have been used to increase public and private sector contract procurement by minority, women-owned and disadvantaged businesses.
One final note in light of this is that there is an argument to be made for CSCC to integrate courses, or modules, on business management and entrepreneurship, given that the services and skills that the EERC program cultivates lend themselves well to launching new ventures, expanding their businesses’ offerings or seeking employment as an independent contractor. CSCC has the resources available to offer students training in entrepreneurship and business management through its academic business department, its small business development center (part of a statewide system) and successful business incubator (operated as part of a TVA-sponsored network of incubators). The challenge is in making students aware of these resources and encouraging them to seek out the support services that they offer or conversely, finding ways to integrate these resources into existing classes so as to emphasize the business side of energy efficient construction.

**Supporting Continuing Education and Outreach**

As EERC faculty and former students all recounted, there are plenty of job opportunities available in energy efficiency because of available incentives, rising energy costs and the economic recession. However, it is up to those same faculty and students to recognize this potential and translate them into demand for energy efficient construction and retrofitting. Translating potential into demand requires ongoing outreach and education—however informal—on the part of faculty and current and former students.

Given this, there is a rationale for incorporating training in soft skills into the EERC curriculum. Training in presentation, teaching and marketing could all be useful to students who find themselves faced with the challenge of educating potential clients, employers and co-workers about the merits of energy efficiency and the specific skill set that they bring to any job.

A related challenge is that of finding venues through which this education can occur. For incumbent workers, continuing education is more likely to occur informally, on the work site
between co-workers or in meetings with clients. However, for EERC students looking to carve a	niche for themselves in the construction or home energy rating market, it seems that there needs
to be more general awareness-raising activity aimed at the consumer public. CSCC itself is one
venue and conduit for such activity but beyond the school, partnerships with relevant public and
nonprofit organizations—for example, social services providers, and organizations with missions
related to financial empowerment, affordable housing and environmental conservation—could be
used to creating venues and audiences for education about the benefits of energy efficiency.
These partnerships, once created, could form the basis of a network that EERC students could
plug into in order to promote the program, the concepts it teaches, and the services its students
can provide.

**Hocking College: Expanding Opportunity for Disadvantaged Workers**

If fuel cell industry development in Ohio is to live up to the goal of the state and the
broader green jobs movement of creating good jobs for populations that most need them—for
example, minorities, the chronically unemployed, and workers displaced from traditional skilled
trades, HCEI and its peer institutions in the state will have to find ways to meet these populations
on middle ground in order to overcome logistical, educational and social barriers to accessing the
college’s renewable energy curricula. By overcoming these barriers, HCEI can extend the ladder
of green-collar job opportunity down, rather than pulling it up and out of reach of populations
who have missed out on opportunities in other waves of economic development and expansion—
for example, the Internet boom of the 1990s and early 2000s.

Logistical barriers to access include courses being scheduled during the day, and HCEI’s
rural location, which pose problems for potential students who are employed and those in urban
locations or without means of transportation, respectively. Ways to overcome these barriers
include offering courses at satellite locations—especially in urban areas—and offering more flexible enrollment options, including night classes.

Educational barriers to enrollment at HCEI may include a lack of basic skills or need for remediation. Many community colleges have core competencies in providing remedial education to adult learners, but it does not seem that the course load and schedule of the HCEI curriculum would allow for students to pursue this kind of training. Further, if there is a need for basic competencies prior to enrollment, getting remedial attention would be more of a pre-requisite to enrollment in the HCEI course of study.

In light of this, there is a convincing case to be made for a pre-enrollment program that could address basic skills as well as provide an introduction to fuel cells and renewable energy—much as the pre-articulation curricula that HCEI is using in high schools does. The difference would be that this pre-enrollment certificate option could be used to reach individuals who are outside the influence of the public education system—namely, adults who have aged out of the system and out-of-school youth.

This last point highlights the main social barrier that may exist for HCEI in terms of attracting the population identified by green jobs advocates as prime candidates for green-collar employment. Many members of the disadvantaged worker population—particularly minorities—may have had negative behaviors with the public education system or feel disenfranchised by it. For these individuals, enrolling in a community college may be undesirable or discouraging, particularly if the setting and instructors of the school are mismatched to the ethnic and cultural background of the students (Harrison, 1998).

In light of these barriers, there is a clear role of a workforce intermediary if the state of Ohio is to take advantage of the employment prospects posed by the growing fuel cell industry to
extend opportunity to those at the bottom of the socioeconomic ladder. Workforce intermediaries are a set of institutions that act as a bridge between employers and potential employees in a way that goes beyond simply matching workers to jobs. Workforce intermediaries adopt a dual-customer approach to ensure that workers are prepared to meet industry needs and that industries and companies, for their part, are willing to collaborate with workforce intermediaries in the training process and commit to creating opportunities for workers who have traditionally faced barriers to employment (Giloth, 2003) (Giloth, 2004). The particular potential for workforce intermediation in Ohio—and for the transition to a green economy—is that it has been a successful strategy for providing services to specific sectors, particularly those facing critical labor shortages in the manual and semi-skilled trades, as well as a commonly cited way to better align workforce and economic development agendas (Fitzgerald, 2004) (Fitzgerald and Green Leigh, 2002).

While community colleges can and have played the role of workforce intermediary successfully in some settings (Harrison, 1998) (Lowe, 2007), the more common arrangement is that of the community college as the training provider in a network that is coordinated by a workforce intermediary—often a community-based organization, a social service agency, or an industry group—and includes providers of other services critical to overcoming barriers to employment: for example, soft skills training, work readiness, transportation and case work support. This type of arrangement seems logical for HCEI, given the newness of its programs, its rural location, and its inexperience in providing intermediary services. In seeking to extend the opportunity that its program provides, HCEI could insert itself into existing workforce intermediary networks, or help to coalesce new networks by building partnerships with
organizations that have experience in workforce intermediation but are looking to connect their clients to green-collar jobs and careers.

**Conclusion**

Cleveland State Community College and Hocking College have established themselves as leaders in the movement towards a green-collar economy by instituting innovative training programs that respond to the needs and realities of their surrounding labor markets and economies. This connection to local and regional markets is critical because it recognizes that training alone will not create green economic development, but is one piece of larger systemic changes that must occur in order to restore individual, industrial and national economic prosperity through the manufacture and use of clean energy.

Having now established themselves as institutional assets for green economic development in their regions, these two colleges are now faced with the chance to deepen the impact of their programs. By reaching farther outside of their existing base of students and partners, both schools can hope to have a greater impact on the industries and individuals for whom a transition to clean energy provides a renewed opportunity for prosperity. In doing so, community colleges will secure their place in a national green economic development agenda.
Works Cited


