Green Talent Research Initiative

October 2011

Preparing for a Greener Tomorrow: How Publicly Funded Education and Training Institutions in New Jersey Are Responding to Emerging Demand for a Green Workforce

A report of the New Jersey Department of Labor and Workforce Development

Prepared by the John J. Heldrich Center for Workforce Development

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NEW JERSEY DEPARTMENT OF LWD LABOR AND WORKFORCE DEVELOPMENT nj.gov/labor

Executive Summary

As national interest in "green jobs" has grown, so has interest in green training and education. The American Recovery and Reinvestment Act, designed to stimulate economic growth nationwide, included over $500 million for green training[1], and states, local areas, and jobseekers and students themselves have also invested in such training. But what does green training look like? Who are the actors offering the training? How are they working to align the training they offer with the evolving skill and workforce needs of employers? And finally, what can we say about the extent to which programs appear to be successful or unsuccessful in those alignment efforts? This research attempts to answer these questions to provide policymakers with better information about how education and training institutions perform when faced with expected growth in a new, emerging industry like green jobs.

Under a contract with the New Jersey Department of Labor and Workforce Development (NJLWD) for a project funded by the U.S. Department of Labor, The John J. Heldrich Center for Workforce Development developed an analyzed a Searchable Inventory (SI) of green job education and training programs in the state with a primary, but not exclusive, focus on publicly funded programs. Researchers used Internet searches, and a survey of public colleges and universities and vocational education programs, as well as existing lists of training available through NJLWD and the Commission on Higher Education to develop the SI. Center staff also interviewed 23 administrators and educators at public colleges and universities and vocational schools to understand how they understand the demand for green training and education, how green programs are developed and aligned with demand, and the challenges educators face in the alignment process. Finally, select curricula were examined in the context of other available research on the skills New Jersey employers demand for green workers to determine whether the programs appear to match well with employer needs.

Key Findings:

Finding #1: Over 450 education and training programs leading to a "green" credential were identified in New Jersey, including over 300 noncredit programs and 149 credit programs.

- Two-out-of-three green training and education programs are noncredit.
- Among credit programs, nearly one-in-two are bachelor's degrees, nearly one-in-three are graduate degrees, one-in-five are associate's degrees.

Finding#2: Four-year colleges and universities are the largest providers of publicly funded green training and education in the state, especially through the production of credit programs. However, county colleges lead in the production of noncredit offerings.

- Four-year colleges and universities provide close to half (192 out of 457) of all green education and training programs in the GPI and over three-quarters (77% or 115 of 149) credit programs. County Colleges provide one-third of all green training and education in the GPI (151 of 457), and nearly 38 percent of all noncredit offerings (117 of 308). Vocational-technical schools provide a small number of credit and noncredit programs. Other providers, which include non-profits, unions, for-profit

providers, and others, contributed nearly one-quarter of all noncredit programs (73 of 308) and just 16 percent of all green training and education in the state.

Finding # 3: Many public education and training institutions lack information on employer skill and workforce needs that has the precision and timeliness needed to create programs that meet the needs of a fast-changing, emerging green labor market.

- Often in publicly funded programs, competing institutional missions interfere with aligning programs solely with employer demands or with expending significant resources to understand the changing skill needs of employers. Pressure to increase enrollments and the presence of green training grants creates incentives for schools to create programs quickly, with or without employer input.

- Fewer than half (10 out of 23) of public higher education officials interviewed reported ongoing, meaningful contact with employers to inform green program content and planning decisions.

- In the absence of a single reliable resource of information on employer skill needs, program planners rely on a range of sources (NJLWD & other reports from labor market information intermediaries, newspaper articles, infrequent discussions with employers, limited examples from other institutions).

- In interviews, higher education providers reported a lack of access to collaborative networks of peer institutions responding to similar challenges.

Finding #4: Student recruitment practices and program content in many green education programs do not appear to be aligned with employer skill and workforce needs

- Reviews of select programs in the SI, interviews with education providers, and a comparison of these data to interview findings and other reports from employers regarding their skill needs identified several potential areas of misalignment policymakers should be aware of when planning future workforce programs. These include:

  - Student recruitment and screening practices: Employers report that core job skills, such as construction or engineering, are more important than green credentials for most green jobs and emphasize that a green noncredit credentials alone are not sufficient for many jobs[2]. A number of noncredit green credential programs in the SI, however, have no pre-requisites and educators reported recruiting – and training - inexperienced jobseekers in these programs. Educators also reported that some of these inexperienced students were funded through various public workforce programs.

  - Program content: Several AAS degrees, certificates, and other vocationally-oriented programs in the SI are not clear about which occupations they are designed to prepare workers to enter and program requirements do not appear to align with jobs that are in demand based on analysis by the NJLWD[3].

Conclusion and Recommendations

A large number of green education and training programs have been developed at publicly-funded education and training institutions in New Jersey. While program administrators uniformly agree that alignment of programs with employer skill needs is at least one of their goals, or at least something recognized as important, a number of findings in this research suggest that programs could use more assistance with engaging employers and implementing other alignment effort.

Policymakers and Funders can assist with this by:

- Providing additional funding and technical assistance to educational institutions to assist them to prioritize and achieve alignment

Educational institutions may want to consider:

- Working with intermediary organizations, such as workforce, economic development, or industry groups to gain better access to employers for input and internship opportunities
- Implementing pre-requisites and targeting incumbent workers for green noncredit credential programs
- Informing students about the value the credential has is in the current labor market.

Introduction

The green economy has raised hopes for a new generation of industries and occupations that will not only result in a better, healthier and more effective environment, but also provide cutting-edge opportunities for businesses and workers in New Jersey and across the United States. This emerging sector within the economy, however, remains largely undocumented with limited data to guide workforce development policy and employer and employee choices. In order to develop the kind of resources that would inform policy and decision-makers, the New Jersey Department of Labor and Workforce Development (LWD), through its Green Talent Research Initiative, sought resources to fill this knowledge gap.

As national interest in "green jobs" has grown in recent years, so has interest in developing training and education to prepare workers to fill them. Federal and state agencies have spent hundreds of millions of dollars on green training for jobseekers and incumbent workers, and education and training institutions are capitalizing on a growing interest in green job training among students. While many efforts are underway to understand and measure jobs in the green economy, however, little is known about how green education and training programs align with the skill and workforce needs of employers. This research identifies trends in the development of credential-based green training and education programs in New Jersey and highlights the issues and challenges that providers face in designing programs that align well with the skill requirements of green jobs, still an emerging area of work.

The John J. Heldrich Center for Workforce Development, in partnership with the New Jersey Department of Labor and Workforce Development, developed a statewide searchable inventory of green job training programs, the Green Program Inventory (GPI). In addition, staff conducted 23 interviews with education and training providers to understand how providers make decisions about green training, the challenges they face in designing programs that align with employer skill needs, and to identify other ways that educators integrate green concepts into the curriculum. This research can assist education and workforce policymakers working to improve the alignment between green education and training and labor market skill needs by (a) providing a "map" of current programs, thus decreasing duplications of effort, and (b) providing insight into the forces shaping the development of green education programs in New Jersey.

Definition of Green Job Training

Green jobs in areas such as energy efficiency, green building, clean/renewable energy, and others, are often not new types of jobs, but rather jobs that require workers with traditional skill sets who may work with products or

services that conserve energy or otherwise alleviate pollution and other environmental concerns. Some of these jobs require a "layer" of green skills or education, the depth and breadth of which varies by occupation. Sometimes the "green layer" is achieved through green training that is provided separate and apart from the non-green education, such as a worker who earns a traditional construction management degree and then later takes courses and/or earns a certificate in green building practices. At other times, such as in the case of an environmental engineering degree, the green knowledge is integrated with knowledge from one or more traditional disciplines.

This research effort focused on the identifiably green layer of education, and specifically on publicly-funded credential-bearing programs. Green credentials examined included credit and noncredit programs offered at vocational-technical schools, county colleges, four-year colleges and universities, unions, non-profits, online and private providers. Noncredit programs are mostly single courses that lead to a credential or certificate of completion, and do not count towards a degree. Credit programs are academic majors, minors or concentrations within a degree. The primary focus of data collection was publicly funded programs, but staff also collected information on private programs, as it was available.

Green credentials examined included credit and noncredit programs offered at vocational-technical schools, county colleges, four-year colleges and universities, unions, non-profits, online and private providers

Programs were considered green if the title and description of the program had an identifiable connection to one of the following key green topics:

Renewable or clean energy concepts and technologies (e.g. solar, wind, geothermal, nuclear, clean coal, etc.)

- Energy efficiency and weatherization
- Sustainability
- Environmental, waste, and pollution management
- Environmental engineering and brownfields remediation
- Green building
- Green Manufacturing, supply chain management and other green business practices
- Other topics related to reducing carbon emissions or reducing pollution and waste

Research Methods

Heldrich Center researchers used several data collection methods to populate the GPI with green jobs training programs in New Jersey. First, staff collected existing lists of programs from the Council of County Colleges, the Vocational-Technical School Association, the NJ Department of Environmental Protection, the Green REDI project, and others. Staff also consulted the New

Jersey Commission on Higher Education website and the NJTrainingsystems.com website to identify relevant programs, and reviewed publicly available information on the internet through online course catalogs at all public post-secondary education institutions in the state. Staff searched for courses and degree programs with green keywords, and scanned the degree programs in the sciences to identify relevant programs.

Basic information was collected on all training programs that met the established definition for green training (see above). The primary focus of the research was on postsecondary degrees and degree tracks with a strong green component and/or title, employer-recognized "green" credentials such as BPI, LEED and NABCEP, as well as other "green" credentials that were locally-developed. The secondary focus area was on green courses or professional seminars designed to enhance job performance or otherwise train workers or jobseekers, and discrete modules added to coursework to "green" the curricula.

The primary focus of the research was on postsecondary degrees and degree tracks with a strong green component and/or title, employer-recognized "green" credentials as well as other "green" credentials that were locally-developed

To further verify the content in the GPI, researchers designed a pre-populated questionnaire, individualized for each institution, which asked educators to confirm the information on their school in the GPI, and also to inform Heldrich staff of programs that were absent from the GPI. These questionnaires were sent to all vocational-technical schools and all county colleges in New Jersey, as it was easier to administer such a tool to smaller institutions at which Heldrich staff had identified the appropriate contacts. At the four-year institution level it was not feasible to gain access to the necessary individuals at each academic department to verify the GPI content in an expeditious manner. Similarly, questionnaires were not feasible to distribute to unions, non-profits or private providers. Fifteen of 19 county colleges and nine out of 21 vocational schools completed the questionnaire.

The Heldrich Center conducted 23 follow-up interviews with educators to help expand on the information collected from the questionnaires, and to develop in-depth knowledge of training programs. The interviews also provided insight into the factors that influence training decisions. Heldrich staff sent out an initial request for interviews to approximately 200 education contacts. After this request, snowball sampling was used in the interviews to follow up with selected individuals who were likely to have relevant knowledge of training at various institutions. Of the 23 interviews conducted with administrators of programs or departments, 11 were with county colleges, nine with four-year institutions, and three with vocational schools. Several informal interviews were conducted with union training providers, and private providers, to add more in-depth knowledge to the data gathered on those providers through internet searching.

Researchers interviewed administrators, deans, department directors, superintendents and professors at four-year institutions, county colleges and vocational-technical schools. Due to the various course offerings on the noncredit side at county colleges, researchers sought out administrators to learn more about how they decided what training to offer. Additionally, researchers identified schools with new degrees in sustainability, alternative energy or renewable energy, and interviewed faculty to understand the aims of these degrees, and why the faculty felt it was necessary to create new degrees. The overarching goal of the interviews was to better understand how educators anticipate the skill needs of the labor market and create programs to fulfill them.

Profile of Green Education and Training Programs in New Jersey

New Jersey is home to more than 450 credit and noncredit credential-based education programs spanning a range of green knowledge areas. These programs, which focus on the "green layer" of education needed for many green jobs, are offered through vocational schools, county colleges, four-year colleges and universities, as well as private postsecondary providers, nonprofits, unions, online providers and others. Figure 1, provides an overview of the types of green credentials included in the Green Program Inventory (GPI) developed for this project.

Figure 1. Credential-based Green Training Programs included in the Program Inventory

Noncredit programs*	**Continuing or adult education programs that are generally short-term programs, usually ten weeks or less, that earn no credits towards a post-secondary degree**
Green credential program*	A course or series of courses leading to an employer-recognized green credential (BPI, LEED, NABCEP, AAEE, etc.)
"Other" credential program*	A course and /or series of courses leading to a locally developed green credential (e.g. "certificate" created by the program)
Credit-based programs	**Degree majors, minors, or specialized tracks within a degree at the post-secondary level**
Green Degree Major	A collection of courses leading to a postsecondary degree with a green word or phrase in the degree title (sustainability, green building, environmental engineering, etc.) or that has major requirements with a strong green focus
Green Minor or Track	A formal minor or degree track with a green word in the title (e.g. green building track within an architecture degree) or a strong green focus within required courses for the minor/track

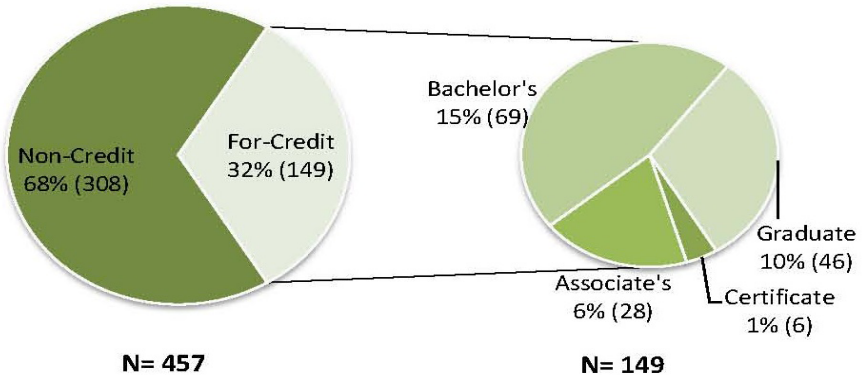
The GPI includes only those noncredit programs designed to train students for a job. It does not include courses and programs designed for "do-it-yourself" homeowners and other groups

Training by degree level and provider type

As Figure 2 indicates, noncredit programs account for over two-thirds (68%) of the 457 green credential-based programs in New Jersey that were identified through this research. Noncredit programs are easier to create, as they are shorter programs and do not require the intense process necessary to gain approval for degree programs. Therefore, it is not surprising that these offerings make up the majority of green programming. The remaining third (32%) of the programs in the GPI are offered for credit. Of these, almost half are bachelor's degree programs (46%; 69 programs), nearly one-third are graduate level programs (31%; 46 programs), one-fifth are associate's degree programs (28%; programs) and four percent (six) are credit certificate programs.

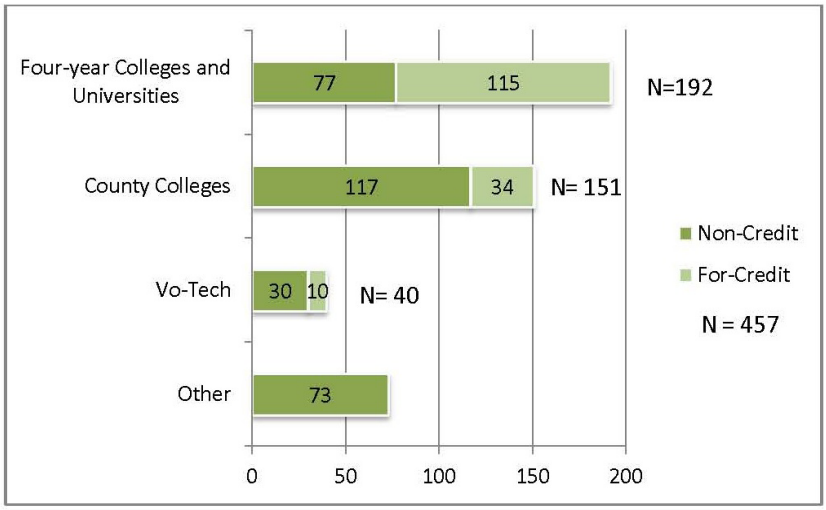
Nearly four-out-of-ten (42%) of all 457 green programs included in the Green Program Inventory are offered at four-year colleges and universities

Figure 2. For-Credit vs. Non-Credit Programs, by Degree Type



Nearly four-out-of-ten (42%) of all 457 green programs included in the GPI are offered at four-year colleges and universities (Figure 3). Of these 192 programs, 60 percent (115 programs) are credit offerings. County Colleges offer fewer green programs overall when compared to their four-year counterparts (3-in-10 or 33% of all programs). These county college offerings are more highly concentrated in noncredit programs. Across both types of higher education institutions, credit offerings are concentrated in science disciplines, many of which have been in existence for many years. These include environmental science, environmental technology/engineering, environmental planning, and "green tracks" within degrees, such as biology, geology, engineering, and environmental science.

Figure 3. Training Offerings by Provider Type



The state's vocational-technical schools offer 40 noncredit programs, or nearly 13 percent of all noncredit programs in the Green Program Inventory

While higher education institutions offer most of the credit and noncredit programs featured in the GPI, other training providers add to the inventory of noncredit offerings. For example, the state's vocational-technical schools offer 40 noncredit programs, or nearly 13 percent of all noncredit programs in the GPI. The "Other" category in Figure 3, which accounts for 73 programs, or nearly one-quarter (24%) of noncredit programs in the GPI, is comprised of online providers, non-profits, private providers and labor unions. The training offerings from these providers focus mainly on building trades. The online programs are offered by Gatlin educational services through several county colleges; the courses follow the same curriculum at all schools in which they are offered, however schools vary in terms of courses offered through this provider. Including the Gatlin courses, researchers identified 31 private provider training programs that contract services out to county colleges or employers. Given their "pass-through" nature and the limited control exerted by the higher education institutions over the content and instructional medium of the courses, these programs were not included in the totals for two-year colleges. Non-profits also offer noncredit training, and 23 training programs were identified in this category. Lastly, nine labor union training programs were identified.

Training by Area of Green Work

Based on the overall definition of green jobs[4] and the taxonomy[5] used to classify green job postings developed by the New Jersey Department of Labor and Workforce Development (NJLWD), Heldrich Center researchers grouped training offerings into four broad categories based on the subjects taught: Green Energy Production/ Clean & Renewable Energy, Energy Efficien-

cy- Green Building/ Construction/ Design, Green Processes, and Environmental Issues. Programs were placed into these categories based on their title, curriculum, and description.

While researchers were able to classify each program in the GPI as belonging to one of the four broadly defined green categories, not all of the training programs clearly align with existing occupations or careers. Researchers noted that some programs do not appear to have any identifiable connection to particular jobs. Sometimes this is because the program is a degree program that prepares students in foundational science or liberal arts skills, as well as a broad training in sustainability or environmental topics, such as environmental science degrees. Other times, programs marketed as professional education, applied degrees, or vocational training lack information in the course description regarding the types of jobs for which the courses prepare students. Finally, based on an analysis of course requirements, some programs marketed to prepare students for specific green jobs lack key components or educational or experience pre-requisites that employers have reported are important for hires[6]. While researchers did not do an exhaustive review of all course requirements, it was clear, both from the evidence in the GPI and interviews conducted with program administrators, that some programs, including those offered as vocational training, lack accurate information about the workforce and skill needs of green employers, resulting in some programs that do not appear to be well aligned with the demands of the current labor market.

The categories that are more rooted in the sciences, Green Energy Production/ Renewable Energy, Green Processes, and Environmental Issues have more offerings on the credit side than does the category of Energy Efficiency- Green Building/ Construction/ Design

Within each green category, programs vary in terms of their relevance to the current labor market, and across categories there is a variety in what type of offerings are most prevalent. For example, the categories that are more rooted in the sciences, Green Energy Production/ Renewable Energy, Green Processes, and Environmental Issues have more offerings on the credit side than does the category of Energy Efficiency- Green Building/ Construction/ Design, which is mostly rooted in the construction trades and is heavily concentrated in noncredit training, where there is often a clearer mission to provide vocational training. Training in the Energy Efficiency category, for example, is closely tied to traditional occupations in the construction trades, so most of the programs in this category have a clear link to the labor market.

The definitions used as guidance in this research are below:

- Environmental Issues includes the elimination of waste materials through the collection, reuse, remanufacture, recycling, or composting of waste materials or wastewater and the removal of pollutants or hazardous waste from the environment. This category also encom-

passes programs that provide training in a broad range of skills related to environmental research and broad environmental knowledge.

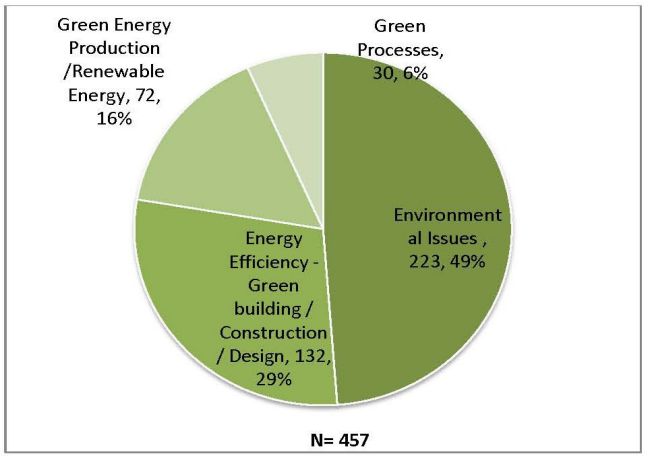
- Green Energy Production/Renewable Energy which consists of electricity, heat, or fuel generated from renewable sources. These renewable energy sources include wind, biomass, geothermal, solar, ocean, hydropower, and landfill gas and municipal solid waste. This sector also includes products in the Green Energy supply chain such as wind turbine products and parts.

- Energy Efficiency – Green Building/Construction/Design includes products and services that improve the energy efficiency of buildings and the efficiency of energy storage and distribution, such as Smart Grid technologies. Also included is "green building" (green retrofits for energy and water efficiency, residential and commercial assessment; green products and materials, and LEED construction).

- Green processes/Sustainability includes efforts made to mitigate the impact that production or business processes and other activities have on the environment. This category includes new degrees in sustainability topics.

Figure 4 provides a breakdown of the types of green training, by training category. Environmental Issues, which covers a broad range of topics, is the largest area of training among the 457 green programs identified in the GPI, comprising nearly half (49%) of all programs. Accounting for nearly one-third (29%) of programs in the GPI, Energy Efficiency- Green Building/ Construction/ Design comprises the next largest category. Green Energy Production/ Clean & Renewable Energy courses comprise 16 percent of the GPI, while Green Processes accounts for six percent.

Figure 4. Training Programs in the GPI by category



Environmental Issues

Nearly half (49%; 223 programs) of all programs in the GPI fit into the broadly defined category of Environmental Issues. Training in the Environmental Issues category includes programs related to environmental remediation, conservation of natural resources, and programs that provide an overall understanding of the environment. Credit offerings in this category focus on traditional topics and skills that are green, but not necessarily new, as they focus on traditional science degrees and disciplines related to the environment broadly. On the noncredit side, training programs focus predominantly on waste water management, as well as environmental remediation and regulations. According to interviews with educators and course descriptions, many of the courses are offered as continuing education for professionals who need to stay up-to-date on regulation and permitting requirements in environmental remediation and waste management industries. As shown in Figure 5, Environmental Issues training and education programs are split almost evenly between noncredit courses and credit programs.

Many of the courses are offered as continuing education for professionals who need to stay up-to-date on regulation and permitting requirements in environmental remediation and waste management industries

Figure 5. Environmental Issues Training, by Credit and Degree Type

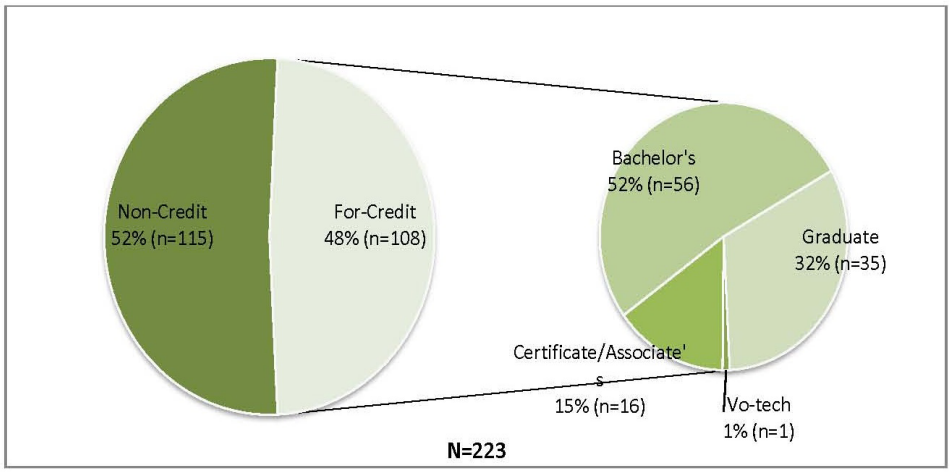
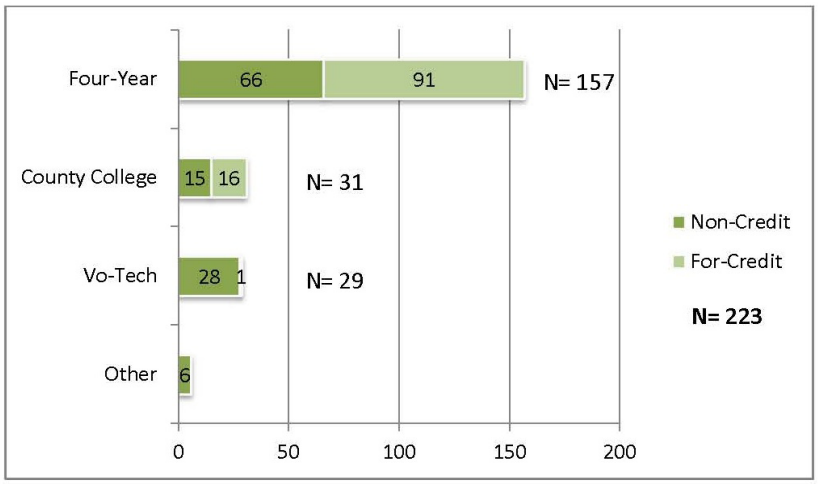


Figure 6, shows the distribution of credit and noncredit programs in this category across provider types, highlighting that four-year colleges and universities offer the most training with a total of 157 programs, or 70 percent. Forty-two percent of the offerings at four-year institutions are noncredit programs, and most of these are continuing education courses offered at the Rutgers University New Jersey Agricultural Experiment Station through the Office of Continuing Professional Education. County colleges are evenly split between noncredit and credit offerings, however, their offerings are smaller in number given they have fewer resources than larger institutions.

Figure 6. Environmental Issues Training, by Provider and Credit Type



Degree programs in this area are mainly environmental planning programs at the undergraduate level, and advanced science degrees that focus on the study of pollution

The Environmental Issues category contains two, key types of programs: Environmental Remediation and Environmental Research. The Environmental Remediation sub-category consists mainly of noncredit programs, many offered at the Rutgers University New Jersey Agricultural Experiment Station through the Office of Continuing Professional Education. Many of these programs focus on regulatory issues, remediation education, permitting and licensing in connection with state Department of Environmental Protection and U.S. Environmental Protection Agency regulations, as well as requirements for Licensed Site Remediation Professionals and Certified Recycling Professionals. Most of these programs are for incumbent workers, or experienced professionals who require certifications or licenses. Topics include wetlands, hydrology, hazardous waste, land use law, and environmental sampling and auditing. Degree programs in this area are mainly environmental planning programs at the undergraduate level, and advanced science degrees that focus on the study of pollution. Graduate level education in this category consists of advanced study of remediation through scientific techniques, such as programs in air pollution control and environmental science programs that focus on hazardous substance management. These remediation programs focus on mitigating or resolving environmental pollution, however, other programs in the Environmental Research category emphasize a more broad study of the environment.

Programs in the Environmental Research sub-category are mostly credit degree programs or minors. Courses in this category at the noncredit level focus on conservation and natural resource management, as opposed to remediation. The environmental research sub-category is largely comprised of degrees offered at four-year institutions. Students in these programs are not trained for a specific occupation or industry, but are provided the basic

knowledge and skills that can be applied in a wide array of green occupations. Examples include environmental science, environmental engineering and environmental planning programs, as well as traditional science degrees, such as chemistry or geology with a "green" track or minor. These programs are widely offered at four-year institutions, because a bachelor's degree is the minimal requirement for many occupations in science fields, as they train students to conduct research and understand environmental concepts. Additionally, students in these programs learn the foundational knowledge necessary to obtain an entry level position or to pursue more specialized training at the master's and doctoral levels.

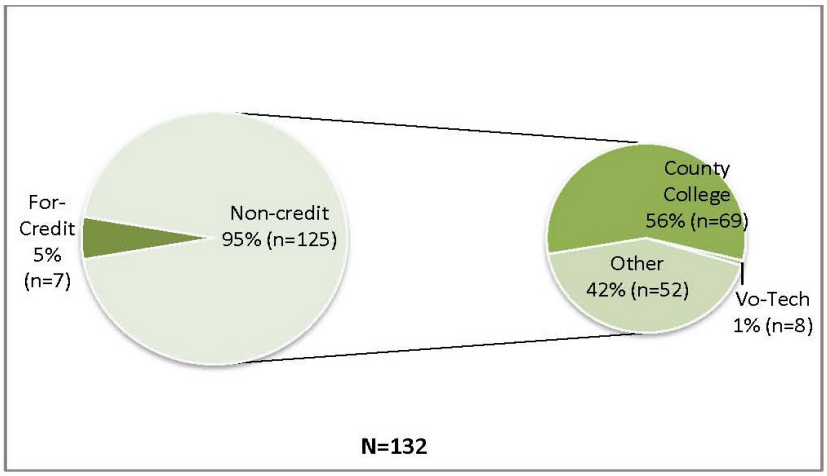
At the master's degree level, the GPI contains graduate certificate and continuing education programs that aim to build on the traditional science skills of professionals in order to improve their marketability in the green jobs economy. Examples of this include Professional Science Master's degrees and Master's of Arts degrees in environmental fields.

According to interviews, with the exception of programs offered by private providers and labor unions, most of the training programs in this category are offered to job seekers, as opposed to incumbent workers

Energy Efficiency- Green building/Construction/Design

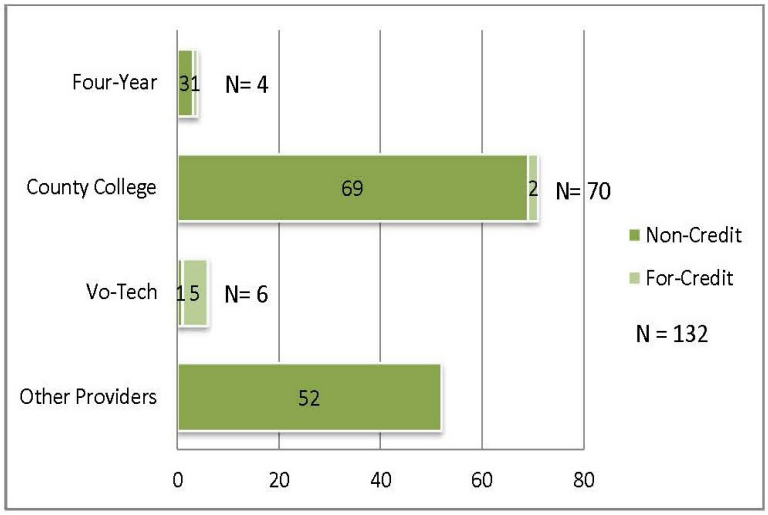
The Energy Efficiency - Green Building/ Construction/ Design category comprises 29 percent of the GPI, with 132 programs, consisting primarily of programs in green construction. As indicated in Figures 7 and 8, training programs in the Energy Efficiency – Green Building/ Construction/ Design category are almost all noncredit programs in green construction trades. County colleges provide 56 percent of the offerings, while 42 percent are training programs offered by providers in the Other category. According to interviews, with the exception of programs offered by private providers and labor unions, most of the training programs in this category are offered to job seekers, as opposed to incumbent workers.

Figure 7. Energy Efficiency – Green Building / Construction / Design by Credit and Provider Type



There are only eight for-credit training programs in the Energy Efficiency category in the GPI (Figure 8). Five of the degree programs are construction programs at vocational-technical high schools provided for students interested in careers in construction; there are also two associate's degrees in energy efficiency and one graduate degree in energy efficient architecture. These programs are explicit in what skills students will gain and how they will translate to an occupation in green construction. Additionally, these programs build on traditional skill sets for relatively traditional occupations.

Figure 8. Energy Efficiency – Green Building / Construction / Design by Provider and Credit Type



All of the union training programs in the GPI focus on green construction, as do most of the non-profit and private provider training programs

All of the union training programs in the GPI focus on green construction, as do most of the non-profit and private provider training programs. Unions provide green credential training in the building trades similar to many county college offerings. They also apply for grants to reimburse their members for the costs associated with obtaining a credential, such as exam fees and books. Rather than creating new programs, unions are also adding "green construction" content to their traditional apprentice curricula, sometimes covering the same content being taught at county colleges. Many of the private provider programs in the GPI are funded by State Energy Sector Partnership grants and are designed primarily for incumbent workers.

Credentials such as Leadership in Energy and Environmental Design (LEED) or Building Performance Institute (BPI) are increasingly recognized as the standard certifications in the green construction industry. As shown in Figure 9, two-thirds (66%; 82 programs) of the noncredit programs in this category are linked to this type of employer recognized credential. There were 45 BPI credential programs identified, the largest number of any single credential in

Figure 9. Widely Offered Noncredit Training Programs (across all provider types)

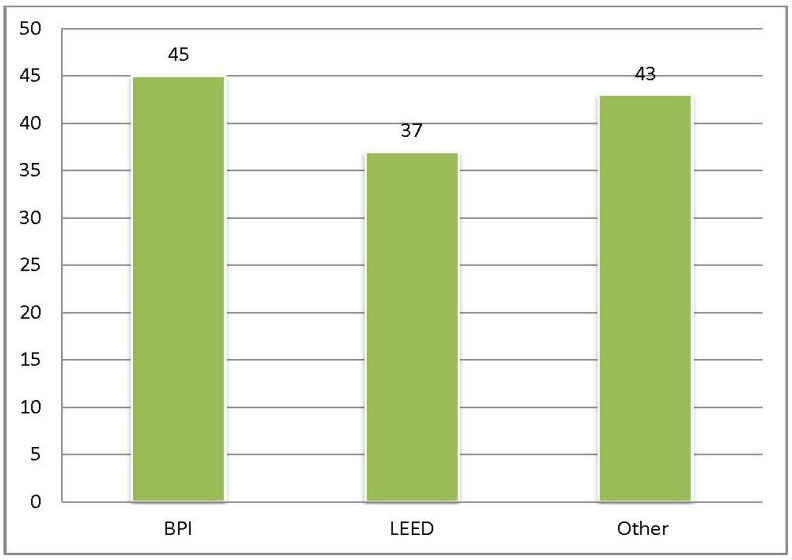
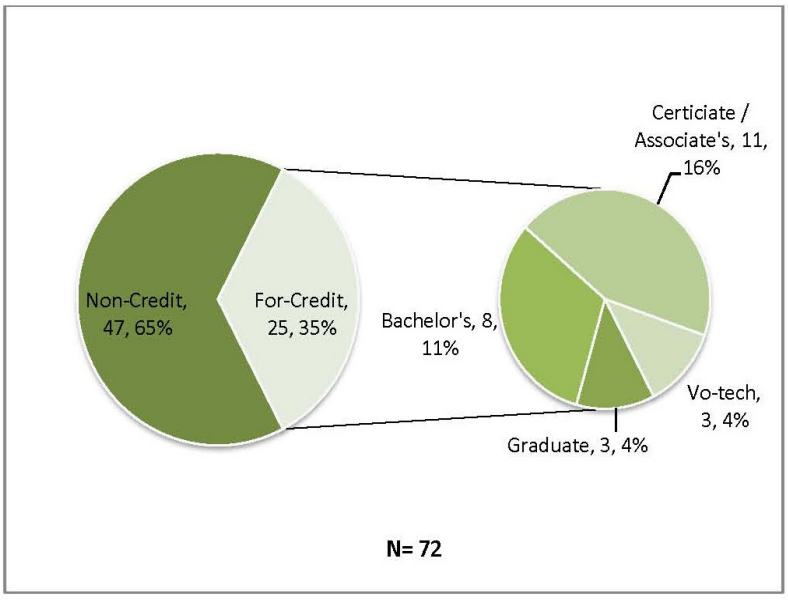


Figure 10. Green Energy Production / Renewable Energy Training, by Credit and Degree Type



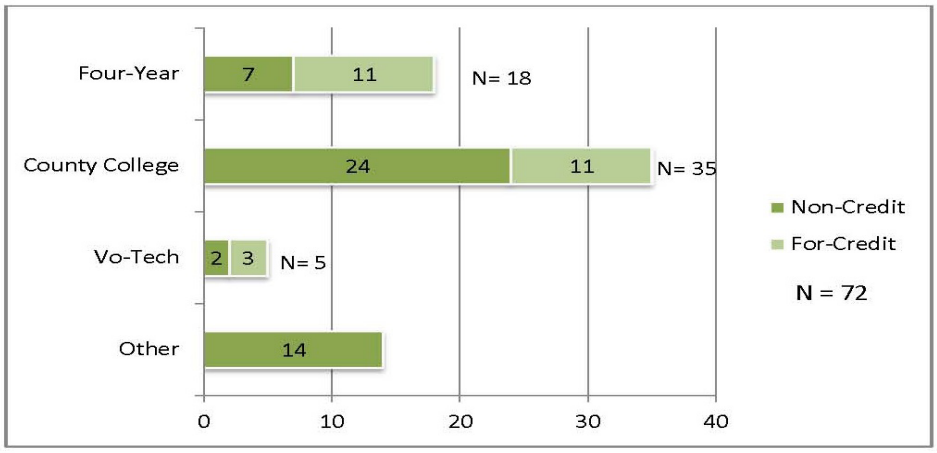
the GPI, however, these include some subspecialties. Most training programs of this type are fairly short in duration, many are completed in a few days and most last less than two weeks, and they focus narrowly on the green layer of knowledge within a traditional occupation.

Green Energy Production/ Clean & Renewable Energy

There are 72 programs in the Green Energy Production/ Clean & Renewable Energy category, comprising 16 percent of the GPI, and most of these focus on training for the solar industry. Training in the Green Energy Production/ Renewable Energy category prepares students for jobs across a broad spectrum of occupations related to green or renewable energy. This ranges from noncredit programs in solar panel installation to graduate degree programs in implementing renewable energy systems. As demonstrated in Figure 10 below, most of the training in this category - 65 percent or 47 programs - is offered on the noncredit side. The noncredit training in this category focuses primarily on solar panel installation or sales.

Over one-third (35%; 25 programs) of the programs in this category are credit degree programs. Programs at county colleges focus on green energy technology through degrees in alternative energy, sustainable energy or nuclear energy. These are generally new degrees or certificates that focus on the technical aspects of renewable energy technology systems. Four-year institutions mostly offer students the opportunity to specialize in this field through concentrations within traditional majors, for example engineering, as opposed to creating new degrees. Additionally, nuclear energy programs are included on the credit side, but there are only four such programs among the county colleges and four-year institutions.

Figure 11. Green Energy Production / Renewable Energy Training, by Provider Type



Training in the Green Processes category consists mostly of programs that teach skills to make business and society green, in a broad sense, by reducing or avoiding pollution in the environment

County colleges offer the majority of all courses in Green Energy Production/Renewable Energy, leading in the number of both credit and noncredit offerings (Figure 11). As mentioned above, virtually all training on the noncredit side is solar panel installation training. County colleges and providers in the Other Provider" category have focused their efforts here, while county colleges have also invested in creating new degrees in renewable energy. The for-credit vocational-technical programs are geared towards high school students with an interest in science and the environment, to enhance their education with renewable energy modules, and to prepare them for college degree programs in similar disciplines. The four-year institutions mostly provide undergraduate concentrations within traditional science departments. Additionally, four-year institutions offer certificates of energy studies provided at the baccalaureate or master's level, which complement a degree in engineering or related science, but also demonstrate specific knowledge of energy systems or alternative energy technology.

Green Processes / Sustainability

Many of the Green Processes programs are new, and others are still being developed, therefore there is a relatively small number of programs in this category on the GPI, only six percent (30) of the GPI. Training in the Green Processes category consists mostly of programs that teach skills to make business and society green, in a broad sense, by reducing or avoiding pollution in the environment. Many courses in this category include corporate sustainability programs that focus on skills for professionals interested in corporate sustainability or green business practices, while others focus on sustainability as an inter-disciplinary degree aimed at creating a sustainable society. On the noncredit side, these are brief courses that focus on providing skills related to preparing corporate sustainability reports or implementing

Figure 12. Green Processes Training, by Credit and Degree Type

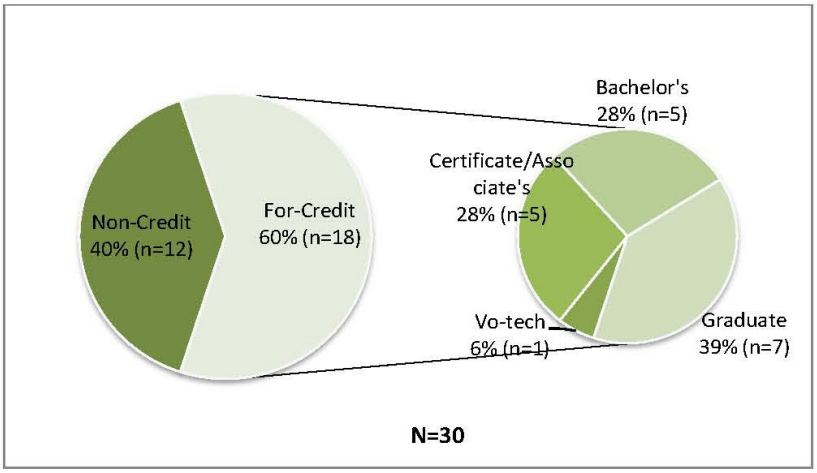
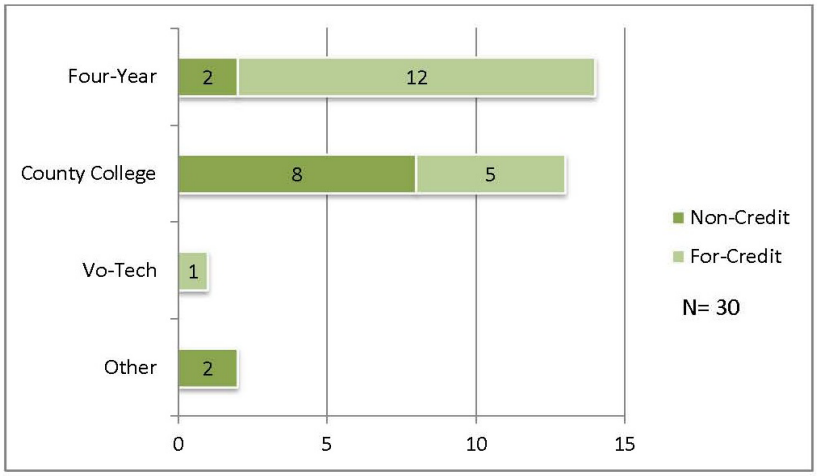


Figure 13. Green Processes Training, by Provider Type



green business practices in the workplace. The for-credit side includes several degree programs and concentrations in sustainability that are integrated with traditional business degrees to help students understand contemporary green issues in business. Some educators are creating new sustainability degrees that focus on sustainability from an inter-disciplinary, societal perspective, while others are integrating less extensive sustainability education with traditional training as it is relevant. Interviews with educators revealed that the area of sustainability education seems to be evolving quickly as faculty from various institutions described their efforts to provide for-credit sustainability education.

Among the 18 credit programs in this category, offerings are distributed among Associate's degrees / Certificates (5), Bachelor's degrees (5), and Graduate degrees (7) (Figure 12). As demonstrated in Figure 13, below, county colleges and four-year institutions are the primary providers of training in this category. Several of these degrees are newly formed sustainability degrees or certificates, while others are sustainability concentrations within traditional business, liberal arts or environmental science degrees.

Processes that Education and Training Institutions Use to Align Curricula with the Emerging Skill and Workforce Needs of New Jersey's Green Economy

Heldrich Center staff conducted 23 interviews with higher education program administrators to learn about the processes that program stakeholders use to understand the emerging demand for green jobs, skills, and credentials; the decision-making process that determined which types of training or education the school would offer; and the processes used to ensure alignment of program planning and implementation with employer skill needs. Researchers also examined selected program descriptions and course requirements and compared them with research findings from other studies regarding the skill and workforce needs for green jobs in New Jersey.

This research is primarily applicable to higher education providers in the state, which offer three-quarters of all programs identified in the GPI (343 out of 457 programs). Of the 23 interviews conducted with administrators of programs or departments, 11 were with county colleges, nine with four-year institutions, and three with vocational schools. While several informal interviews were also conducted with union training providers, and private providers of training, further research is required to determine how well these processes apply to these types of providers not studied extensively here.

This section begins with an overview of the characteristics of labor market responsive colleges based on a review of the scholarly literature, and a brief overview of the unique challenges schools face in achieving alignment for programs that address emerging occupations, such as green jobs. The remaining sections describe trends observed from the interviews and examination of programs in the GPI for evidence of alignment with employer skill needs.

Characteristics of Labor Market Responsive Colleges and Universities

To align educational programs with employer skill needs requires educational administrators to have a strong base of knowledge about what those skill needs are and the institutional support to implement educational programming that addresses these skill needs. There is significant research, particularly at the community college level, on the characteristics commonly found in colleges that have achieved documented success in responding to the skill and workforce needs of local labor markets.

In a review of the research literature on the labor market responsiveness of community colleges, researchers identified the following list of character-

istics of colleges that respond effectively to the skill and workforce needs of employers :

Institution-level leaders committed to aligning education and training with the needs of the labor market

Indicators of committed leadership include: allocating resources based on labor market demand; aligning recruitment efforts with demand; building programs employers want – including strong contract training divisions and adding new in-demand degrees and courses; understanding best practices for achieving alignment with employer skill needs; and making alignment part of the institution's mission.

Understanding the local labor market and developing strong partnerships with businesses

Indicators of understanding employer needs and developing strong partnerships with employers include: maintaining up-to-date information on employer skill needs; the ability to detect sudden shifts in demand; offering targeted and contract training; collaborating with business on curricula and seeking employer input ; recruiting industry experts/ professionals to teach courses; partnering with other educational institutions to offer comprehensive training to employers; and creating internal collaboration among departments to develop strong curricula.

Internal structures that facilitate flexible responsiveness to changing labor market demands

Indicators of internal structures that support labor market responsive training include: evidence of rapid response to changes in demand, including timely modification of curricula; developing divisions dedicated to employer training; integrating noncredit elements into credit programs; and using distance learning to deliver programs.

While it is beyond the scope of this study to fully assess how well New Jersey colleges and universities exemplify the characteristics identified in the research literature, these characteristics provide a useful framework for understanding the types of activities and priorities that are often in place at higher education institutions considered to be well aligned with labor market needs. It is also a useful tool for understanding the information gained in interviews with program administrators for this study.

How Social, Institutional, and Historical Factors Shape the Labor Market Responsiveness of Green Education and Training Programs in New Jersey

As discussed earlier, various priorities, incentives, and structures at higher education institutions often limit the ability of program administrators to create green education and training programs that are strongly aligned with employer skill needs. While the following discussion is not exhaustive of all factors that shape labor market responsiveness of higher education and training programs, it presents some dynamics that are worth highlighting, particularly those that came up in a number of interviews and which appear to present barriers to alignment with employer skill needs. In addition to items raised in interviews, aspects of the history of higher education institutions in the state also affect the extent to which alignment with employer skill needs is a key focus of the institutional leadership.

Competing Philosophies among Stakeholders Regarding the Purpose of Higher Education

Those designing credit programs, whether for traditional or emerging occupations, may face barriers to implementing programs that align completely with employer skill needs due to competing philosophies about the purpose of higher education.

Some administrators of four-year schools explained in the interviews that they do not align their curriculum with labor market demand. Rather, they indicated that most four-year academic degrees focus on the underlying principles of a discipline regardless of what the present labor market values. The goal, these administrators say, is to impart a core set of critical thinking, communication and problem-solving skills that will prepare students for a wide range of high-skill jobs. Both faculty and students tend to view the education in these disciplines as important, regardless of how closely the education translates to a specific job after graduation.

Community colleges that were included in this study tended to emphasize scholarship and transfer to four-year institutions over workforce development. This lack of connection with workforce development can be seen in decision-making on program offerings and for tracking program performance. Community colleges in New Jersey dedicate few resources to researching labor market needs and rely very little on labor market information in program decisions. Additionally, many schools recognize success in terms of enrollment as oppose to job placement. Some educators interviewed for this project indicated that they might take workforce development into account when designing curricula, however, priorities of enrollment overshadow the workforce development component and admitting students to programs that will lead them to four year colleges and universities prevail.

Some institutions offer training or education programs in response to student interest rather than based on labor market outcomes. These choices reflect role of community colleges in New Jersey as vehicles to increase access to higher education and institutionally they have aligned their priorities with those of four-year institutions rather than training students for specific jobs.

The Culture of Academic Disciplines

All of the educators interviewed recognized the value of green education and training, and consider it important to provide students with opportunities to learn about the current challenges facing the environment and the emerging technologies to address them. While many would argue that knowledge of the environment is relevant for all students, it is difficult for faculty members to integrate education on new topics in green technology or sustainability into traditional academic programs. Educators vary in their views on how extensive their offerings in green education should be. Some believe that some knowledge of sustainability or the environment should be imparted through an elective course or a required general education course, others would back the option of a green degree. Educators interviewed discussed the problems they face in traditional academic programs, such as engineering, business and traditional sciences, where they want to incorporate relevant green education modules.

Engineering departments, for example, might struggle to update their curricula in light of the constraints placed on students by the rigorous traditional modules. One interviewee explained that his engineering department has trouble finding space and time to incorporate knowledge of sustainability into a curriculum that is already filled with required courses. Some schools are addressing this challenge within traditional disciplines through introducing specialized education as an "add-on" major. Educators seeking out this kind of solution explained that they are looking for ways to partner with traditional disciplines to provide complementary programs on specialized green topics that relate to a student's primary major. In addition, some educators felt an add-on degree or minor concentration within a traditional discipline is better suited for green studies, which they do not perceive as sufficient to comprise a stand-alone degree.

Traditional Measures of Program Success in Higher Education

According to interviews with program administrators, enrollment is often the primary measure of success for higher education programs in New Jersey, both for credit and noncredit programs. This is also true for green training and education programs. A number of those interviewed suggested that their credit and noncredit green programs, like other programs offered at the institution, were developed primarily to cater to student interests, as opposed to focusing solely on the knowledge and credentials needed to

obtain or advance in a green job. Several administrators interviewed cited enrollment as the only measure of success for their programs. While a few programs noted that job placement was also goal, very few had any reliable way to track placement, whereas all had access to enrollment data.

Pressures or Directives from Outside Funding Sources

The availability of funding plays a major role in the direction and form of green education and training programs at higher education institutions. In some programs, educators reported a large number of students came to them with unemployment training vouchers, suggesting an increased demand for training due to the students' access to funds for it. Additionally, businesses were provided with grant funds for incumbent workers, and many employers looked to schools to provide the training; in some instances, educators reported that this was a main driver in determining what courses were offered.

Interviews revealed that some educators were encouraged to start new green programs because funding was made available to the institution for this purpose. A number of county colleges created training programs in response to the availability of training grants for green jobs. Some of the grants required educators to teach particular types of courses or to serve certain types of jobseekers regardless of current realities in the local labor market. One example of this might be a green construction training program that is required to target training to low-skilled workers with no experience, at the same time that there are many displaced construction workers with ample experience who more closely fit employer skill needs. In satisfying grant requirements, pressure to move fast may contribute to growth of noncredit programs over credit programs, as seen in the GPI. Noncredit programs are easier to implement and may appeal to a wider group of students.

Actions by the federal and state government also helped to spur demand for green jobs training, both by directly funding training programs and also by passing legislation that placed a higher priority on green training. One example is the 2008 NJ Energy Master Plan, which provided financial incentives for solar installation and also funded incumbent worker training. The incentives led to growth in the solar industry, and subsequently training providers seeking to go green felt this would be a good opportunity for student employment prospects. In direct response to state and federal training grants, employers approached community colleges to establish partnerships in efforts to train their employees in green skills. These forces all led to an increase in noncredit offerings for green jobs training, which were widely available to anyone who wanted to enroll, although the programs were not necessarily designed for such a broad audience.

Key Findings on Processes New Jersey Higher Education Institutions Use to Align Green Education and Training Programs with Employer Skill Needs

Higher education institutions in New Jersey prepare students for the labor market in several ways. Bachelor and Associate of Arts degrees (BA and AA degrees) provide a broad foundation of learning that, while not closely aligned with the particular skill requirements of individual jobs, have been shown through the long-established field of human capital development theory to prepare students for long-term success in the labor market or to enter even higher levels of education. Colleges and universities, however, also offer a range of noncredit certificates, certifications, credit professional degrees, and, in the case of community colleges, credit Associate of Applied Science (AAS) degrees that are marketed as career-oriented programs designed to prepare students to enter or advance in particular jobs or classes of jobs.

The following key findings from interviews with program administrators highlight the factors and processes that are being leveraged at the institutions included in the study in order to foster alignment of green education and training programs with employer skill and workforce needs. These findings are loosely grouped around the factors identified in the scholarly literature as being most influential in producing education and training programs that are aligned with labor market needs. It is important to note, however, that due to limitations in the scope of this project, it was not possible to achieve a full assessment of the extent to which New Jersey postsecondary institutions fit the criteria identified in the literature for achieving alignment. Interviews conducted for this project included open-ended questions regarding the processes used to understand labor market demand for green jobs and skills, and asked broadly about the factors that administrators perceived as having contributed to aligning programs with employer skill needs. Responses were then grouped into the broad categories of leadership; understanding the labor market and building business partnerships; and building internal structures to respond to labor market demand.

Leadership

Researchers asked program administrators to identify key factors that influenced the development of their green education and training programs. However, interviews conducted for this project did not ask administrators to provide details on institutional leadership and the role leaders played in fostering alignment of green education and training with employer skill needs. Through this line of questioning, only a few programs commented on the role that institutional leaders played in the alignment of programs with employer skill needs, but other examples of the effects of leadership at the program level were found, such as targeting recruitment of students to match em-

ployer skill needs and identifying best practices among colleges perceived to be responsive to the labor market.

Importance of institutional leaders

At one community college, administrators stressed that alignment of all "career-related" programs, by which they meant Associate of Applied Science (AAS) programs as well as noncredit professional education courses, was a priority of the college president and was identified as a priority in the college's mission statement. They noted that for years, all AAS programs have been required to maintain active employer advisory groups. These groups are mandated by policy to meet monthly and to have direct input into curriculum development. The structure of these employer groups, as well as those developed by other institutions, is discussed in more detail in the sections below.

At another college, administrators convened a group of employers to advise on the development of grant-funded green education and training programs. It is possible that this was driven more by grant-requirements than by an institution-level commitment to engaging employers in the development of curricula. In either case, the employer group was convened only a handful of times and the green curricula were developed primarily by program-level administrators and faculty with little further direction from college leaders or employers. In the absence of advisory boards, or readily available industry experts at their institutions, some administrators sought this expertise through others means.

A small number of administrators reported joining committees that promoted green campus initiatives at their institution, in an effort to understand green more broadly. When one administrator learned that job seekers were going out of state to receive training, she personally reached out to industry experts and businesses to understand the training needs and looked to accreditation associations to understand the appropriate training structure and curricula. In the absence of leadership in convening advisory boards or connecting to businesses, administrators are left to rely on anecdotal information or informal relationships with employers, which can provide confusing, conflicting or misleading insight.

Aligning student recruitment with employer skill needs

One aspect of leadership noted in the scholarly literature that contributes to improved labor market responsiveness is alignment of student recruitment with the skill and workforce needs of employers. According to employers, many noncredit programs in green construction and installation are better suited to incumbent workers or displaced workers with relevant experience,

than for inexperienced jobseekers and career changers. As mentioned earlier, many of these programs, for example LEED or BPI courses, focus on the "green layer" of education in the green construction field, assuming students have a basic skill set needed in these occupations. In fact, employers revealed that in most instances a candidate with BPI certification lacking relevant work experience and traditional training was less desirable than a candidate with more work experience, but lacking a BPI certification. Employers also revealed in interviews that they are willing to train their own workers in green skills, and educator interviews confirmed that they enroll incumbent workers whose training is paid for by their employer. Based on a review of publicly available program descriptions and interviews with educators, few, if any green programs have strict pre-requisites for "green layer" training, although some course descriptions do highlight that they are geared to workers with prior experience. It seems the composition of students varies across schools; most schools enrolled inexperienced unemployed students as well as incumbent workers, although in the interviews some educators said they steer inexperienced, unemployed workers away from BPI and LEED courses. According to employers, students with little experience and difficulty navigating the labor market are at a disadvantage when they complete noncredit programs which are best suited to incumbent workers or experienced professionals seeking to add a niche skill set to broader, foundational knowledge in their field.

In addition to employers fulfilling skill needs by training incumbent workers, the research for this project also revealed that employers do not necessarily demand these skills, but rather the resources for training are available and they think the training may be useful in the future. Several educators mentioned that incumbent workers or business owners enroll in training to add an additional service or product deliverable to their business while funding is available to do so, rather than enrolling in response to a market demand for these skills. For example, many electricians registered for solar courses at one institution, simply to expand their knowledge in hopes that this additional deliverable might improve their own businesses. In these instances, educators realized that their enrollment numbers were not necessarily representative of the current labor market demands for these skills as much as the result of available resources for training.

Identifying Promising Practices

In an attempt to replicate best practices for responding to labor market demand for green education and training, many program administrators interviewed for this project looked to follow other institutions when developing green programs and curricula. While no formal collaborative network for educators in green training exists, educators make efforts to connect through personal relationships or meetings hosted by interest groups, such

as the New Jersey Higher Education Partnership for Sustainability. Educators expressed that it was helpful to look to the examples of other institutions making decisions on training, but many indicated a strong desire to have additional opportunities to collaborate with one another to gain an understanding of the "big picture" of labor market demand, and to learn about the responses of peer institutions throughout the state.

With access only to isolated examples of what other schools are offering in response to perceived employer demand, higher education institutions appear to be replicating very similar programs without full knowledge of the numbers and types of competing providers offering similar credentials. Some schools, however, acknowledged that they feel competition from other nearby institutions offering similar programs. Based on data presented in the GPI, it is clear that some schools are offering similar programs, or making similar modifications to programs to better serve students. At the county college level, for example, many of the noncredit offerings are concentrated in the green construction industry, centered on a few types of training such as BPI and LEED.

Another factor that propagates the replication of course offerings is the presence of private vendors that offer training and green certifications and actively market their courses to schools. These vendors offer schools a readily-available solution based on employer-recognized credential models, and they establish credibility based on their services to others institutions. These vendors have essentially filled a vacuum in the need for promising models. Educators who have undertaken the process of developing their own training reported that finding alternative models to these well-established private provider options can be very challenging, and it is even more challenging for educators trying to develop unique programs.

Interviews show that educators at all levels of education place a high value on collaboration in making decisions about what training to offer, to whom, and how best to design curricula. For county colleges, collaboration is desired in order to help schools compare approaches and learn from others' successes and failures. At the four-year level, many educators discussed collaborations among departments within their own institutions, as well as collaborations with faculty at other institutions. Such collaborative efforts have helped four-year schools to partner with one another to expand course offerings to students, to help share ideas and curricula, and to discuss the demand for green skills in particular industries. Additionally, at all levels of education, collaboration with business leaders was said to be valuable and highly desirable. In lieu of collaborating with in-state educators, administrators also reported sending faculty to conferences in other states to learn about promising practices in training.

Understanding Demand and Business Partnerships

Overall, program administrators for these career-oriented programs, and even many who oversaw traditional BA and AA programs, uniformly recognized a need to offer programs that were perceived to be in demand in the local labor market. As discussed earlier in this report, many green education and training programs identified for the GPI fall under the second category and are marketed to students as career-relevant programs. Researchers expected that program administrators, especially those associated with vocationally-oriented programs, would assign a high priority to aligning these programs with the skill and workforce needs of employers. In general, this did appear to be the case. All, however, reported doing some level of research to identify the types of green jobs that are in demand and the types of skills and credentials employers require.

Given that green jobs, while growing in popularity among students and school administrators, are still an emerging area of work, information on which jobs are growing and which skills and credentials lead to job success is sometimes difficult to find. Additionally, the data varies by geographic area, and changes quickly. Administrators interviewed for this research reported triangulating information about labor market demand and skill needs for green jobs through a range of sources, including reports from labor market intermediaries, newspapers and magazines, national reports, employer partnerships or advisory groups , and anecdotal information. Information gathering, for most educators, is an ongoing process, as they realize the industries associated with green jobs are constantly changing and experiencing various challenges.

Sources of Information on Green Jobs that Program Administrators Consult

Broadly speaking, most administrators interviewed reported relying on secondary sources for information on workforce and skill needs for green jobs, while a few reported meaningful connections and partnerships directly with employers to obtain up-to-date information. The secondary sources provide useful guidance for initial decisions on program focus, but based on the Heldrich Center's research on employer skill needs and survey of the literature on green jobs and skills, the information in secondary sources is often conflicting and / or out of date and therefore not helpful in guiding curriculum development. Such sources do not provide sufficient detail on skill requirements and may not represent current or complete information on hiring demands, especially in the context of the local labor market needs. Given the absence of models to follow, some educators report following the examples set by other institutions that provide green training, in addition to relying on information that is readily available, which is plentiful, but not necessarily reliable.

LMI Sources used by educators, as revealed through interviews:

- Reports from labor market intermediaries such as NJLWD, USDOL, and the Heldrich Center
- One-stops and WIBs
- Industry publications such as the Wall Street Journal
- Expert reports that focus on New Jersey
- Updates from websites that track policy changes
- Industry advisory boards
- Websites such as NJ Clean Energy

The process of trying to understand the demand for green jobs and skills is complicated by the robust media coverage of green jobs, as well as the profitable training industry that has evolved around the green sector. Several educators explained that it can be difficult for them to parse out reliable information upon which to make decisions in the absence of employer input, or a central reliable data source. As one faculty member said, "The green trend is definitely on in the media. There is no way one cannot hear/see what government is developing in terms of programs and requiring in terms of legislation.… Training needs required by employers, though, has been lacking."

Without a source of accurate and timely information, educators are left with a significant amount of unreliable information to sift through, which can make training decisions even more difficult for them. One administrator of noncredit programs used traditional labor market data to identify 25 job openings for students of his solar installer program. When the students graduated, he said the jobs simply were not there, and he now questions the reliability of the data he has traditionally used. Although employer engagement has helped some educators to navigate the landscape of information, in the absence of employer information on skill demand, educators are left to seek out alternative resources. Some professors found out how students applied their training in the labor market by following up with them after graduation. One educator said he was able to adjust training offerings and curricula to better align with what he knew his former students were doing in their current jobs.

Employer Engagement and Partnerships

Ten out of 23 program administrators reported direct, ongoing and meaningful input from employers or advisory boards, while 13 reported very limited contact with individual employers or no contact at all. Educators who reported ongoing and substantive input from employers cited the use of an advisory board as an effective vehicle for convening and receiving valuable industry insight. All educators reported reading industry publications, following labor market data, and engaging in various fact-finding efforts on their

own in a efforts to understand the skills needed in the green jobs economy. One community college reported making connections to industry by sending instructors to networking events to meet employers in hopes of establishing relationships to help their students find job opportunities. Less than half of the educators interviewed reported convening advisory boards comprised of employers and industry experts.

Educators who use advisory boards convey a solid understanding of the realities in their local labor markets, and the needs of various employers in green industries. This is important in a volatile labor market in which even seemingly direct connections to employment opportunities can be unreliable. Interviews revealed that relying on limited employer input or partnering with only one employer, which may yield promising results in more established industries, can pose challenge in the emerging green labor market. One example is a training program that incorporated on-the-job training in its curriculum, but the employer that initially agreed to take on the students was ultimately not able to fulfill the commitment. Another educator closely aligned with a large local employer to feed workers into the employer's pipeline, and then the business went bankrupt. The educators in these examples learned that they must be proactive, versatile and communicate persistently with groups of employers to understand demand well.

Educators on the noncredit side that convene advisory boards have also learned that employers mainly want training for incumbent workers, as opposed to training for potential new hires. These partnerships have helped educators satisfy their enrollment goals, while helping employers improve the skills for their workforce. Before seeking to train new workers, educators have found these to be worthwhile relationships to pursue through advisory boards. It is important to note, however, that an advisory board should be comprised of a group of individuals across an industry and not be too closely linked with one area of green business.

Development of Internal Structures

Educators in this study have made numerous efforts to adapt to the ever-changing demand landscape for green training. Initially, educators had to find ways to quickly adapt to a fairly sudden influx of demand for green training. More recently, educators have had to grapple with bigger problem of assessing employer demand for green skilled workers. Adapting to the sudden labor market demand for green skills posed a significant challenge to educators, coupled with the uncertainty about the future of green jobs. The challenges have been difficult, but educators have demonstrated dexterity in trying to keep pace with the changing dynamics of the green jobs labor market.

A number of educators reported closely watching activities of policymakers in Trenton for changes that will affect solar training needs, such as tax credits and financial incentives that affect the industry. Many solar courses were discontinued in response to low demand for workers, and also because of uncertainty over how long the incentives previously supported by state government would continue to aid growth in the industry. A small number of educators experienced increased demand for solar sales staff and added solar sales courses, demonstrating an ability to respond to industry needs. Schools have also responded rapidly to employer demands for training through their institutional training divisions, as they traditionally have. Educators in these situations have demonstrated a commitment to assessing skill needs and a willingness to seek out useful information to aid in this effort.

Educators are also adjusting by working internally to modify existing training to better serve students who have difficulty in the tight labor market even after training. Two administrators at different county colleges were working to find ways to link noncredit credential programs, such as BPI or LEED, to the credit side so that individuals could apply training toward a certificate or degree. These schools were separately trying to address the same challenge: develop a curriculum to help students that received a credential but were unable to get a job, or those who returned for further education. Other schools also revealed they were dealing with a similar challenge of finding ways to roll noncredit credentials into a degree program. In this difficult economy, the administrators of these programs were seeking ways to create stackable credential models, to help job seekers improve their skills since finding employment continues to be a challenge for many even after receiving training. In this instance, Heldrich staff were able to connect educators working on similar ventures through learning of their efforts in the interviews, but educators continue to seek internal solutions on how they can better serve students.

The theme that has emerged from the research is that county colleges are confronted with the traditional, yet competing, missions within their institutions to supply new green training offerings quickly without the opportunity to learn from one another about which programs produce the best outcomes. Four-year colleges, however, are more apt to consult each other as they consider the best method to provide green education under their overarching mission as an institution, which is often consistent throughout the university and traditionally less directly geared to labor market preparation.

ANALYSIS OF ALIGNMENT WITH LABOR MARKET

Introduction

Interviews with employers in green businesses, existing literature on the green jobs economy from other think tanks and national organizations, news on green jobs and emerging industry trends, and economic analysis and data provided by industry experts provide a broad overview of the emerging skill needs of green jobs employers. This information was used to compare emerging skill and knowledge requirements of employers with the content and structure of select programs in the SI. The following sections identify key themes that emerged from this comparison.

Theme 1: Setting Pre-Requisites for Training

One trend that emerged from the data in the GPI coupled with employer interviews, was that while the intent of some green courses is to train students for an existing occupation, it is unclear whether the training is sufficient to place completers without any related professional experience in that occupation. For instance, brief, specialized noncredit courses that focus solely on green skills may be more suitable to incumbent or experienced workers. Workers with little or no experience have a low chance of receiving a job if their training and experience is limited to such a course, as reflected in the employer interviews. Employers in the study indicated they would like more workers with hands-on training, so providers considering online offerings should consider whether the curriculum might lend itself better to in-classroom activities, per employer skill needs. Students considering online courses should also bear in mind that employers' desire for hands-on experience, and whether an online course is sufficient as a supplement to prior work.

Furthermore, employers in the study indicated that specific green skills were not necessarily a priority in hiring decisions, because they are willing to train workers in green knowledge who had adequate professional experience and training in a broader skill set. If workers need specialized green skills, employers said they train them as necessary. One of the findings from the employer interviews was that "green layer" training is not as valuable to inexperienced workers as is traditional training coupled with relevant experience. These are key points for students and providers to consider in pursuing specialized training.

Theme 2: Some Degree Programs Offer a Broad Overview of Green Topics, but Connections to Job-relevant Knowledge is Difficult to Identify.

In light of recent increased interest in renewable energy technologies, many educators have responded with new programs in solar technology,

alternative energy or renewable energy, among others. Some of these programs, however, are not very clear about what comprehensive skill set they provide or what occupation they prepare students for. Newly formed technical degrees in renewable energy or alternative energy have curricula and modules that students may find interesting, and they may hope that learning about these new technologies will help them excel in the emerging green economy. It is not clear, however, how the courses in some of these programs cohesively fit together to provide students an adequate background for a specific occupation. Some programs provide an overview of various topics, but it is unclear what type of job a student will get with this training in the absence of more traditional occupational training. For example, students interested in environmental issues but not in a B.S. degree might be able to take electives or pursue a concentration that touches upon environmental issues, allowing them the opportunity to get formal instruction as it relates to a more traditional degree with a clear link to the labor market. In addition to undergraduate programs that are responding to interest in environmental issues, there are also graduate and continuing education programs catering to this peaked interest.

Employers interviewed for this project echoed the uncertainty surrounding the future direction of renewable energy and alternative energy technologies. While employers in this industry initially hired workers to ramp up for ARRA projects, hiring has slowed or stopped completely for most employers. The overall economic climate and weak demand for products have contributed to a reversal of skill needs, and uncertainty over future policies and incentives add to confusion over which specialized skills will be in demand in the future. To put it simply, it is difficult to say if, when, or in what role employers will demand more workers. Furthermore, employers who have seen growth in the green side of their business have shifted that work to incumbent workers, and retrained them as needed. Training of incumbent workers, as new skill needs emerge, is a theme that recurred in the employer interviews as well as the education interviews.

Employers highlighted that specialized green layer credentials and training only makes candidates more attractive if these credentials are coupled with a broader, traditional skill set and work experience. Within the building trades, one employer said job seekers should "get trade skills first. Then add on green skills. Don't start green." The exception to this is green training specific to environmental remediation, which includes traditional "green" degrees such as environmental science and geology. Otherwise, employers often reported hiring workers with traditional skills and training, and then paying for them to obtain green layer training as necessary. Students considering enrolling in specialized degree programs should analyze how they will market themselves given the conditions employers described to researchers.

Theme 3: Students enrolled in programs that do not strive to align to the labor market must make their own connections

Given the ambiguity surrounding the green jobs labor market, training offerings that seek to build on traditional skills to adapt to the projected growth in the green jobs economy lack a clear occupational focus or direction. These degrees may be beneficial for students who have clear goals and objectives, but programs with vague descriptions or titles that do not explicitly link to an occupation may not be a good choice for students who do not have a clear understanding of how they will link these degrees to a job. Several educators also reported that students in specialized programs came to training with a connection to the labor market already, so they had a fairly good idea of how they would apply the training upon graduation. One educator revealed that he discourages jobseekers from his program, and instead recruits incumbent workers or those with job offers (but requiring more training) for his specialized program.

Employers in the study, overall, indicated that unless they see a substantial growth in demand which they perceive to be steady and reliable into the future, they will not be hiring permanent workers. Students interested in entering the green labor market should be aware of current hiring trends, and how they will adapt to the limited needs in this industry. One educator indicated that students in her specialized degree program recognize that the program does not explicitly prepare them for common occupations, but they are dedicated to the discipline and they are willing to work hard to find job opportunities that will enable them to pursue their interests. At some schools, student interest in specialized green education was generated by green campus initiatives and activities at some schools. In these cases faculty are responding to student intellectual curiosity, and being clear that the education in this aspect is not about career preparation.

Theme 4: Responding to future skill needs in sustainability

Many specialized programs in sustainability are evident from the GPI data, which led researchers to examine these programs specifically through educator interviews, in an effort to learn why educators are creating these new programs. Administrators, department directors and faculty at several county colleges and four-year institutions indicated in the interviews that they are currently debating whether they should create new green degrees and courses in sustainability, or whether green education should be incorporated into traditional programs. Academic departments at these institutions recognize the necessity of sustainability education, but they struggle with identifying the best way to incorporate this content into their curricula. For example, one school's engineering department is trying to gauge how they

can introduce sustainability into the rigorous curriculum; faculty feel it is necessary for engineers to learn about sustainability as it relates to their profession, but they do not have much room in the curriculum for the courses. Data from the GPI and educator interviews revealed a variety of opinions regarding the importance of sustainability education, as evidenced by the varied approaches to sustainability education schools have taken and the many options they offer students.

Several educators interviewed advocate for a comprehensive sustainability degree which will bring more elements of social science into the physical sciences. Other educators, however, believe that while sustainability is important, it should be woven into traditional degree programs, such as business and engineering, rather than be the sole focus of a stand-alone degree. Throughout this project, researchers found that a number of schools have also made a large effort to educate students on sustainability issues outside of the classroom through extra-curricular research projects, work study opportunities and various sustainability initiatives on campus. Some academic administrators and directors at four-year institutions attributed an increased focus on sustainability education to the influence of such campus sustainability initiatives at the school. The objective of sustainability education at these schools seems to be focused more on systems change, while at other schools the programs are training students for sustainability professional positions to help make businesses "green." In fact, the variance in how faculty members and administrators explain the mission of sustainability programs demonstrates that educators in this field perceive the labor market for students with these degrees differently.

Interviews with educators conflict with one another on the topic of sustainability, as some educators believe there are many opportunities for students that are specialized in this area, while others feel the business community and the labor market have yet to evolve to a point where employers see the value of experts in sustainability. One reason for this discrepancy is that educators have different philosophies of what the mission of sustainability programs should be. Faculty in several programs explain that they advocate for large scale changes in political, economic and social systems to create a more sustainable and just society. Other programs use the term sustainability in the scope of sustainable business practices, and faculty members say many companies are already adopting and demanding workers with specialized knowledge in this field. Overall, interviews revealed that it is not clear what jobs require a sustainability degree, or if these degrees are of more value than a traditional degree in a related field.

Many programs in sustainability focus specifically on corporate sustainability. There are short, noncredit programs as well as credit degree programs

at both the bachelor's and master's level in business or economics, and all are intended to train students to be corporate sustainability professionals. Educators and students interested in sustainability education should assess which sustainability course is most appropriate given their educational and professional backgrounds, as well as what their career objectives are. Educators offering corporate sustainability degrees should ensure that their courses are in line with what corporations seek in candidates for such positions. Many corporations have adapted the skills of current employees with traditional degrees and skills to respond to the need for a focus on sustainability, and students and educators interested in sustainability education can learn what skills are important from following such trends.

Given that these new degrees are untested in the labor market, researchers looked for insight from the employer interviews for any indication of how employers might regard these credentials. Employers reported that when they hire senior level staff members for sustainability projects, they consider candidates with tangible experience on projects with a sustainability component before (or in addition to) candidates with a specialized credential, such as LEED. Employers also said specialized green layer credentials are sometimes beneficial in giving new hires an advantage, but only if they are coupled with experience and a broader traditional skill set. As stated earlier, employers report that they are accustomed to hiring workers with traditional backgrounds and training them in specialized green areas as necessary, specifically they mentioned the fields of construction, engineering, architecture and law. Educators in Master's or Continuing Education programs confirmed this finding, as they said they have many enrollees that are incumbent workers, or who have traditional professional backgrounds upon which they are layering corporate sustainability education.

Conclusion and Recommendations

Many new types of green education and training are emerging in New Jersey, including noncredit programs marketed as career-relevant programs. However, due to a variety of historical and other factors, while many programs consider alignment important, higher education institutions are not uniformly focused on achieving alignment with employer skill needs to the extent that significant resources are used to achieve this goal. In addition, few supports exist to assist higher education and other training and education institutions to align their programs effectively.

Key Recommendations

Workforce policymakers and higher education and training stakeholders who are interested in achieving closer alignment between green programs and employer demand should consider the following actions:

Workforce and Education Policymakers and Funders

- **Build in specific funding to support alignment efforts when providing grants to support green jobs training or training designed to prepare workers for other emerging areas of work.**

Providing additional funds for educators to conduct employer surveys, recruit and continually engage employer groups, and perform other tasks that will increase their knowledge of the labor market will help to ensure that education stakeholders have the resources needed to obtain meaningful input from employers, which is an important component of alignment, especially for programs preparing individuals for emerging occupations.

- **Provide professional development, technical assistance, and collaboration opportunities for program planners and faculty to increase their knowledge of effective ways to engage employers in curriculum development and program planning.**

While many grants designed to fund workforce training require educators to demonstrate some knowledge of the labor market and others require employer engagement, educators and administrators may benefit from training and assistance in developing the systems needed to do these tasks effectively. A broad collaborative network for educators would also be helpful so that colleges can collaborate and learn from one another, as well as from outside sources.

Higher Education Administrators and Faculty should consider:

- **Working with intermediaries to engage multiple employers on the development and implementation of green programs and internship opportunities.**

Workforce and economic development associations, as well as industry associations, often hold forums with employers. Working with these intermediaries, schools may be able to connect with and engage employers more effectively to get meaningful input on curricula and to develop internship and / or job leads for students.

- **Implementing pre-requisites or targeting incumbent workers, particularly for noncredit, green credential programs.**

To avoid students who are lacking in appropriate core qualifications for green jobs, from pursuing credentials that may have limited value without on-the-job experience, educational institutions may wish to consider establishing pre-requisites for job-related experience and/or core education. Programs can also be directed more toward incumbent workers to upgrade the skills of key professionals.

- **Informing students about green degrees and other credential programs and their connection, or lack of connection, with labor market demand.**

Some green education and training programs, especially green degrees, may not be designed to align with current or short-term future demand for particular green jobs, but rather to inject new ideas and skill sets into the economy or to provide a liberal arts education with a green focus. However, students may not be aware of this and may choose green majors or other green programs based on the assumption that the program is preparing students for jobs that are available now. Informing students about the value of their credential in the local labor market will help students make better informed choices and may assist schools with recruiting efforts and completion rates.

Footnotes:

1 U.S. Conference of Mayors. (2009). Green Jobs Training Competitive Grants provided by the American Recovery and Reinvestment Act (ARRA). Washington D.C.: Author. Accessed on 8/10/11 at: http://www.usmayors.org/recovery/documents/greenjobsgrants.pdf

2 Employer Insights: Skill and Workforce Needs for Green Jobs in New Jersey, New Jersey Department of Labor and Workforce Development, prepared by the John J. Heldrich Center for Workforce Development, October 2011.

3 Recent Demand for Jobs with Green Skills in New Jersey, New Jersey Department of Labor and Workforce Development, October 2011.

4 Overview of Green Industry Clusters in New Jersey, New Jersey Department of Labor and Workforce Development, October 2011.

5 Recent Demand for Jobs with Green Skills in New Jersey, New Jersey Department of Labor and Workforce Development, October 2011.

6 Employer Insights: Skill and Workforce Needs for Green Jobs in New Jersey, New Jersey Department of Labor and Workforce Development, prepared by the John J. Heldrich Center for Workforce Development, October 2011.

About the Heldrich Center

The John J. Heldrich Center for Workforce Development, based at the Edward J. Bloustein School of Planning and Public Policy at Rutgers, The State University of New Jersey, is a dynamic research and policy center devoted to strengthening the nation's workforce. It is one of the nation's leading university-based centers devoted to helping America's workers and employers respond to a rapidly changing 21st Century economy.

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