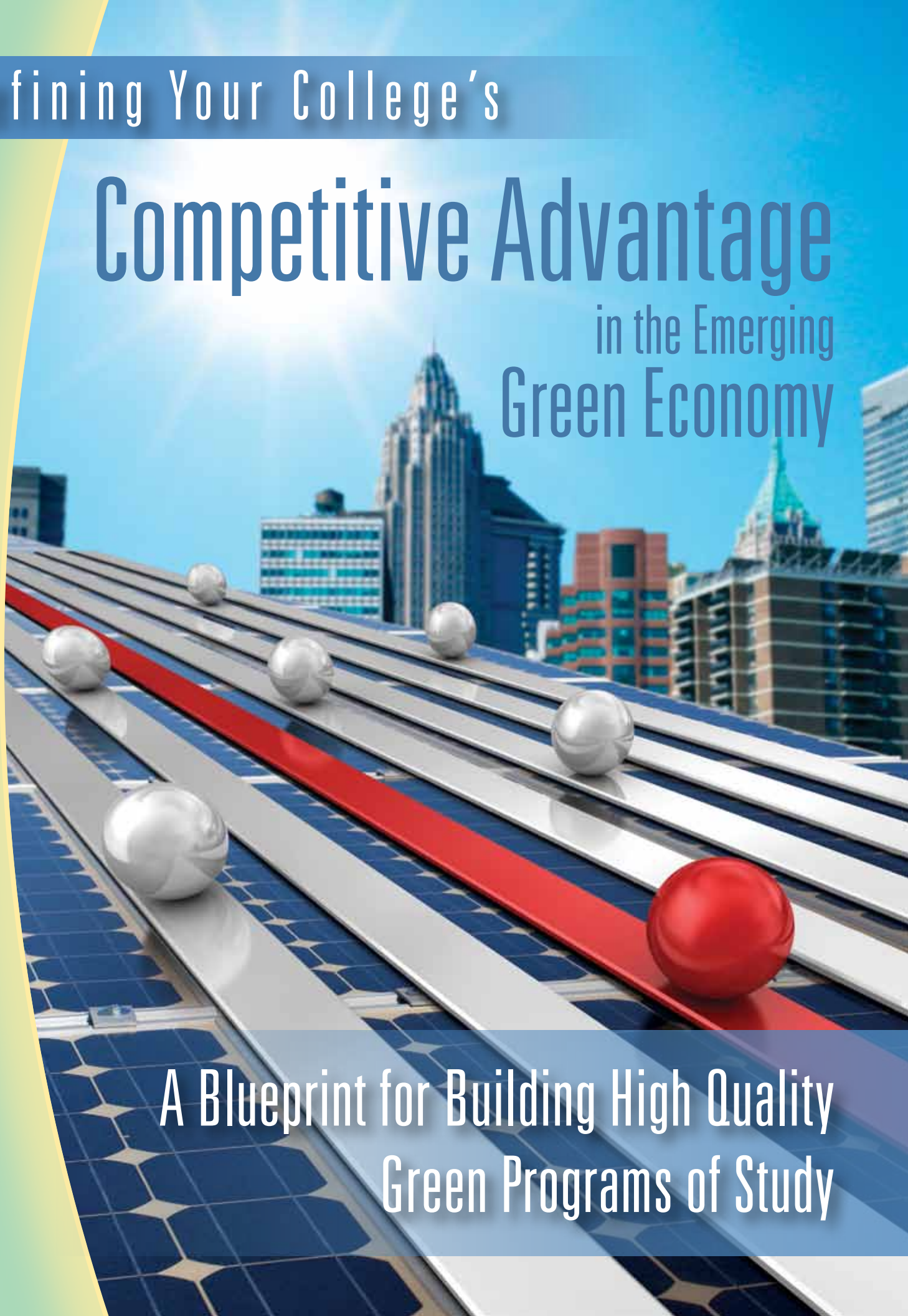
Defining Your College's

Competitive Advantage

in the Emerging Green Economy



A Blueprint for Building High Quality Green Programs of Study

Defining Your College's Competitive Advantage in the Emerging Green Economy

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THE KRESGE FOUNDATION

Special acknowledgement goes to the students, faculty, staff and administrators at Los Angeles Trade-Technical College, many of whom are the "champions" referred to herein and whose commitment, expertise, and many long hours of dedicated work enabled Los Angeles Trade-Technical College to become a leader in green education.

LOS ANGELES TRADE-TECH
LATTC
A Community College

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Preface

Our Story: The Greening of Los Angeles Trade-Technical College

California has long been a leader of state efforts to establish a sustainable future and green economy. In 2002, California passed a Renewables Portfolio Standard (RPS), requiring that 20 percent electricity generation be derived from renewable energy sources no later than 2017 — the highest standard of its time. This goal has since been increased and accelerated to be 33% achieved by 2020. In 2006, the state passed the Global Warming Solutions Act (AB 32) mandating the first-ever statewide cap on global warming pollution. AB 32 has put California at the forefront of the fight against global warming by requiring the state to reduce its greenhouse gas (GHG) emissions to 1990 levels by 2020. Further, in 2006, the Million Solar Roofs Initiative (SB1) was enacted which combines policy mandates, funding and incentives ranging from tax credits and rebates to homebuilding guidelines in an effort to achieve the benchmark of installing a million solar roofs in California over a ten-year period. In 2008, a new solar loan law (AB 811) was enacted to allow cities and counties to make low interest loans to homeowners and businesses to install solar roofs, energy efficient air conditioners or other energy-saving improvements which are then paid back through property tax assessments. Subsequent to these groundbreaking acts, numerous legislative and policy mandates have been adopted in California to ensure its existing sustainability goals are met and new, loftier goals are established.

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workforce. To that end, these institutions have been involved in economic, workforce and community development efforts and have played the role of workforce intermediaries to facilitate expansion of the green economy while ensuring historically disadvantaged populations and communities — typically ones left behind during economic shifts — are included.

With increasing recognition of the importance of addressing global warming at the state and regional level and the planet as a whole and the potential of job opportunities for students, Los Angeles Trade-Technical College (LA Trade Tech) set out to become a "green" leader in the state and nationally — committing itself to developing policies, practices and green programs of study that would change the culture and contribution of the college to a sustainable future and an emerging green economy. In October 2006, LA Trade Tech's College Council approved the adoption of a Green College Initiative, with the vision to *"eliminate the impact of the college on the environment, set an example for current and future generations that environmental quality is essential to long-term wellbeing and provide an informed citizenry and trained workforce for contributing to a sustainable future for Los Angeles."* By 2008, the Green College Initiative was included in LA Trade Tech's five-year strategic plan to ensure a sustained commitment by the college.

The Green College Initiative was comprised of four key activity areas: 1) the green built environment, 2) a clean and green campus, 3) public awareness and 4) green education and training programs. The green built environment activity focused on the adoption and implementation of built environment policies and practices to ensure LA Trade Tech facilities were designed, built, renovated, operated or reused in an ecological and resource-efficient manner. The second activity, the Clean and Green campus activity, focused on the adoption and

implementation of policies and practices that meet "clean and green" and "green certified" standards such as using environmentally preferable cleaning products/practices, conserving water, composting, implementing pollution prevention measures and reducing the amount and/or toxicity of materials entering the waste stream. The public awareness activity focused on conducting events that increase public/community awareness and participation in environmental issues and green policies and practices, with the hope of significantly impacting students and the community about their environmental opinions and actions and in turn increase the expansion of the green economy.

The last activity of the Green College Initiative, green education and training programs (and the focus of this guide), was launched through several successful green-related workforce development initiatives beginning in summer 2007, through the college's Regional Economic Development Institute (REDI), which was established with a generous grant from the Bank of America Foundation. REDI's mission was to strengthen the regional economy through the design, delivery and dissemination of state-of-the art workforce development, career technical and basic skills education and training programs. Due to green funding opportunities from federal, state, local and foundation sources, the college was able to prioritize its efforts and develop green programs of study, utilizing labor market research and innovative practices and principles laid out by REDI.

The REDI core principles are at the foundation of all LA Trade Tech green programs of study. These include:

- "It's the practitioner that makes best practices" – focus on professional and organizational development at all levels of the college organizational structure to create a critical mass of innovative practitioners
- Strong administrative support
- High expectations of everyone – administrators, faculty, staff, and students
- Programs are designed to be scalable, sustainable and flexible to adapt to industry and community needs
- Strategic partnerships are required with multiple organizations within the region who focus on their core institutional competencies
- Programs are driven by research and development and programs are developed utilizing extensive market research to ensure the postsecondary and industry credentials students obtain have market value
- Technology is utilized as much as possible to innovate and/or streamline practices, services and instruction

As the college was beginning to focus on sustainability goals, LA Trade Tech also developed a comprehensive workforce development strategy in 2008 and determined that organizational change was needed to incubate new programs and support innovation with existing programs. The LA Trade Tech leadership created the Workforce and Economic Development Division and developed strategic workforce development criteria and REDI, working closely with faculty and staff, determined which disciplines/ programs would be transferred into the division. All the programs of study that were targeted to be greened were now part of this new division, and the leadership was able to work successfully with faculty and staff to ensure that programs were adequately resourced and, over time, made numerous programmatic changes. These changes included integrating

green course content and curriculum into existing courses and certificate and degree programs and creating new training/education programs for high growth, high-demand and emerging green-related industries and occupations utilizing a competency-based approach. Other important activities included: a Sustainability Industry and Educators Forum that defined green industry sector trends and needs including career and academic pathways, occupations and skills/competencies; research on the demand/supply side of green construction, transportation and energy sectors in the Los Angeles Region; the identification and prioritization of industry sectors and occupations for developing green workforce training programs and the creation of ten, new stacked and latticed certificate and degree programs in renewable energy.

These formative and successful experiences of creating a comprehensive green program of study development strategy for LA Trade Tech serve as the foundation for this technical assistance guide. The overall goal of the guide is to provide community colleges with a resource and tools to help design high quality "green" programs of study, recognizing that the development and implementation of a strategy may differ for each college. By colleges developing or enhancing these programs in a very focused and strategic way, students will be provided with a competency-based education, enhanced support services, industry-recognized credentials and promising employment opportunities in multiple "greening" industries, with the goal of ultimately providing pathways out of poverty.

Introduction

The *Defining Your College's Competitive Advantage in the Emerging Green Economy: A Blueprint to Building High Quality Green Programs of Study* (the Guide) provides insightful and valuable information for community colleges. The Guide is designed to be useful for those at the beginning of the process of greening existing programs or creating new green education and training programs, as well as for those that are working to enhance and/or sustain green programs already in place.

The Guide outlines several steps to identifying a college's competitive advantage and provides useful tools for summarizing and analyzing this information to create successful strategies. The steps outlined in the Guide include:

- ## ACTION STEP 1

  Determining the External and Internal Factors to Create, Expand or Enhance State-of-the-Art Green Programs of Study

- ## ACTION STEP 2

  Finding Your Competitive Advantage by Capitalizing on the Perfect Storm of Opportunity

- ## ACTION STEP 3

  Building High Quality Competency-Based Green Programs of Study

- ## ACTION STEP 4

  Sustaining Green Programs of Study

The overall objective of the Guide is to provide information, resources and tools for completing these action steps. The Guide is, however, primarily centered on assisting colleges with engaging in a process of identifying the "perfect storm of opportunity" — the point at which external and internal factors come together to provide the college with insight as to the best strategies for green program of study development. The process is facilitated by the use of several tools specifically designed for the Guide. The primary one, the Competitive Advantage Analysis Tool, includes scaled data and a spider diagram which graphically depicts a college's competitive advantage based on the assessment of its unique external and internal factors. The Guide includes insights on how these data can be used to inform the college about which green programs of study to augment, build and/or institutionalize and to help prioritize decision-making regarding green program of study development.

Action Step 1

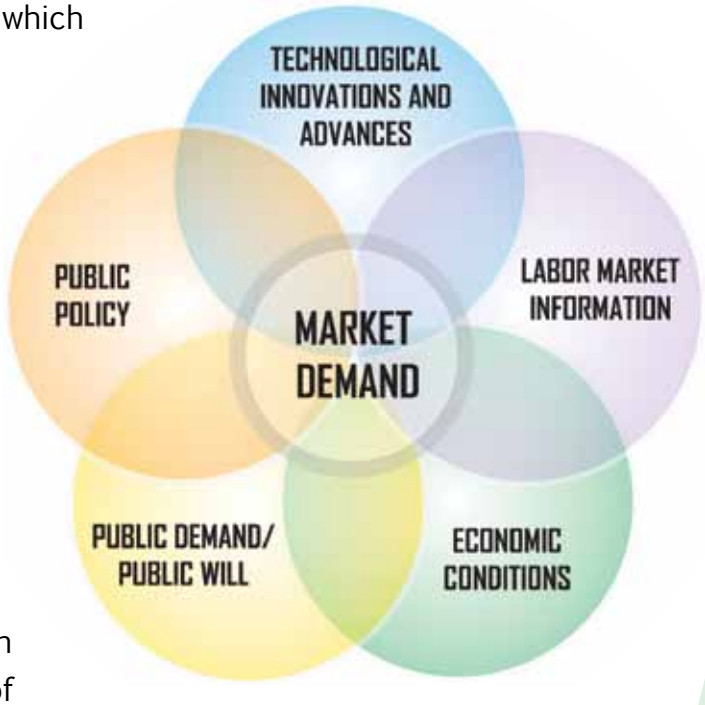
Determining the External and Internal Factors to Create, Expand or Enhance State-of-the-Art Green Programs of Study

Whether your college is only beginning to explore the development of green programs of study, has a number of specially-funded green training programs and must soon decide to institutionalize them or not, or has some well-established green programs of study and wishes to explore adding additional ones, the process for determining the best course of action involves the careful consideration of a number of factors to maximize success.

The next two sections of the Guide will highlight key external factors and internal factors that should be considered. While external factors are listed first, the order in which colleges explore the external and internal factors is flexible. Some colleges might find it useful to do these analyses simultaneously; other colleges might determine that the strength of the data collected around external factors might drive the agenda at the college and wish to complete the external analysis first. Other colleges might decide to evaluate internal factors and gain buy-in before collecting much data on external factors. Regardless of the order, both external and internal factors need to be assessed.

Market Demand: The Assessment of External Factors

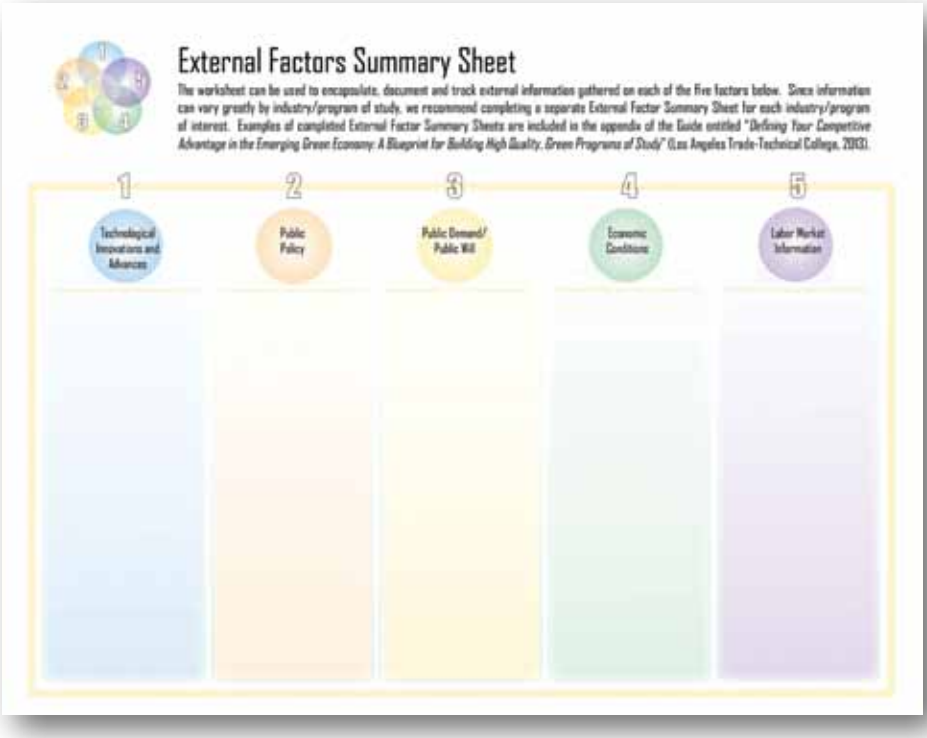
There are a number of key external market factors to consider when deciding which green industries/occupations to focus on and in turn, where to strategically invest in green program of study development. The following diagram illustrates how these external factors are interrelated, which are: 1) Technological Innovation and Advances, 2) Public Policy, 3) Public Demand/Public Will, 4) Economic Conditions, and 5) Labor Market Information; all of which collectively determine Market Demand.



Market Demand can be estimated by assessing the convergence of each of these factors, all of which interact with and influence each other in often inextricable ways. Examining all of

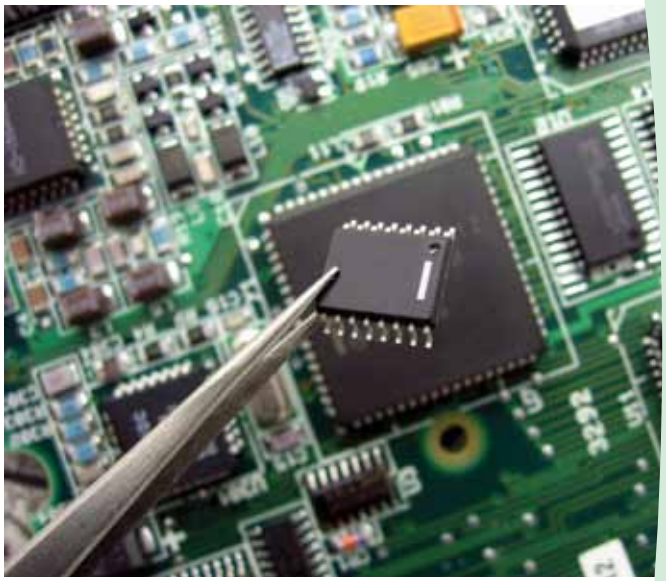
these external factors enables colleges to make strategic decisions about which programs of study are integral to green careers in the regional economy. The external analysis is ultimately designed to answer the question "what is the potential market value for this program?" The Guide includes a **Resource List**, which is a snapshot of available websites and other resources that can assist colleges with locating data on these external factors. The List is not designed to be comprehensive and does not purport to contain all needed information; however, there are quite a number of useful resources and websites to get colleges started. While all of the links and content were up to date and active at the time of publication, data continually changes so some sites might not be accessible. It is suggested that this list be augmented by colleges' own Internet searches, practical experience and input from industry partners — all of which inform the program development process.

The Guide also includes an **External Factors Summary Sheet** (see example below), which can be used to encapsulate, document and track information gathered. Since information can vary greatly by industry/program of interest, we recommend completing separate External Factor Summary Sheets for each industry/program of interest. Examples of completed External Factor Summary Sheets are included in the Appendix.



1) Technological Innovation and Advances

Without technological advances and innovations that foster the "greening" of industries such as transportation, construction, energy generation and distribution and manufacturing among others, there would be limited demand for green occupations or a skilled workforce, and therefore, no market value for developing green programs of study. Understanding the lifecycle of the development and deployment of technology is a key consideration in green program of study development. Anticipating the short-term and long-term phases of the technology lifecycle and associated workforce needs are important when considering the timing and duration of labor market demand for particular occupations and resulting demand for green programs of study. For example, when technological advances are in the research and development phase, the occupations most associated with and in demand during this phase are typically research and design-related occupations such as engineering and architecture. When technological advances reach the production phase, demand shifts towards manufacturing-related occupations.



Focus on researching technological innovations in areas that are relevant to college's local, regional or "service area" economy both in general and that are occurring in industries that align with program development priorities of the college. One way to determine this is to look at recent patents and pending patents related to technological innovations in a given field. Some resources to locate pending and granted patents are provided on the Resource List included with the Guide.

As was mentioned previously, familiarity with technological innovations is necessary, but it is also essential to be aware of the timeframe for the development, mass production and widespread availability and adoption of this technology. For example, the technology which enables manufacturers to produce a fully electric-powered vehicle has been available for quite some time; however, the technology to support the infrastructure to make electrical vehicles a reality for consumers lagged behind. This was initially not the case for hybrid vehicles, which were readily available from most auto manufacturers and projected to grow. Therefore, at that time, the development of LA Trade Tech's Certificate of Achievement in Hybrid Vehicle Technology made sense, given the timeline of technology deployment, as opposed to a certificate program in electrical vehicle technology. However, the electrification of transportation is now, several years later, a viable program option and a Certificate of Achievement in Hybrid and Electric Plug-in Vehicle Technology is being offered at the college.

For LA Trade Tech, the initial focus for the development of green programs of study was in the construction and transportation industry sectors, as research showed that many innovations were developing in these sectors. In transportation, LA Trade Tech found that the majority of clean technology patents that had been registered in California — during the time it was exploring development of programs of study — were in energy storage technologies, including batteries, fuel cells and hybrid systems. In the construction sector, research revealed that patents were being granted or pending, for polymers used to create insulated vinyl siding, pre-fabricated concrete, multiple renewable energy technologies and energy storage technologies.

Changes in workforce knowledge, skills and abilities related to the production, distribution and use of these technological innovations and advances is also a consideration — these changes are herein referred to as "up-skilling". Some advances or new technologies will not require any up-skilling, some might require up-skilling within existing occupations, while others may require entirely new occupations.

Questions to Consider

- What green technological innovations are currently in use in the industries in which the college is interested?
- Are these technologies standardized within the industry, widely utilized or rarely utilized?
- What innovations are currently being developed or refined, and if so, what are the timelines for broad availability?
- What green technology patents have been granted in the past three to five years in the state and/or region? Are the patents concentrated in particular areas such as solar, alternative fuels, energy storage, etc.?
- Does data collected on technological innovation and advances signal if, when and in what industries and occupations there may be job growth?
- Does data collected on technological innovation and advances suggest that "up-skilling" of the workforce will be necessary?
- Does data collected on technological innovation and advances suggest that new occupations will be necessary?
- Does data collected on technological innovation and advances suggest where they may be market strengths or challenges?
- Does data collected on technological innovation and advances suggest when and where there will be big or small (payoffs) in the next three to five years?

2) Public Policy

Public policy is another external factor that also often impacts state and regional economies and drives labor market demand and this is very much the case as it relates to the green economy. The degree to which federal, state and local policies influence green labor market is well documented. At the federal level the most relevant federal policy initiative, the American Recovery and Reinvestment Act (ARRA), was legislation that included priorities intended to "build" the green economy and drive the labor market. ARRA allocated $85 billion towards energy and transportation-related spending; $21 billion tax incentives for wind, solar and other renewable energy manufacturers; $11 billion for electrical grid modernization and $30 billion for direct spending on clean energy programs. Further, ARRA authorized $5 billion in weatherization funds for low-income homes and $4.5 billion to federal building retrofits. There was $6.3 billion allocated to states for energy-related programs (renewable energy and energy efficiency) and $4 billion for Workforce Investment Act (WIA) adult, dislocated and youth job training and employment (emphasis on "green jobs", renewable energy, infrastructure, energy efficiency, home retrofitting, biofuel development, vehicle development and manufacturing).

There are a myriad of industry sectors and related occupations that were directly affected by the ARRA priorities including: Public and Private Utilities; Power Generation (electric, hydroelectric and other fuels); Power Transmission and Distribution; Construction (residential, commercial, industrial and remodeling); Power and Communication Line Construction; Glazing and Roofing Contractors; Various Manufacturing Sectors (including lighting, appliance, motor, generator, storage batteries, motor vehicle and semiconductors) and Automatic Environmental Controls.

But before ARRA, there were a number of other federal policies that has influenced the green economy including: Energy Policy Act of 2005 (H.R. 6), Energy Independence and Security Act of 2007 (H.R. 6), Green Jobs Act of 2007 (H.R. 2847), Clean Energy Jobs and American Power Act of 2009 (S. 1733), The Green Act of 2009 (H.R. 2336) and Clean Energy Stimulus and Investment of 2009 (S. 320). It is expected that if a major clean energy legislation and bill is enacted within the next few years, it would have a significant impact on the green economy as well.

Information on state laws, regulations and policies also needs to be gathered. Many states offer financial incentives related to energy. According to the Database of State Incentives for Renewables and Efficiency (http://www.dsireusa.org/), fifty states offer some form of tax incentive to encourage corporations and residents to use renewable energy or adopt energy efficiency systems and equipment. Forty-seven states provide residential, commercial and industrial loan financing for the purchase of renewable energy or energy efficiency systems or equipment. Thirty-nine offer rebate programs to promote the installation of solar water heating or solar panels for electricity generation. State policies around clean air and vehicle emission standards are also related to the green economy. Fifteen states have adopted California's vehicle emission standards, which allows states the right to require automakers to reduce carbon emission from new cars and light trucks more aggressively than federal standards mandate. Thirty-eight states and the District of Columbia have adopted renewable portfolio standards, which require electricity providers to supply a minimum amount of power from renewable energy sources and twenty-seven states have established energy efficiency standards for energy generation, transmission and use.

Federal, state and local policies that influence the green economy can provide insights for strategically determining green program of study development.

In California, there were a number of state policies that LA Trade Tech considered when developing green programs of study including those

related to building energy efficiency standards, clean air ordinances and renewable energy incentives.

Local city and county initiatives and ordinances also need to be researched. LA Trade Tech explored those in Los Angeles, which was also at the forefront in establishing a green economy. City and county initiatives in the college's region can sometimes have more of an impact on local/regional market demand than federal policy.

As part of Mayor Villaraigosa's plan for Los Angeles to be the "Greenest Big City in America", the City adopted and implemented LEED standards for all Department of Public Works building projects 7,500 square feet or larger. At that time, the City had 59 LEED registered projects, making it fifth in the United States for the highest number of registered projects. In November 2008, Mayor Villaraigosa unveiled a long-range plan for securing 1,280 megawatts of solar power, enough to meet one-tenth of the city's energy needs, by 2020. Parallel to this plan, the Los Angeles Department of Water and Power (LADWP), the country's largest public utility, was in the midst of developing a new strategy for its Solar Photovoltaic Incentive Program that ran until 2011, committing $150 million to the program. The program aligned with the state's Million Solar Roofs Initiative and assisted LADWP in achieving its renewable resource portfolio goal of 20 percent renewable energy by 2010. And most recently, the City has begun the implementation of a Green Business Certification program.

Federal, state and local policies that influence the green economy can provide insights for strategically determining green program of study development. The policies, timelines for implementation and likely impact on job creation should be analyzed. In some cases, public policy could change or create an entire industry sector, such as the renewable energy industry sector. In other cases, public policy might not completely transform an industry sector but will change or modify the way things are done or the materials used, such as what has taken place in the construction industry sector. And public policy can lead to changes in or to the creation of new industry standards and certifications. The Resources List provides information on websites where public policy initiatives can be found; some of these sites are searchable by state.

Questions to Consider

- Are there current or proposed federal, state, county or city policies influencing the green economy in the state and/or region?
- What specific industries or occupations are most impacted by these current or proposed policies?
- Are there mandates and timelines included in the public policy directives, and if so, how do these influence the extent and timing of growth in targeted industries and occupations?
- Are there local initiatives or ordinances in place that support the growth of the green economy, such as green business or restaurant certification programs, local building retrofit incentives, etc.?
- Has public policy led to the revision or addition of industry standards or certifications? Are these revised/new standards and certifications required or been adopted in your state, region and/or city?
- Does data collected on public policy signal if, when and in what industries and occupations there may be job growth?
- Does data collected on public policy suggest where there may be market strengths, opportunities and/or challenges?

3) Public Demand/Public Will

Public policy is also inextricably related to public will or public demand. One could say that policy drives the behavior and attitudes of individuals, but that the behavior and attitudes of individuals also influences public policy through demonstrated support of policy initiatives and politicians who support green ordinances and laws. The public not only responds to government incentives and availability of new products, but also influences the direction of policy through the political process, which in turn generates demand for new green products and services.

The degree to which there is public will or public support may not be as directly observable as some of the other external factors. Public support can be demonstrated by the existence of a number of grassroots sustainability coalitions or organizations, support at the polls for green legislation, rates of sales for green products such as cleaning products and appliances or by analyzing other indicators and findings from surveys conducted by researchers. Cities and regions with green business initiatives and/or certification programs may also signal where public demand is prevalent — these programs typically choose to focus on particular industries such as hotels, restaurants and vehicle maintenance and dealerships because of public demand for the greening of these services and products. It is also important to think of ways to engage your community in order to bring awareness to sustainability and to change public opinion to grow the green economy.

Questions to Consider

- What is the level of public awareness and support of green policies in the state or region?
- Is there evidence of consumer awareness and consumer demand for particular green choices such as renewable energy, green transportation, energy efficient appliances, organic and locally grown produce, etc.?
- Is there evidence of resistance or skepticism among the public to "green" that influences public will?
- Is there evidence of demand from the public for green services such as green hotels and restaurants, recycling and composting, etc.?
- Are there green advocacy organizations, coalitions, and/or social media groups that influence green policies and awareness in your state, region or community, and if so, what are their current initiatives/focused activities?
- Does data collected on public will signal if, when and in what industries and occupations there may be job growth?
- Does data collected on public will suggest where they may be market strengths, weaknesses, opportunities and/or challenges?

4) Economic Conditions

Current economic conditions and trends will undoubtedly have an impact on the growth of green jobs and green industries and the investment and deployment of technological innovations described previously in the Guide. Factors such as energy prices, venture capital and military investments enter in to the equation as well. Few could argue that the projected growth of the green economy that was anticipated when ARRA was signed was thwarted by the depth of the economic crisis that spiraled out of control in the months and years that followed.

Energy prices, particularly the cost of oil and other fossil fuels, have a direct impact on both the overall economy and the green economy as well. For example, some energy economists suggest that the increased use of "hydraulic fracking," creating fractures in rocks and rock formations to extract petroleum, has impacted the development of renewable energy solutions. As energy prices rise, one would expect for the demand for alternative and renewable energy solutions to increase, and vice versa when the prices go down. However, regardless of fuel costs, the economy needs to be strong enough to support the growth and development of new technologies.

For a longer-term estimate of the favorable economic conditions to grow the green economy and potential for green jobs, monitoring venture capital investments in clean and green technologies in the region (if information is available), the state, the U.S. and in some cases internationally is necessary. There are a number of online resources included on the Resource List that may be used for this purpose. The MoneyTree Report from PricewaterhouseCoopers and National Venture Capital Association are two that are frequently cited. The MoneyTree Report is a quarterly study of venture capital investment activity in the United States and is published collaboratively between PricewaterhouseCoopers and the National Venture Capital Association based upon data from Thomson Reuters. It is the only industry-endorsed research of its kind. The MoneyTree Report is the definitive source of information on emerging companies that receive financing and the venture capital firms that provide it. The study is a staple of the financial community, entrepreneurs, government policymakers and the business press worldwide.

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There are also a number of resources specific to capital investments related to green industries. Green VC provides news and resources on green venture capital, funding and startups. Clean Edge, Inc., founded in 2000, is the world's first research and publishing firm devoted to the clean-technology sector. The company, via its publications, events and online services, helps companies, investors and governments understand and profit from clean technologies. Clean Edge, with offices in the San Francisco Bay Area and Portland Oregon, offers unparalleled insight and intelligence on emerging clean technology trends, opportunities and challenges.

Questions to Consider

- Are economic conditions, in general, strong or weak?
- Which, if any, industry sectors in the region are experiencing market/revenue growth?
- Are economic conditions favorable to the development of the green economy?
- Does economic data suggest that particular (or targeted) industry sectors are projected to grow, decline or remain relatively stable? In the short-term (e.g., three to five years) and in the long-term (e.g., five to ten years)?
- Has there been an increase, decrease or relatively stable number/amount of capital investments made in green companies?
- Does data collected on economic indicators suggest where there may be market strengths, weaknesses, opportunities and/or challenges?

5) Labor Market Information

Another key external factor is labor market information, which is actually impacted by all of the factors. Labor market information needs to be assessed, along with the other key external factors, when determining strategic direction in the development of green programs of study. It is important that labor market information include market and job growth projections, which rely heavily on all of the other external factors described above. One can quickly become overwhelmed with the myriad of potential for program development in areas such as environmental science, green chemistry, water treatment, fuel cell technology, energy management, green construction, energy efficiency, alternative fuels and hybrid technology, biomass, air quality, hazardous materials cleanup and more. Without labor market information to serve as the foci, practitioners can easily become side-tracked, divert precious resources from one area to another and may develop programs with limited market value.

According to the Bureau of Labor Statistics, jobs in industries that are greening are mostly made up of traditional industries such as manufacturing, construction and transportation and produce goods or provide services that benefit the environment or conserve natural resources or involve making their establishment's production processes more environmentally friendly or use fewer natural resources.

Labor market research includes: identifying trends anticipated to have the greatest impact on the industry and its occupations, occupations with the greatest potential for job growth, current and anticipated workforce challenges in the industry, changes as a result of the "greening" of the industry and most pressing workforce development priorities. These workforce development priorities could include, for example, an aging workforce with large numbers of anticipated retirements, the need for up-skilling the workforce to respond to the "greening" of the industry and lack of diversity in the workforce.

It is imperative that green programs of study be developed for which jobs are available for participants at the conclusion of their education and training, especially in the local or regional labor market. This should be a key factor in determining and prioritizing green program of study development. Therefore, the importance of conducting research to determine labor market demand for green jobs cannot be understated. This is complicated by the fact that, until most recently, very little information has been available on green workforce demand — particularly at a local or regional level. And, this is further complicated by the fact that many "green jobs" are not "new" jobs, but are current occupations where skill sets and knowledge must be upgraded to reflect the "greening" of an industry. Therefore, gather information to determine: (1) existing green or greening industries and occupations in targeted geographic area(s) and (2) potential of green or greening industries and occupations in targeted geographic area(s). There are several sources and methods for gathering this information:

1. Green Jobs Studies/Reports
2. U.S. Green Jobs Online Resources and Other State, Regional and Local Green Jobs Online Resources
3. Labor Market Data and Reports from O*Net Online
4. Data from industry and community stakeholders

The Resource List provides links to numerous studies and reports which focus on describing the green labor market; the number of reports on this topic has increased in the last few years. There are reports that focus on the national green labor market, the green labor market in specific states or regions and the green labor market in specific industry sectors such as construction, transportation and energy and utilities. Also,

in 2011, LA Trade Tech conducted a literature review in which 123 green economy and jobs studies and reports were inventoried, reviewed and summarized. This inventory, entitled *"Inventory of 'Green Jobs': A Review of the Literature,"* includes studies from across the country and is available on the college's website at http://college.lattc.edu/green/.

New reports and studies are being released much more frequently, largely as a result of a myriad ARRA-funded projects which have published "best practices" documents and reports. Internet searches for these reports, especially those produced by projects within each state and industry sector, can be conducted by using the search terms "ARRA literature reviews and reports". These searches will yield a large number of reports including needs assessments, program outcome summaries, best practices and labor market information in industry sectors such as transportation, building, energy efficiency, renewable energy and others.

The importance of conducting research to determine labor market demand for green jobs cannot be understated.

Additional strategies to locate green labor market information can be found using commercially available economic modeling applications sponsored by for profit organizations, a few of which are included on the Resources List. Economic Modeling Specialists, Intl. (EMSI, www.economicmodeling.com) has a web-based suite of tools that provides an analysis platform for regional workforce and economic research. EMSI integrates data from over ninety sources in a suite of economic modeling modules. EMSI also has a green industries and occupations module that enables the user to understand its own or a region's postsecondary educational offerings in relation to green labor market demand. Impact Analysis for Planning (IMPLAN, www.implan.com) is another economic modeling tool that allows a user to create a detailed social accounting picture and a predictive multiplier model of a regional economy. It can then be used to conduct impact analyses on a study area being analyzed. These study areas may consist of a state, county, sub-county area such as ZIP code areas or group of any of these areas. Geographic Solutions is yet another example of a modeling application.

There are online labor market databases that are quite helpful in identifying external factors related to the labor market. O*Net OnLine has a wealth of resources on green jobs through its green occupations portal. Once a green occupation is identified in the portal, one can also obtain information on the skills required for the occupation, average wage and typical education requirements. According to their website:

> The National Center for O*NET Development, as part of its efforts to keep up with the changing world of work, investigated the impact of green economy activities and technologies on occupational requirements and the development of New and Emerging (N&E) occupations. Results of the research led to the identification of green economic sectors, green increased demand occupations, green enhanced skills occupations and green new and emerging (N&E) occupations. These occupations are now reflected in the O*NET-SOC system.

Most recently, **The Greening of the World of Work: O*NET Project's Book of References**, adds additional green references to those compiled from O*Net's initial research report on the green economy.

United States Department of Labor's Bureau of Labor Statistics (BLS) launched its Green Jobs Initiative in 2010. The published goal of the BLS Green Jobs Initiative is "to develop information on (1) the number of and trend over time in green jobs; (2) the industrial, occupational and geographic distribution of the jobs and (3) the wages of the workers in these jobs." The Division of Occupational Outlook also publishes career information on green jobs and occupations including: wages; expected job prospects; what workers do on the job; working conditions and necessary education, training and credentials. Further, the BLS Green Jobs Initiative periodically publishes Green Career articles which have included:

- Energy Auditors, February 2012
- Careers in Recycling, September 2011

- Careers in Electric Vehicles, September 2011
- Careers in Green Construction, July 2011
- Careers in Solar Power, June 2011
- Careers in Wind Energy, September 2010

Another source for labor market information within a specific region or geographic location is green employment search engines. For example, The Green Jobs Network has developed a search engine called Greenjobsearch (http://www.Greenjobsearch.org), which allows the user to type in keywords or company name; location (by zip code or city or state) and proximity. Another search engine, Green Job Spider (http://www.greenjobspider.com/), also allows the user to type in job titles, keywords, company name, city or state. In addition links are provided to search for green internships.

Because there may be a shortage of studies specific to certain regions and industry sectors (especially at the local level), forums, advisory meetings and focus group meetings will need

LA Trade Tech engaged in finding information from stakeholders in a number of ways. First, the college conducted a two-day industry and educator forum entitled "Working for a Sustainable Future" in fall, 2007. The forum was organized primarily to begin a conversation and to broaden collaboration among industry, community-based organizations, educators and the public sector to build a workforce connection between the demand and supply-side challenges and opportunities in utility and construction sectors — in particular as these sectors were being "greened". A comprehensive report on the findings of the forum was completed. Second, the college commissioned the completion of the report "Clean Technology Workforce Challenges and Opportunities" to determine workforce development needs of the emerging clean technology industries in the Los Angeles and Orange County region. And third, the college prepared a comprehensive report entitled the "Strategic Opportunity to Build a Green Workforce in Los Angeles" which examined occupational opportunities from the "greening" of the utility and construction industries. All reports are available on LA Trade Tech's website at http://college.lattc.edu/green/.

to be conducted to gather information from industry and community stakeholders including planned green activities, anticipated workforce demand, skills required for green jobs and hiring/placement practices.

Since LA Trade Tech had a Green College Initiative, through its Regional Economic Development Institute (REDI), the college continuously gathered industry and occupational data related to industries and occupations being greened, emerging green technologies and patents and venture capital investments in clean and green technologies and companies throughout the state of California, U.S. and in some cases internationally. An inventory of green job studies is updated routinely. REDI also has conducted employer surveys to gather information regarding the numbers of workers they plan to hire in green-related occupations in the next one to three years, the skills these workers will need, methods they use to recruit workers, employment eligibility requirements, barriers to finding and hiring employees they are experiencing and other employment-related information. It is suggested that colleges interested in remaining ahead of the curve in terms of green program of study development also should routinely engage in these activities.

With careful and thorough research, a college can minimize the risk of developing programs of study that will not lead to meaningful employment or do not have "market value" for the student, industry and regional economy: however, risk remains a reality that must be considered.

Further, many community colleges convene and facilitate the work of industry sector-based collaboratives comprised of business, industry, government, education, labor and community constituent groups. The mission of such collaboratives is to collectively develop and support workforce development activities that strengthen the entire industry sector; including existing occupations or new occupations that are necessary as a result of the greening of the industry. For example, LA Trade Tech has

served as an intermediary for the LA Infrastructure and Sustainable Jobs Collaborative. The purpose of this Collaborative is to bring together key stakeholders to plan and implement a seamless education, training and workforce infrastructure for both traditional and greened occupations in the utility and construction sectors. If the region has not developed a collaborative, it may be useful to consider doing so. Although not easy to start, engaging key stakeholders to begin the conversation on the value of such an intermediary would be a good first step.

Most colleges developing career technical education programs of study need to be able to document labor market demand as a requirement in the program approval process, including identifying the occupations, projected salaries and anticipated job growth. As was demonstrated in this section, this is often more challenging when developing programs of study related to the green economy due to the emerging nature of these industry sectors, occupations and due to the difficulty in defining and projecting future labor market demand. With careful and thorough research, a college can minimize the risk of developing programs of study that will not lead to meaningful employment or do not have "market value" for the student, industry and regional economy: however, risk remains a reality that must be considered.

When looking at external factors, colleges must also consider the number of current or pending education and training programs in the region already addressing market need. Gather data on similar programs at other community colleges, private colleges and training centers; labor-sponsored training and apprenticeships and other training organizations such as non-profits, Regional Occupation Programs/Centers and industry-sponsored training. Prior to developing a new program of study, colleges need to determine if the projected labor market demand is already being adequately addressed or if there exists a gap the college can fill.

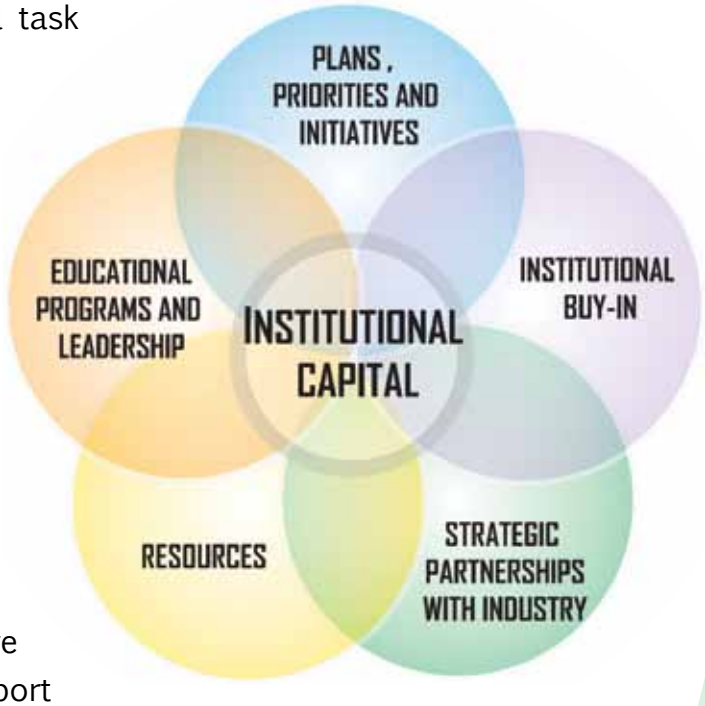
Questions to Consider

- How many green jobs are available, currently in the next three to five years, and in what industries and occupations? Are the industries/occupations in relative proximity to the college?
- Is there evidence of projected growth in labor market demand for these occupations?
- Does labor market data suggest that particular (or targeted) industry sectors and occupations are projected to grow, decline or remain relatively stable? In the short-term (e.g., three to five years) and in the long-term (e.g., five to ten years)?
- Are there significant trends in particular (or targeted) industry sectors anticipated to have an impact on labor market demand or workforce needs, such as large numbers of retirements and replacement hiring, difficulty attracting and/or retaining a workforce, off shoring manufacturing, occupation reclassifications, etc.?
- To what extent is the labor market demand already being met by other education and training providers?
- Are there labor market needs current or anticipated due to industry trends which are not being met?
- Will the green programs of study being considered lead to meaningful jobs in the local or regional market for completers?

Gathering data on the external factors we have explored in the Guide is an essential step in the program development process. We recommend the information be documented using the Summary Sheets provided in the Guide. Please see the Appendix for sample External Factor Summary Sheets that reflect the data collected by LA Trade Tech for two renewable energy industries: solar energy and wind energy. These examples will be used to illustrate various aspects of analyzing a college's competitive advantage later in the Guide.

Institutional Capital: The Assessment of Internal Factors and Gaining Institutional Buy-In

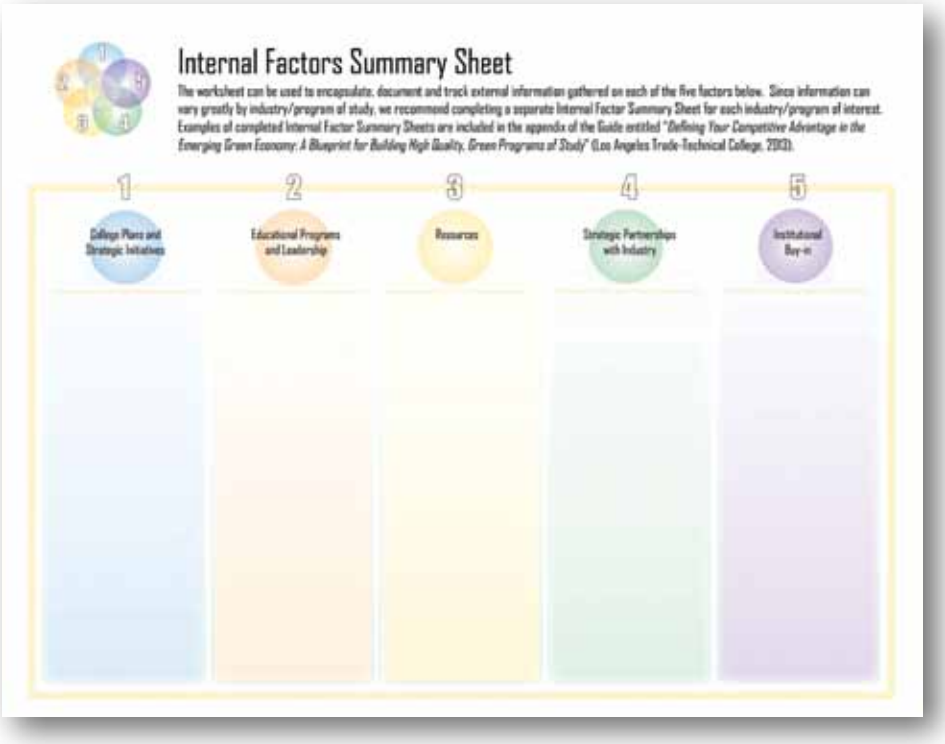
The process of determining when and how the college should engage in the development of green programs of study must also include an assessment of the internal factors that support or hinder program development. The identification of "champions," assessing institutional "buy-in," determining a college's capacity for green programs of study and identifying strategic partnerships that will assist in program development are essential steps in the process. The college could create a small task force to examine these factors.



This diagram demonstrates the inter-relatedness of the internal factors, which lay the foundation for successful and sustainable green program of study development; they are: 1) Strategic Integration of Green Program of Study Development in Plans, Priorities and Initiatives; 2) Strength of Educational Programs and College Leadership; 3) Resources to Support

and Sustain New and Enhanced Green Programs of Study; 4) Strategic Partnerships with Industry and 5) Institutional Buy-In: all of which, collectively, determine Institutional Capital.

The internal analysis of Institutional Capital reflects not only assessing buy-in, but the availability of assets, or capacity, for green program of study development. This analysis is ultimately designed to answer the question "what is the potential for developing, implementing and continuing this program over time?" The Guide includes an Internal Factors Summary Sheet, which can be used to summarize and document the information gathered about the internal factors more fully described next.



1) Strategic Integration of Green Program of Study Development in College Plans, Priorities and Initiatives

Long before the design and implementation of green programs of study, institutional commitment is required as a first critical step. Key leaders and a critical mass of constituents need to be engaged and to provide both support and resources. The degree to which sustainability is included in college plans and initiatives should be examined as a signal of institutional commitment. In addition, because college's resource allocation processes are integrated with or tied to planning processes, the inclusion of green programs of study in college master plans (e.g., Strategic Master Plan, Educational Master Plan, Technology Master Plan, Facilities Master Plan, etc.) ensures that resources are more likely to be directed to support them.

As the college gains commitment to sustainability at all levels, it is also essential to examine institutional commitment to green workforce and economic development efforts, within the college and in the community. By doing this assessment, colleges have the opportunity to begin the dialogue about building both a sustainable and equitable future for students, the community and the nation and develop a vision for a strategic and integrated approach to sustainability and green workforce and economic development at the college. It allows for colleges to not build green programs of study

in isolation, but rather as part of a broader institutional commitment to green. This type of strategic approach will ensure greater impact for the institution and community and also help long-term sustainability of green programs of study. To assist, the American Association of Community Colleges (AACC) Sustainability Education and Economic Development (SEED) Center developed the Community College Green Genome Framework, which provides the institutional competencies and indicators for success needed in specific areas including governance, strategic partnerships, program design and delivery and community engagement to achieve green transformation. As a complement to the framework, LA Trade Tech and the SEED Center created a Green Institutional Self-Assessment to help colleges gauge baseline activities and commitments related to sustainability and green program of study development and to help prioritize resources and supports. Both the framework and the self-assessment tool can be accessed at http://www.theseedcenter.org.

When a commitment to green program of study development has been formally declared either by its inclusion in college strategic plans or the development of a specific college initiative for green, the likelihood of success and broad-based support is increased. LA Trade Tech's commitment to a strategic approach has been best demonstrated with the inclusion of "green" or sustainability concepts in the college's strategic master plan, educational master plan, mission and goals of the college and the short-term and long-term programmatic objectives included in these plans.

When a commitment to green program of study development has been formally declared either by its inclusion in college strategic plans or the development of a specific college initiative for green, the likelihood of success and broad-based support is increased.

LA Trade Tech's Green College Initiative, described in the preface, is an example of when sustainability and green workforce development are part of an even broader vision and action for a college.

It was also recognized by LA Trade Tech leadership early on, that commitment to a strategic and integrated approach has to be considered in the context of equity. LA Trade Tech established as a core principle for all sustainable workforce and community development efforts — an incontrovertible commitment to serve underserved and disconnected populations where they live — in order to attain prosperity and sustainability for all. LA Trade Tech would ensure this core principle/ commitment was realized by translating it into strategies that connect people that have been isolated from real economic opportunities to good jobs and careers while helping employers access green-skilled employees, which are essential for both a sustainable and equitable future. This commitment is also paramount for: (1) mitigating the "divides" that often occur during economic shifts or new or emerging economies such as what occurred with the "digital divide"; (2) guaranteeing that supportive services are an essential component of workforce development strategies, activities and programs and (3) ensuring that "creaming" (e.g., selecting populations that are easiest to serve or are most likely to succeed with minimal effort) is eradicated and all individuals benefit from sustainability and green workforce development initiatives at the college.

Questions to Consider

- Does your institution have a commitment to sustainability principles and practices and (at the highest levels of the college) does it connect to the institution's core vision, mission and values?
- Will green programs of study advance key institutional goals and objectives; particularly those included in institutional master plans?
- Is there a standing committee, working group or other college body assigned oversight responsibility for sustainability and/or green program of study objectives?
- Has the college formalized its sustainability, green program of study and/or green workforce development goals and objectives into action steps?

2) Building on Strength of Educational Programs and College Leadership

Once college commitment is fully understood and a strategic approach is considered, an assessment of the college's existing programs of study will provide context and suggested areas where opportunity for green program of study development exists. It is likely that if the college has an engaged and dynamic faculty and strong industry advisories, it may have already begun to integrate green concepts into the curriculum based on the needs of industry. Choosing to focus on educational programs in areas where the college has a demonstrated reputation for leadership and innovation is also a good place to start.

LA Trade Tech chose to focus its initial efforts on building green programs of study within its Construction, Design and Manufacturing department not only because research showed that many innovations were developing in the industry sectors served by this department but also due to its reputation for quality and unique educational programs in these areas. In some cases, LA Trade Tech was one of a few or the only community college in the entire Los Angeles region to have existing or related educational programs targeted to these sectors and occupations. The strength and reputation of the department and its programs, therefore, was a solid base on which to build.

Analysis of the existing/related strengths of faculty interest, knowledge and skills; existing/related facilities; existing/related equipment and supplies; existing/related curriculum and/or courses and instructors' expertise and competencies will determine the college's capacity for developing green programs of study. Although it is possible to create programs in which the college has limited or no existing/related assets such as these, it may be more challenging to do so. For example, whether or not colleges have existing/related programs may mean the difference between having to hire faculty, build or reallocate facilities, purchase equipment and supplies and allocate a portion of the college's resources available for course offerings, or not.

In addition, green program of study development can be useful as a catalyst for initiating other long-term, strategic objectives of a program, department and/or the entire college such as: program/course diversification, contextualizing curriculum around a common theme/purpose, integrating liberal arts and career technical programs, building or enhancing industry partnerships and more. At LA Trade Tech, green program of study development was used as the mechanism for reigniting the college's focus on its workforce development mission; for attracting and engaging students in science, technology, math, and engineering (STEM) programs as well as for establishing a methodology for career pathway, competency-based program of study design and development.

. . . green program of study development can be useful as a catalyst for initiating other long-term, strategic objectives of a program, department and/or the entire college. . .

Questions to Consider

- Are there programmatic strengths (e.g., existing or related instructional programs; unique, reputable and/or industry-recognized programs or faculty; programs with strong ties to community and economic development efforts in your community; etc.) that green programs of study can be built upon?
- Does the college have particular faculty, staff or administrator expertise that green programs of study can be built upon?
- Are there existing facilities (or planned for the near future), equipment and supplies that support the development of particular green programs of study?
- Can green program of study development be utilized to advance long-term strategic objectives such as improving partnerships with industry, diversifying program offerings, re-engineering curriculum, regaining market relevance, etc.?

3) Resources to Support and Sustain New and Enhanced Green Programs of Study

Another important assessment is determining the extent of capital start-up costs, and, depending on the status of the variables above, a determination if the college will need funding for expenses related to program development such as professional development, curriculum development, facilities, equipment and supplies. Funding to support program delivery also needs to be calculated, including the costs of hiring faculty and any needed staff, consumable supplies and materials and other program costs. Since these considerations need to include plans for sustaining the program beyond the initial start-up phase, we suggest planning for at least three to five years. The availability of grant funds, industry incentives and assistance from strategic partnerships should be considered as potential sources. The college's infrastructure, enrollment and availability of other continual funding sources, such as **Carl D. Perkins Vocational and Technical Education Act** funds, should all be considered when determining if the college has the financial capacity to build and institutionalize green programs of study.

The existence of (or the feasibility or ease of developing) college expertise, processes, policies and procedures for garnering new, reallocating existing and managing funding sources (particularly from multiple funding streams/sources) is also a consideration. While not imperative, having these mechanisms in place will likely make garnering and managing funding easier, particularly because green program of study development, implementation and continuation is likely to require multiple and leveraged funding sources.

Questions to Consider

- Is the development of green programs of study likely to require resources, new or reallocated?
- Are resources available to support green program of study development, delivery and continuance (e.g., curriculum development, professional development, facilities, equipment, supplies, day-to-day operational costs, costs of instructional delivery, etc.)?
- If resources are required but are not already available, what is the feasibility of acquiring new or reallocating existing resources?
- Is there commitment, or ability to obtain commitment, from industry and other sources to support green programs of study through funding or in-kind donations?
- Does the college have institutional capacity to garner new, funding sources? Does the college have faculty, staff and/or administrators with a track record of garnering grants, contracts and other externally-funded resources?
- Does the college have institutional capacity to manage multiple funding sources?
- Are there existing funding streams at the college that can be directed to green program of study development? Does the college have policies or procedures in place that facilitate the re-allocation of funding to support new program development?
- Does the college have faculty, staff and/or administrators with a track record of leveraging multiple external and internal funding sources?

4) Strategic Partnerships with Industry

Critical to the success of all workforce development programs, green or otherwise, are partnerships with industry. Evaluate existing/related partnerships with industry, especially those in close geographic proximity to and/or within the college's service area. If the college has strong ties to local and regional industry partners who might assist in the development of green programs of study, these are an added strength. They can serve as advisors on curriculum design and validation, allow the use of and/or donate equipment and provide employment opportunities for program completers, thus increasing the success and continuance of green programs of study. If no such relationships exist, the college is encouraged to identify local and regional industry partners and develop these strategic partnerships.

LA Trade Tech's long-standing relationship with the local investor-owned and public utility industry partners in Los Angeles, largely fostered through REDI, strengthened the development of the energy efficiency and renewable energy stackable certificates at the college through contributions of expertise, equipment, internships and hiring of program completers.

The assessment of strategic partnerships with industry should include not only employers, but also trade associations, labor unions and other sector-based initiatives and groups. This could ideally begin with the college's industry advisory boards, which could be expanded and broadened to ensure that industry representatives familiar with developing and hiring a highly skilled green workforce are included.

Questions to Consider

- Does the college have strategic partnerships with existing or related industries or the ability to readily develop them?
- Do these partnerships include other organizations associated with the industry such as trade associations; labor unions; credentialing/accrediting agencies; city, state, federal regulatory agencies and other postsecondary institutions?
- Does the college have existing or related advisory boards or the ability to readily develop them?
- Does the college have a track record of developing and maintaining strategic industry partnerships?
- Does the college have a track record for engaging industry partners in the program development process?

5) Institutional Buy-In

All of the internal factors described above influence the degree and the ultimate goal of "institutional buy-in." It is important to find a "champion" or ideally a group of champions and key implementers comprised of faculty, staff and administrators, who believe in the importance of the development of sustainability and/or green workforce development and are willing to support green program development efforts through advocacy, committee membership/leadership and business and community engagement. This support can make a big difference for breaking down barriers and resistance. Colleges should consider buy-in to include the identification of administrators, faculty and staff who will manage and push forward green program of study development (e.g., change agents). It is also vital to understand if the college has plans and policies that are flexible and supportive of green program of study development and the broad-based support of sustainability among all college constituents. Another means for increasing buy-in for green program of study development is to make evident how they can contribute to other institutional objectives. In addition, don't underestimate how the support of influential, external constituents can also foster buy-in. Aligning green program of studies with community initiatives can increase their importance. Such community initiatives would of course include those related to sustainability, but community health, economic revitalization, beautification, workforce development, and similar types of community health and welfare initiatives are also possibilities. When buy-in is clear, and external support is prevalent, there is greater ease in program development, implementation and long-term continuance.

Questions to Consider

- How much enthusiasm will green programs, policies and practices garner with administrators, faculty, staff and students?
- Who will be your internal champions that commit to advocating for green programs of study and/or making changes required for implementing them (e.g., change agents)?
- If college policies and procedures need to be developed or changed to support green program of study development, are those who are integral to this process willing to do so? And/or does the college have a history of changing policies and procedures, when necessary, to obtain its goals and objectives?
- Do key college constituents view green programs of study as contributing to the long-term institutional objectives such as improving partnerships with industry, diversifying program offerings, re-engineering curriculum, regaining market relevance, etc.?
- Do key external constituents consider and support the development of green programs of study as contributing to community initiatives? Can or will these constituents influence internal buy-in?

In summary, gathering data on internal factors to determine a college's degree of Institutional Capital for green program of study development is an important step in the program development process and can be summarized on the Internal Factor Summary Sheets provided in the Guide. Please see the Appendix for sample Internal Factor Summary Sheets that reflect LA Trade Tech's Institutional Capital several years ago, as we began to implement our Green College Initiative.

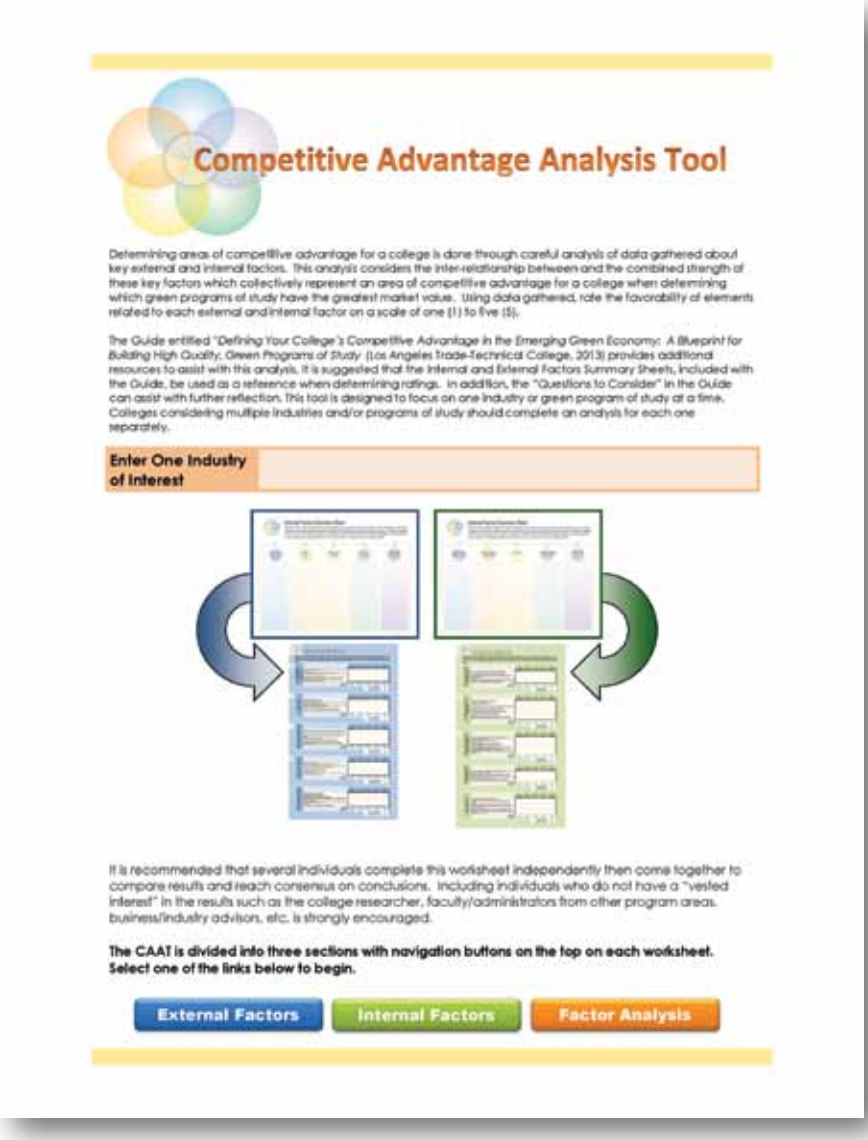
Action Step 2

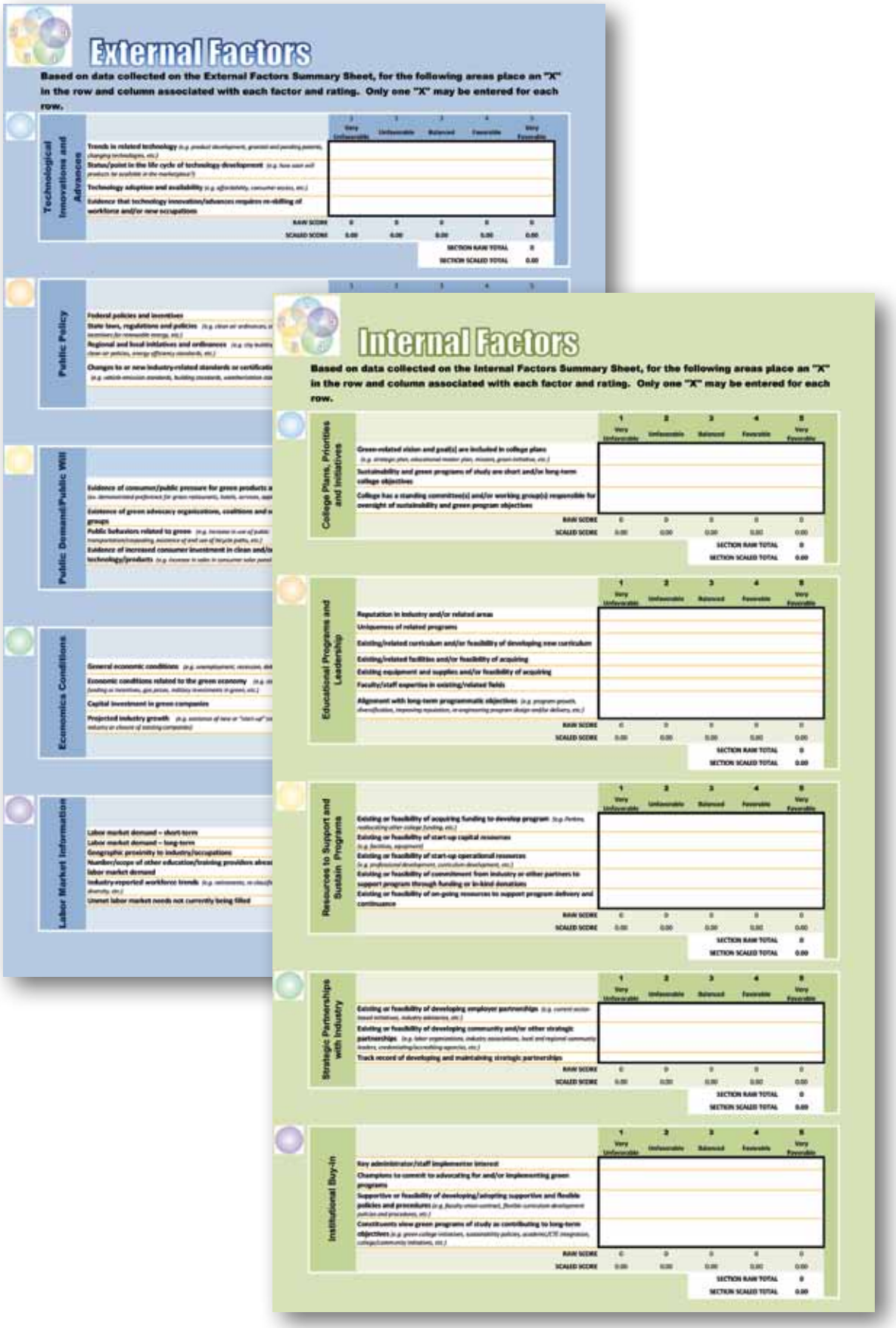
Finding Your Competitive Advantage by Capitalizing on the Perfect Storm of Opportunity

Determining areas of competitive advantage for a college is done through careful analysis of data gathered about key external and internal factors. This analysis also considers the inter-relationship and the combined strength of these key factors to identify the "perfect storm of opportunity," which represents an area of competitive advantage for a college when determining which green programs of study have the greatest market value. The perfect storm of opportunity is the point at which all data comes together, where external market demand and internal institutional capital factors converge. The reference to a "storm" is a perfect analogy since sometimes visibility is difficult in a storm, but if a college can harness the energy of the storm, it can be extremely powerful.

Finding Your Competitive Advantage

To facilitate the process of analyzing the colleges' external factors which determine market demand, as well as the internal factors, or institutional capital, a Competitive Advantage Analysis Tool was developed as part of the Guide. The Competitive Advantage Analysis Tool (CAAT) includes questions pertaining to each external and internal factor, outlined previously in the Guide. Based upon data gathered during Action Step 1, the college rates the favorability of elements related to each factor on a scale of one (1) to five (5). It is suggested that the External and Internal Factors Summary Sheets be used as a reference when determining ratings. In addition, the "Questions to Consider" previously in the Guide can assist with further reflection. The tool is designed to focus on one industry or green program of study at a time. Colleges considering multiple industries and/or programs of study should complete a CAAT for each one separately.





External Factors

Based on data collected on the External Factors Summary Sheet, for the following areas place an "X" in the row and column associated with each factor and rating. Only one "X" may be entered for each row.

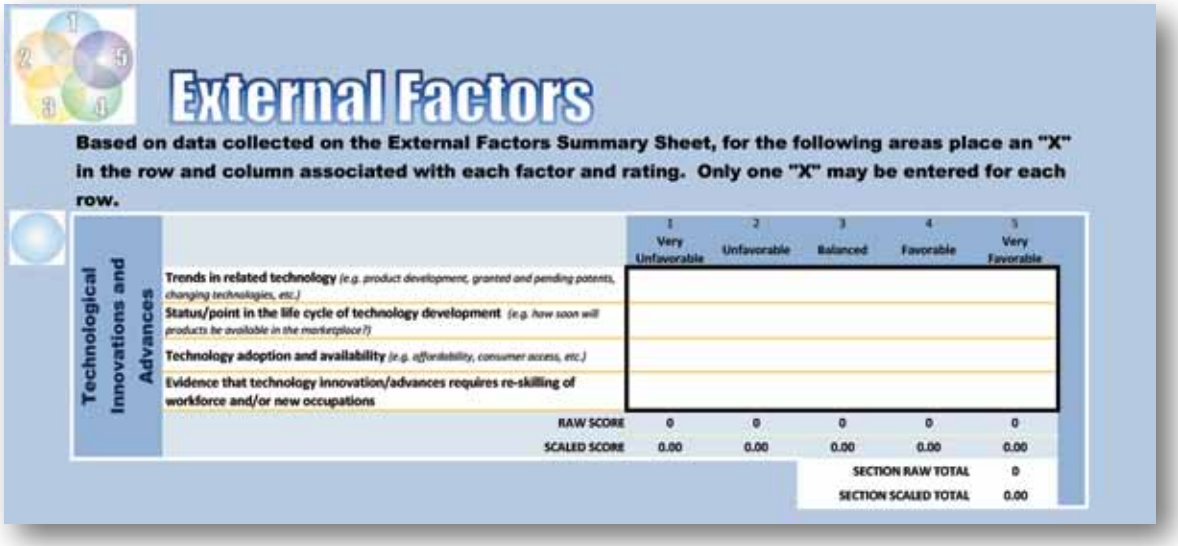
	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Technological Innovations and Advances					
Trends in related technology (e.g. product development, granted and pending patents, changing technologies, etc.)					
Status/point in the life cycle of technology development (e.g. how soon will products be available in the marketplace?)					
Technology adoption and availability (e.g. affordability, consumer access, etc.)					
Evidence that technology innovation/advances requires re-skilling of workforce and/or new occupations					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
SECTION RAW TOTAL	0				
SECTION SCALED TOTAL	0.00				
Public Policy					
Federal policies and incentives					
State laws, regulations and policies (e.g. clean air ordinances, or incentives for renewable energy, etc.)					
Regional and local initiatives and ordinances (e.g. city building, clean air policies, energy efficiency standards, etc.)					
Changes to or new industry-related standards or certificati (e.g. vehicle emission standards, building standards, standardization stan					
Public Demand/Public Will					
Evidence of consumer/public pressure for green products a (ex. demonstrated preference for green restaurants, hotels, services, appl					
Existence of green advocacy organizations, coalitions and n groups					
Public behaviors related to green (e.g. increase in use of public transportation/carpooling, existence of and use of bicycle paths, etc.)					
Evidence of increased consumer investment in clean and/o technology/products (e.g. increase in sales in consumer solar panel					
Economics Conditions					
General economic conditions (e.g. unemployment, recession, sho					
Economic conditions related to the green economy (e.g. cli (trading or incentives, gas prices, industry investments in green, etc.)					
Capital investment in green companies					
Projected industry growth (e.g. existence of new or "start-up" co industry or closure of existing companies)					
Labor Market Information					
Labor market demand – short-term					
Labor market demand – long-term					
Geographic proximity to industry/occupations					
Number/scope of other education/training providers alread labor market demand					
Industry-reported workforce trends (e.g. retirements, re-classifi diversity, etc.)					
Unmet labor market needs not currently being filled					

Internal Factors

Based on data collected on the Internal Factors Summary Sheet, for the following areas place an "X" in the row and column associated with each factor and rating. Only one "X" may be entered for each row.

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
College Plans, Priorities and Initiatives					
Green-related vision and goal(s) are included in college plans (e.g. strategic plan, educational master plan, mission, green initiative, etc.)					
Sustainability and green programs of study are short and/or long-term college objectives					
College has a standing committee(s) and/or working group(s) responsible for oversight of sustainability and green program objectives					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
SECTION RAW TOTAL	0				
SECTION SCALED TOTAL	0.00				
Educational Programs and Leadership					
Reputation in industry and/or related areas					
Uniqueness of related programs					
Existing/related curriculum and/or feasibility of developing new curriculum					
Existing/related facilities and/or feasibility of acquiring					
Existing equipment and supplies and/or feasibility of acquiring					
Faculty/staff expertise in existing/related fields					
Alignment with long-term programmatic objectives (e.g. program growth, diversification, improving equivalency, re-engineering program design and/or delivery, etc.)					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
SECTION RAW TOTAL	0				
SECTION SCALED TOTAL	0.00				
Resources to Support and Sustain Programs					
Existing or feasibility of acquiring funding to develop program (e.g. Perkins, reallocating other college funding, etc.)					
Existing or feasibility of start-up capital resources (e.g. facilities, equipment)					
Existing or feasibility of start-up operational resources (e.g. professional development, curriculum development, etc.)					
Existing or feasibility of commitment from industry or other partners to support program through funding or in-kind donations					
Existing or feasibility of on-going resources to support program delivery and continuance					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
SECTION RAW TOTAL	0				
SECTION SCALED TOTAL	0.00				
Strategic Partnerships with Industry					
Existing or feasibility of developing employer partnerships (e.g. current sector-based initiatives, industry advisories, etc.)					
Existing or feasibility of developing community and/or other strategic partnerships (e.g. labor organizations, industry associations, local and regional community leaders, credentialing/accrediting agencies, etc.)					
Track record of developing and maintaining strategic partnerships					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
SECTION RAW TOTAL	0				
SECTION SCALED TOTAL	0.00				
Institutional Buy-in					
Key administrator/staff implementer interest					
Champions to commit to advocating for and/or implementing green programs					
Supportive or feasibility of developing/adopting supportive and flexible policies and procedures (e.g. faculty union contract, flexible curriculum development policies and procedures, etc.)					
Constituents view green programs of study as contributing to long-term objectives (e.g. green college initiatives, sustainability policies, academic/CTE integration, college/community initiatives, etc.)					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
SECTION RAW TOTAL	0				
SECTION SCALED TOTAL	0.00				

For example, when rating the external factor Technological Innovations, colleges will consider the research found on trends in technology including new product development, patents, changing technologies, the status/point in the life cycle of product development and whether or not the infrastructure exists to support technological changes occurring in the industry. If data indicates that technological changes are imminent, this is a positive indication there will be a need for workers familiar with this new technology — or working in areas that would be impacted by this new technology — relatively soon. Thus, this factor should be rated favorably. However, if product development and time to market of the new technology is estimated to be five years away or further, the college might consider waiting and thus this factor would be rated unfavorably. Based on these considerations, the ratings are then entered into the Competitive Analysis Advantage Tool (CAAT) (see example below of the Technological Innovations and Advances section of the Tool). It is in this section of the CAAT where colleges rank these factors from 1, Very Unfavorable to 5, Very Favorable.



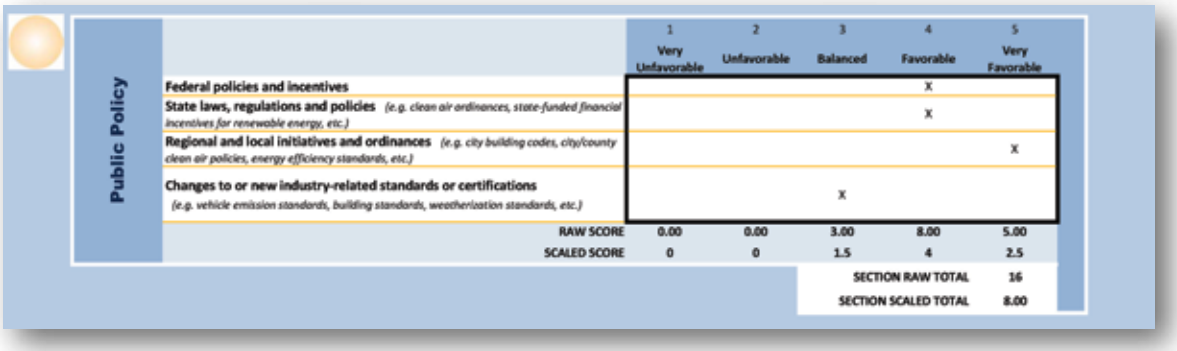
External Factors

Based on data collected on the External Factors Summary Sheet, for the following areas place an "X" in the row and column associated with each factor and rating. Only one "X" may be entered for each row.

		1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Technological Innovations and Advances	Trends in related technology *(e.g. product development, granted and pending patents, changing technologies, etc.)*					
	Status/point in the life cycle of technology development *(e.g. how soon will products be available in the marketplace?)*					
	Technology adoption and availability *(e.g. affordability, consumer access, etc.)*					
	Evidence that technology innovation/advances requires re-skilling of workforce and/or new occupations					
	RAW SCORE	0	0	0	0	0
	SCALED SCORE	0.00	0.00	0.00	0.00	0.00
					SECTION RAW TOTAL	0
					SECTION SCALED TOTAL	0.00

Looking at another external factor, Public Policy, if city, state and/or regional sustainability polices take effect immediately, this indicates a sense of urgency the college could capitalize on to generate support for green program of study development. Policies sometimes include funding streams, incentives and other fiscal encouragement for the development of programs of study that the college might explore. Using the example

from LA Trade Tech's Competitive Advantage Analysis for the solar industry, when evaluating data about public policy related to renewable energy (including federal, state and regional laws, policies, initiatives and ordinances) it was determined that these factors were generally favorable. As can be seen from this section of the Competitive Advantage Analysis Tool sample below, (see the Appendix for full sample), the federal and state policies around renewable energy were rated as favorable, and regional and local policies were rated as very favorable, due to the fact that the City of Los Angeles had numerous policy commitments and incentives for solar energy.



Public Policy	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Federal policies and incentives				X	
State laws, regulations and policies *(e.g. clean air ordinances, state-funded financial incentives for renewable energy, etc.)*				X	
Regional and local initiatives and ordinances *(e.g. city building codes, city/county clean air policies, energy efficiency standards, etc.)*					X
Changes to or new industry-related standards or certifications *(e.g. vehicle emission standards, building standards, weatherization standards, etc.)*			X		
RAW SCORE	0.00	0.00	3.00	8.00	5.00
SCALED SCORE	0	0	1.5	4	2.5
				SECTION RAW TOTAL	16
				SECTION SCALED TOTAL	8.00

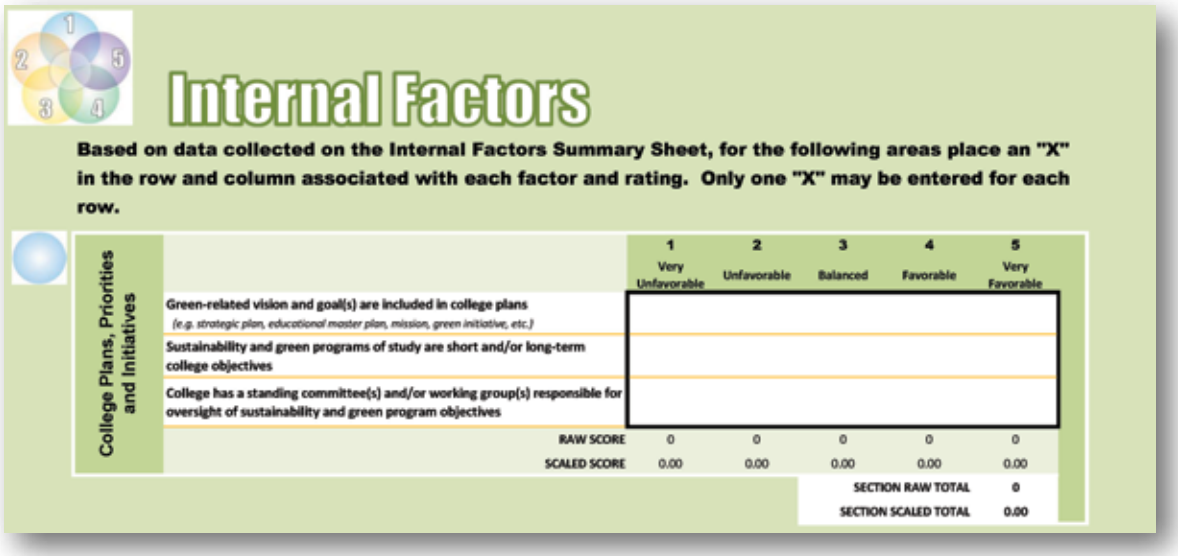
Further, look for significant signals or patterns in data collected. Are similar themes emerging around particular green industries or environmental concerns? Do multiple data sources, public policies and public will reveal commonalities in theme? For example, in Los Angeles, local ordinances, public will and technology innovations were largely focused on clean air and cleaner, greener transportation with some emphasis on green building as well. Clean water, renewable energy and recycling were also common themes, but no consistent, emergent patterns were found. The ability to see these patterns and trends will assist in decision-making when a myriad of green program of study development opportunities exist, but the college is only able to focus on one or a few of them. For example, when LA Trade Tech was developing its programs of study, information suggested that energy efficiency and renewable energy (particularly solar and solar thermal energy) were areas of high interest and potential. Favorable growth projections appeared in multiple sources and there were few contraindications that this would be an

area of growth. When topics emerge and reemerge across labor market databases, reports and articles, this is an indication of a pattern or opportunity that should be explored further.

After gathering data described above, utilize the findings to make strategic decisions on which green programs of study make the most sense (e.g., have greatest market value potential) given economic conditions, technology trends, public will and public policy. The amount of collected data might be extensive or scant, depending on state-wide, regional and local circumstances.

Using the Internal Factors Summary Sheet as a reference, data about the institution's capital will also be analyzed and entered into the Competitive Advantage Analysis Tool. Consider, for example, the degree to which the green economy or sustainability is or is not reflected in the college's plans, goals and objectives as a factor in the potential development of green programs of study and rate this aspect on the favorability scale. Assessing the degree of support or resistance is important. If the support is already present, (i.e. there is a college-wide policy or initiative and sustainability and/or green workforce development is part of the strategic plan) this enhances the "perfect storm of opportunity." However, if the college has yet to embrace one or both, this might create some barriers that need to be addressed. When filling out this section of the Competitive Advantage Analysis Tool, specifically the College Plans, Priorities and Initiatives section, the degree to which sustainability and green workforce development are reflected in college plans and initiatives, are part of the long-term college goals and objectives and the degree to which an infrastructure exists for implementation (such as standing committees, designated staff, etc.) are rated in terms of favorability from one (1) to five (5).

When topics emerge and reemerge across labor market databases, reports and articles, this is an indication of a pattern or opportunity that should be explored further.



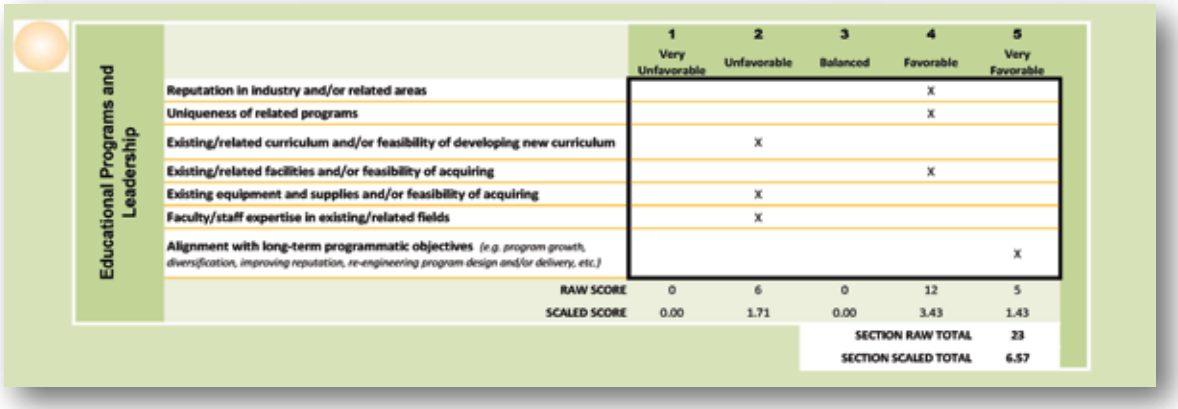
Internal Factors

Based on data collected on the Internal Factors Summary Sheet, for the following areas place an "X" in the row and column associated with each factor and rating. Only one "X" may be entered for each row.

College Plans, Priorities and Initiatives

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Green-related vision and goal(s) are included in college plans *(e.g. strategic plan, educational master plan, mission, green initiative, etc.)*					
Sustainability and green programs of study are short and/or long-term college objectives					
College has a standing committee(s) and/or working group(s) responsible for oversight of sustainability and green program objectives					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
SECTION RAW TOTAL					0
SECTION SCALED TOTAL					0.00

Another key factor is the presence of existing and/or related programs of study. For example, a college might have found in the external research compiled that the region is highly focused on green transportation; however, if the college does not have an automotive/transportation program at all, it may be more difficult to build a green program of study in transportation. An inventory of existing or related programs of study and curriculum content and courses that can be greened should be conducted. For example, at LA Trade Tech, when exploring Educational Programs and Leadership with regard to the solar industry, we determined that our strength was the fact that we had related programs in the Construction, Design and Manufacturing department with a strong regional and national reputation. This was most evident with our Electrical Construction program, and thus the first factors (uniqueness and reputation of related programs) were rated as favorable. However, we did not have existing faculty expertise, nor the equipment and supplies for a solar program, so these were rated unfavorably.



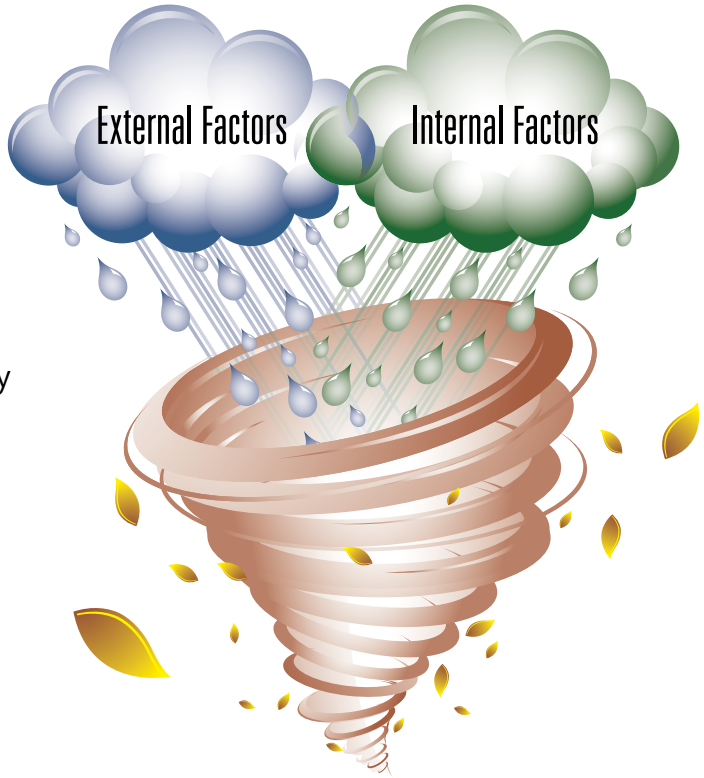
Educational Programs and Leadership

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Reputation in industry and/or related areas				X	
Uniqueness of related programs				X	
Existing/related curriculum and/or feasibility of developing new curriculum		X			
Existing/related facilities and/or feasibility of acquiring				X	
Existing equipment and supplies and/or feasibility of acquiring		X			
Faculty/staff expertise in existing/related fields		X			
Alignment with long-term programmatic objectives *(e.g. program growth, diversification, improving reputation, re-engineering program design and/or delivery, etc.)*					X
RAW SCORE	0	6	0	12	5
SCALED SCORE	0.00	1.71	0.00	3.43	1.43
SECTION RAW TOTAL					23
SECTION SCALED TOTAL					6.57

For this portion of competitive advantage analysis, colleges should look at areas where it has particular strength and expertise, and is perhaps recognized locally, regionally and nationally for a particular department or program of study. Drawing on the college's strengths will increase opportunities for competitive advantage.

The Perfect Storm of Opportunity

Determining the perfect storm of opportunity is the process of collecting and analyzing data on key external and internal factors to make strategic decisions regarding green program of study development. The perfect storm of opportunity is actualized when colleges can recognize the convergence of the external and internal factors, capitalize on the strengths of each independently and collectively, and ultimately ascertain the college's competitive advantage or "perfect storm".



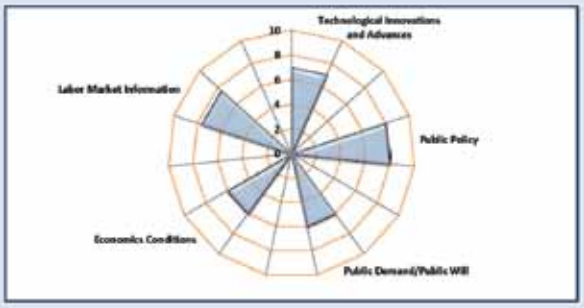
The Competitive Advantage Analysis Tool is designed to assist in this determination; it graphically depicts ratings entered and provides output to assist decision-making. The sample output results below are based on data from two competitive advantage analyses that were based on LA Trade Tech's research several years ago in the renewable energy industry (see the Appendix for complete competitive advantage analysis tools).

Results of the analysis of the ratings inputted by the college includes three different spider diagrams, one which summarizes the strengths of the External Factors, one which summarizes the strength of the Internal Factors and one which combines both factors into a single diagram. The shading of each factor - how far it extends from the center of the web to the outer edge - indicates the strength of that factor. The spider

Solar Energy FACTORS DIAGRAMS

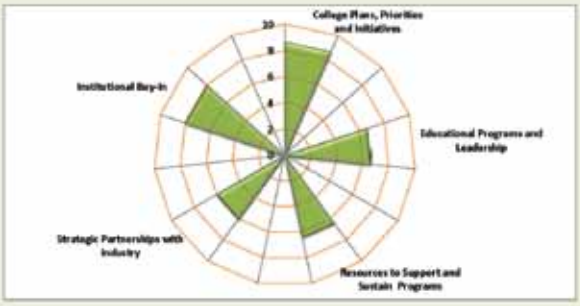
External Factors Spider Diagram

FACTORS	SCORE
Technological Innovations and Advances	7.00
Public Policy	8.00
Public Demand/Public Will	6.00
Economics Conditions	6.00
Labor Market Information	7.67



Internal Factors Spider Diagram

FACTORS	SCORE
College Plans, Priorities and Initiatives	8.67
Educational Programs and Leadership	6.57
Resources to Support and Sustain Programs	6.40
Strategic Partnerships with Industry	6.00
Institutional Buy-In	8.00



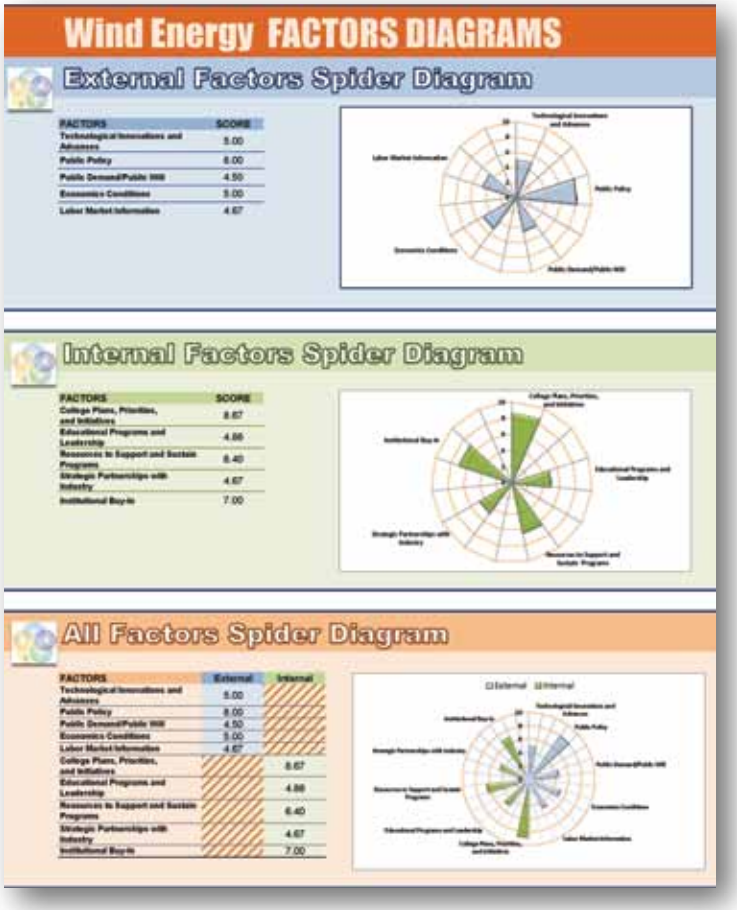
All Factors Spider Diagram

FACTORS	External	Internal
Technological Innovations and Advances	7.00	
Public Policy	8.00	
Public Demand/Public Will	6.00	
Economics Conditions	6.00	
Labor Market Information	7.67	
College Plans, Priorities and Initiatives		8.67
Educational Programs and Leadership		6.57
Resources to Support and Sustain Programs		6.40
Strategic Partnerships with Industry		6.00
Institutional Buy-In		8.00

diagram output for LA Trade Tech's competitive advantage analysis for solar is presented on the opposite page.

As you can see from the All Factors Spider Diagram, the shading for public policy and labor market information extends almost to the outer edges of the spider diagram, indicating very high levels of favorability or strength for those external factors. The Internal Factors spider diagram shows most favorability in college plans and initiatives and institutional buy-in. It is apparent that most of the factors seem favorable. Even the least favorable factor, strategic partnerships with industry, indicates some level of favorability — even if not as high as the others. When examining the combined spider diagram from the solar example, one can see that most of the factors are rated fairly strong; thus the results support LA Trade Tech's decision to build its solar programs of study.

Conversely, when conducting a competitive advantage analysis for the wind energy industry, there were a number of factors which were considered problematic or unfavorable. As can be seen from the spider diagram of the Internal Factors, the favorability of institutional buy-in and inclusion in college plans and initiatives are still quite strong. It is important to note that these are relatively stable factors and will not likely change significantly for the college, even when analyzing different industries. However, the existing programs factor was less favorable



than it was for solar, and the favorability of industry partnerships is significantly weaker. The external factors analysis seems to indicate that the labor market for the City of Los Angeles is not very strong for wind energy as a source of renewable energy. So while the public policy factor is still favorable given Los Angeles's commitment to renewable energy sources in general, the degree to which there will be jobs in Los Angeles in the wind energy industry is limited. Further, while there is a lot of technological innovation in the wind industry, the timeline for the deployment of those innovations in urban areas was at least seven to ten years away. Thus, based on the results of the competitive advantage analysis for that industry, LA Trade Tech decided not to focus its efforts on the development of wind energy as one of our renewable energy programs of study.

It should be noted that The Competitive Advantage Analysis Tool rates each of the factors equally for the purpose of analysis. However, it is recognized that these factors might not all be seen as equally important and relevant depending on colleges' unique situations. For example, the campus culture at some institutions might consider institutional buy-in as paramount – nothing gets done without the full support of faculty and administration; while other colleges are able to move agendas along, even with minimal support from a few identified champions. In terms of external factors, some colleges might be willing to take a riskier approach to building programs of study and develop programs even though technological advances are not expected to be implemented for several years. So despite the fact that the technological advances and innovations section of the spider diagram does not indicate this is a strength, some colleges might be willing to build the programs anyway, while others have a more conservative approach. Therefore, in interpretation, it is important to consider the relative importance of the factors based on the colleges' unique situation. If a competitive advantage appears weak in a particular area, temper that with an assessment of the importance of that factor for the unique institution and situation.

Questions to Consider

- What are the results of the examination of the external factors, including trends in technology, public policy public demand/public will, economic factors, the short-term and long-term labor market demand and unmet needs?
- What are the results of the examination of the college's internal factors including the existence of a major college initiative with a green focus, strength of any related curriculum or programs of study, specific expertise or recognition for its leadership and innovation in the industry and strength of strategic partnerships with key industry leaders in the local or regional community?
- Based on the competitive advantage analysis (using the tool provided in the Guide), what is the best course of action for the college to take in terms of developing green programs of study at this time?

Action Step 3

Building Quality, Competency-Based Green Programs of Study

The competitive advantage analysis exercise is designed to illuminate a strategic path for the college to take in the creation, expansion or enhancement of green programs of study. Once the external and internal analyses are done and conclusions are made that there is a "perfect storm of opportunity" for a college, it is now important to act. There are several strategies colleges might employ, including: 1) integrating green content into existing courses, 2) creating new, green courses within existing programs, 3) developing stand-alone green certificate programs of study and/or 4) developing stacked and latticed green programs of study that culminate in certificates and associate degrees. The details of the specifics steps in the development of green programs of study, especially the development of stacked and latticed programs is beyond the scope of this guide; however, the overall process is summarized herein.

Developing the Green Program Strategic Plan

The college might decide it is not necessary to build an entirely new program of study, but instead to green existing programs. This process could include adding specific content to existing courses in order to address green competencies. This additional content may or may not constitute a substantial change to the curriculum, but in any case, will likely include faculty professional development, and in some cases new equipment or supplies. It may be determined that green competencies and the corresponding content that needs to be included warrants the development of one or more new courses within an existing program of study.

The analysis might result in the realization that the college is poised and ready to develop a new, green program of study culminating in at least one postsecondary certificate or degree. There are situations where the process suggests there are several, feasible green programs of study that would work well given the external and internal factors considered; the college will then need to decide *which* program of study to develop. At this point the college will need to further evaluate their internal resources. Is there sufficient institutional buy-in to support the development of multiple, green programs of study? Does the college have the capacity to develop and sustain multiple, green programs of study simultaneously? If not, then the development of the programs of study will need to be prioritized and/or staggered. It is suggested that colleges start with building programs of study where they have the most internal resources, such as adequate facilities, eager and enthusiastic faculty and strategic partnerships with industry. Programs of study developed in the future will benefit from the lessons learned by these initial programs.

It is suggested that colleges start with building programs of study where they have the most internal resources, such as adequate facilities, eager and enthusiastic faculty and strategic partnerships with industry.

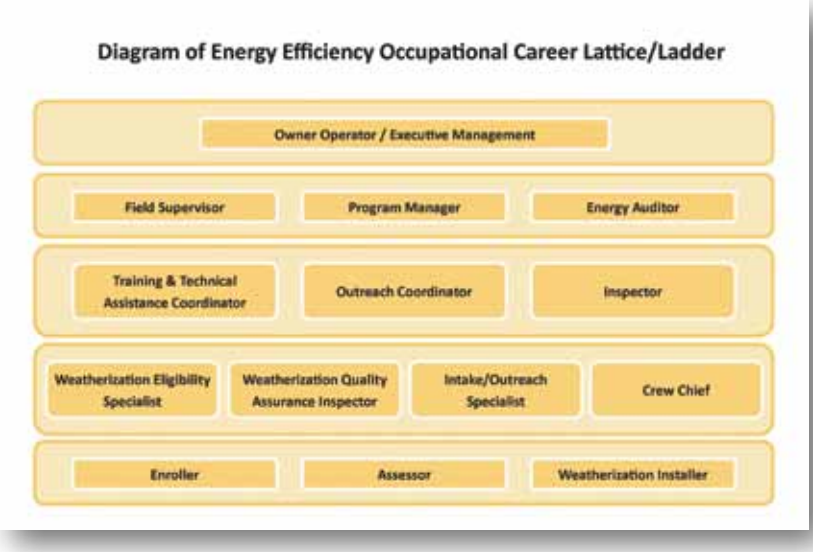
Initially, external and internal factors suggested that LA Trade Tech might not be able to or need to develop entirely new programs of study. Rather it chose to integrate "green concepts" into existing courses and enhance existing programs of study with new, greened courses. The college also chose to develop a new certificate option, the Hybrid Vehicle Technology Certificate of Achievement, within its existing diesel and automotive technology programs of study. LA Trade Tech's Green College Initiative website (http://college.lattc.edu/green/) illustrates the numerous ways that the Green College Initiative achieved the goals of greening programs of study.

Finally, the college may need to answer the question, "is it necessary and desirable, and does the college have the institutional capital to develop green stackable certificates and degrees"? See next section for more information. LA Trade Tech was able to develop ten stacked and latticed certificate and degree programs of study in energy efficiency and renewable energy. This is a challenging endeavor, but achievable if external and internal factors are in place. The next section of the Guide provides more information on stackable certificates and degrees.

Career Pathway Approach

Regardless of the strategy decided upon, the college should ideally take a career pathway approach to program of study development. For the purposes of the Guide, career pathway is defined as one or more occupations that share competencies, clustered to form an identifiable career ladder/lattice within an industry sector that has promising employment opportunities. Also for purposes of this guide, green programs of study are defined as a structured sequence of competency-based academic and technical learning activities and supportive strategies that culminate in one or more of the following career/postsecondary milestones: (1) an industry-recognized credential; (2) one or more postsecondary certificates, (3) one or more postsecondary degrees; (4) transfer-readiness to four-year university programs and/or (5) employment tied to industries and occupations that are greening.

This career pathway, program of study development approach begins with locating or developing career maps that diagram occupational ladders and lattices that exist within a typical business (for small businesses) or occupational cluster (for larger organizations). When LA Trade Tech began its green program of study development processes, very few, if any, green career maps existed. As a result the college convened industry advisors who assisted in developing several career maps such as the Energy Efficiency Occupational Career Lattice/Ladder shown here. Other green career maps are available on the college's website at http://college.lattc.edu/green/.



There are several career map tools available to facilitate this process such as the Solar Career Map (http://www1.eere.energy.gov/solar/careermap/), developed by the Interstate Renewable Energy Council in its capacity as the national administrator of the Department of Energy's Solar Instructor Training Network. This interactive, online tool maps solar occupations in four areas throughout the U.S.: component production, system design, sales and marketing and installation/operations. And this visual career map explores thirty-six solar-energy occupations deemed essential to building a robust, high quality solar industry, describes diverse jobs across the industry, charts possible progression between them and identifies the high-quality training necessary to do them well.

Many states and regional agencies have also developed online green career mapping resources and tools (all referenced sites are available in the Resource List). One such example is Minnesota's iSeek Green which provides career maps and other excellent resources on occupations in

five career clusters: environmental conservation, recycling and pollution reduction, green manufacturing, renewable energy generation and building-related energy efficiency. iSeek Green also has a green career paths website (http://www.iseek.org/industry/green/careers/green-pathways.html) where industry maps are available in the wind, ethanol, residential energy-efficiency and commercial energy-efficiency industries. Another example is Oregon's Green Statewide Career Pathway Roadmaps website (http://www.oregongreenpathways.org/). This source provides existing and emerging green career maps and occupations with specific and detailed information on the skills needed for these careers.

An example of a regional career mapping resource is Green Careers (http://www.mapyourcareer.org/green/) developed by the Workforce Development Council of Seattle and King County, Washington. This site lists entry-level, middle-level and higher-level green occupations in six industry sectors. In addition, information is provided on the experience, skills and education required for each occupation.

The Development of Competency Models

After the college has identified green career ladders/lattices and associated occupations, the next task is to develop a competency model for targeted occupations in the career ladder/lattice utilizing all data gathered. A competency model is a method of collecting and illustrating the skills and competencies needed for successfully performing a particular occupation or cluster of occupations within an industry. Begin by identifying employment eligibility requirements, common work tasks, skill standards, industry-recognized certifications or credentials and most common tools and technology used for those occupations which, ultimately, determine the competencies required of a successful worker. A competency is the capability to apply or use a set of related knowledge, skills and abilities required to successfully perform "critical work functions" or tasks in an occupational setting. Competencies often serve as the basis for skill standards as well as potential measurement criteria for assessing competency attainment. From the information

gathered, identifying the competencies required for green occupations related to programs of study, will involve a number of approaches.

Colleges can use O*Net OnLine to locate and gather information on knowledge, skills, abilities and other occupational requirements that can then be organized into competencies. Using O*Net's occupational search feature, one can locate an overall description and the tasks, tools and technology; information on knowledge, skills, abilities as well as work activities associated with green occupations. This information can be downloaded to enable further analysis, and for deeper research and analysis, the entire O*Net production and analyst databases can be downloaded from the O*Net Resource Center.

Another strategy is to gather information to determine competencies by synthesizing existing industry, state and national skills standards, accreditations, technical curriculum and certifications related to the green occupations of interest. For example, The North American Board of Certified Energy Practitioners (NABCEP) provides standards for the certification of PV and solar heating installation. Another example is the program for accreditation recently launched by The American National Standard Institute (ANSI) and the Interstate Renewable Energy Council, Inc. (IREC). The ANSI-IREC program for accreditation evaluates renewable energy and energy efficiency certificate-awarding schools, colleges and other institutions against requirements for curriculum, equipment, facilities, administration and personnel, as set forth in the IREC Standard 14732: 2013. Such requirements are useful to consider during this phase of green program of study development as well.

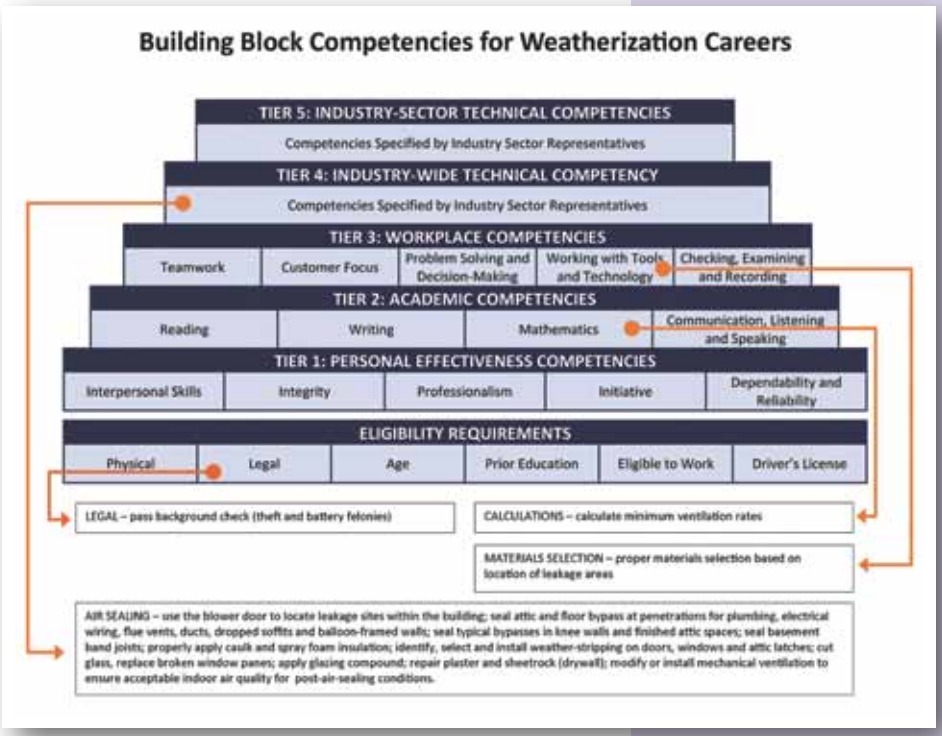
In addition, many of the career mapping tools mentioned previously (e.g., The Solar Career Map, Minnesota's iSeek Green and Oregon's Green Statewide Career Pathway Roadmaps) also provide detailed information on occupation-specific competencies. The college should locate any existing industry accreditations and certifications to help to determine required competencies. Some of these sources are identified on the Resource List. Ideally, if the college can grant industry-recognized certifications or offer programs that are accredited, this strengthens the program's competitive advantage and employment opportunities for students.

Yet another important way to acquire information about competencies is through input and feedback from industry partners — thus having strong strategic partnerships with industry would facilitate this process. Industry partners can provide information about entry level and advanced competencies that are required for various green occupations. Industry representatives should be involved in the development of course curriculum and programs of study to ensure critical and validated competencies are reflected in curriculum, instructional activities and program completers obtain competencies necessary for successful employment. Job descriptions, particularly from employer partners, can also be examined to identify skills and competencies, as well as other pertinent industry information. It is important to include other behaviors and requirements that are deemed necessary for successful job performance; for example, if workers are required to possess a valid driver's license, have a clean criminal record, have the ability to tolerate heights or small enclosed spaces or to lift a certain amount weight.

Once this information gathering is completed, the competencies should be organized into a model or framework starting with foundational/beginning competencies then working up to more advanced/technical competencies. Competency models can take a variety of forms. We suggest using a typical model that includes the following elements: competency names and detailed definitions; and descriptions of knowledge, skills, behaviors and activities associated with each competency. And typically, the model is presented as a visually appealing graphic form, which assists users to quickly identify competencies.

The U.S. Department of Labor hosts a Competency Model Clearinghouse (http://www.careeronestop.org/CompetencyModel/) with links to validated industry competency models and tools to build customized competency models and career ladder/lattices. Also available in the clearinghouse are user guides for developing competency models, other useful resources and links to competency models developed and used by organizations throughout the U.S. such as the **Building Block Competencies for Energy Careers** developed by the Center for Energy Workforce Development (CEWD). The CEWD competency model framework, which articulates utility career requirements from eligibility and interpersonal skills to industry- and occupation-specific technical competencies, can be adapted for more specific careers. Other competency, skill standards and career pathway leaders include WorkSource Oregon and the Pacific Northwest Center of Excellence for Clean Energy (PNCECE).

Below is an example of a competency model LA Trade Tech developed for weatherization occupations. The competency framework was validated by industry partners to ensure it reflects the needs of industry, including standards and certifications. The framework was also vetted with faculty, either through participation in its development or through consultation at key points. Once the competency framework was approved, it was thought of the as the "blueprint" for creating weatherization-related programs of study at the college.



From Competencies to Programs of Study

The development of green certificates and degrees within structured and comprehensive programs of study coupled with supportive services, improves academic achievement, certificate/degree attainment and employment outcomes (Baider, et al., 2010; Chisman, 2009; Institute for a Competitive Workforce and the National Career Pathways Network, 2009). Further, by developing programs of study to include "stacked" and/or "latticed" certificate and degree programs, allows individuals to build a portfolio of credentials that have both postsecondary and labor market value.

The college should utilize the competencies in its framework to determine how courses might need to be changed or enhanced, or if new courses need to be developed to green a program of study. If the college is greening an existing program of study, the current curriculum will need to be examined to determine which competencies are already being addressed and which are not. This should include a careful analysis of existing syllabi, projects, student learning outcomes as well as experiential learning that might exist, including internships or work-based learning. The college needs to determine the best way to include competencies that are not adequately addressed in the existing curriculum.

The question that may need to be asked is, "are the green competencies easily integrated into existing courses without substantially altering the course content"? If so, then non-substantial changes might be made to curricula. For example, at LA Trade Tech, our existing Carpentry 117 and 118 courses on Construction Materials and Building Materials were

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Baider, A., Choitz, V., Duke-Benfield, A. E., Foster, M. W., Harris, L., Lower-Basch, E., et al. (2010, May). *Course design elements most valued by adult learners in blended online education environments: an American perspective.*

Chisman, F. (2009, October). *Background and Supporting Evidence for Adult Education for Work.* Retrieved from Jobs for the Future, National Center on Education and the Economy, Workforce Development Strategies Group.

Institute for a Competitive Workforce and the National Career Pathways Network. (2009, October). *Thriving in Challenging Times: Connecting Education to Economic Development through Career Pathways.* Retrieved from National Career Pathways Network: http://www.cord.org/thriving-in-challenging-times

augmented to include green building materials. The faculty determined there was no need for a separate stand-alone course to provide knowledge of green materials and supplies and the green content was easily integrated into the existing courses. This may be true of many courses, as much of the greening is being done within existing occupations in traditional sectors and industries such as energy, manufacturing and construction.

However, if it is determined that the competencies that need to be addressed are many, broad and/or complex enough to require a separate course, one will need to be developed. For example, at LA Trade Tech several stand-alone courses were developed to supplement existing programs of study. For example Building and Construction Techniques 10, CADD for Sustainable Landscape Design, and Electrical Construction Management 164, Sustainable Lighting Principles and Practices, were developed and added as new courses within existing programs of study.

When the college determines that a significant number of new courses would need to be developed to address all the competencies and that there is also market potential, the college might consider developing a new certificate or degree program. An example that was mentioned previously is the Hybrid and Electric Plug-In Vehicle Technology program, which is a 12 unit credit-bearing certificate program. It is important that competencies become the basis for the course content when colleges build new certificate and degree programs.

The salient features of quality, postsecondary programs of study, including those developed by LA Trade Tech, are outlined in the following list:

Program of Study Salient Features

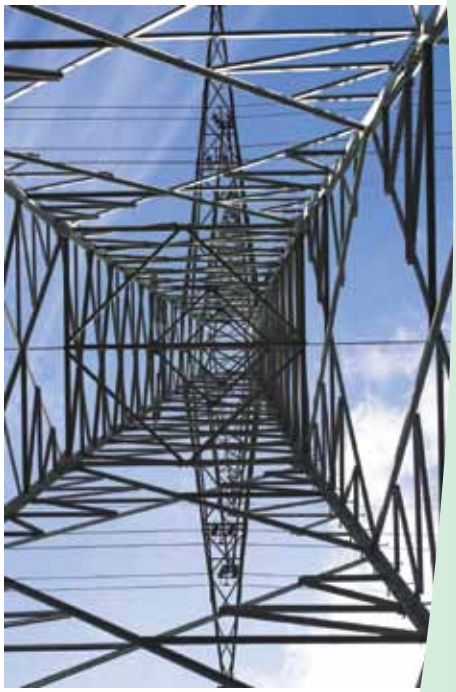
- Focuses on occupations that have most promising employment opportunities, both in terms of number of jobs and wages earned, in targeted region and industry sectors.
- Engages partners that represent key business and industry, local government, nonprofits and workforce and secondary/postsecondary education system stakeholders in program design and delivery.
- Program design enables students to pursue and succeed at achieving ALL of the following postsecondary/career milestones: an industry-recognized credential; one or more postsecondary certificates, one or more postsecondary degrees; transfer-readiness to four-year universities and/or employment.
- Utilizes a competency-based approach: curriculum is "stacked and/or latticed" whereby competencies build upon one another and postsecondary/career milestones occur at the point when competencies, collectively, have "market value" (e.g., employment value, industry-recognized credential value, university transfer value, etc.).
- Stacked and latticed certificates and degrees allow students to enter and exit at multiple points with corresponding career/postsecondary milestones at each exit point.
- Academic and technical curriculum is selected for the program of study based on its relevance to the targeted industry and occupational competencies including: math; English; workplace skills; information literacy; technology literacy; and gateway liberal arts courses in the social sciences, life sciences, arts and humanities.
- Multiple means for accelerating student progression is employed — recognizing that individuals may have already acquired competencies and also recognizing multiple ways competencies can be acquired

— such as credit-by-exam, credit for military experience and/or other learning and articulated courses/programs.

- Work experience opportunities are incorporated (e.g. mentorships, internships, apprenticeships, cooperative education, etc.).
- Integrates multiple, supportive strategies to ensure students achieve career/postsecondary milestones.

Stacking and Latticing Certificates and Degrees

Building courses, certificates and degrees into green programs of study, all of which stack within a pathway as the student progresses, provides students with clear on and off ramps to meet their specific needs and goals at different points in their lives and careers. High quality programs of study should also include an option for "latticing" these credentials, which is non-linear and allows for side-to-side credentialing. This option creates opportunities for students to earn certificates but at some point, add or shift to another related program of study to pursue different or additional postsecondary, industry credentials or career options.



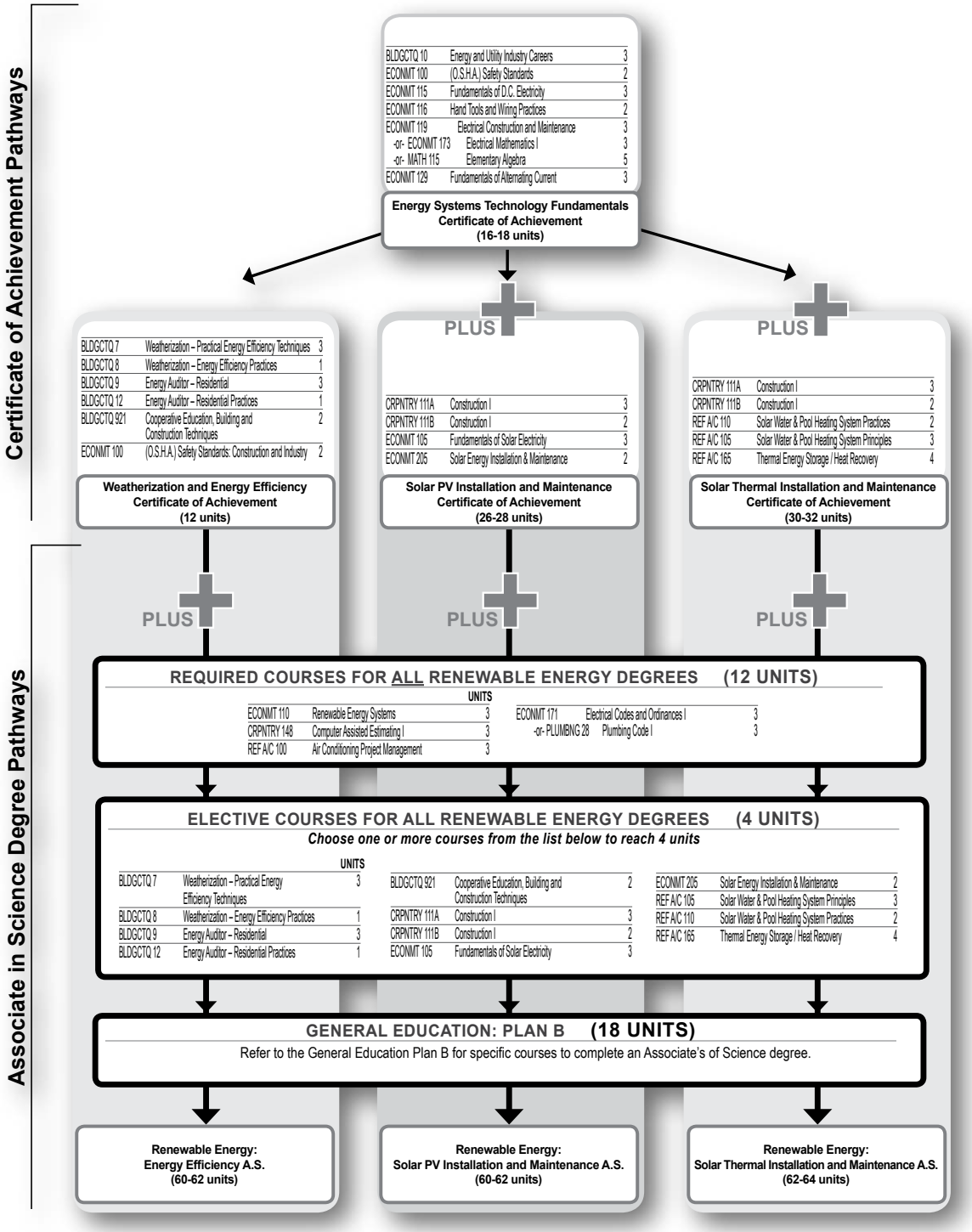
Although number of courses, "stacks" and/or "lattices" and length to completion vary by program of study; the following are typical of these types of programs of study: 1) a "fundamentals" program, which focuses on building industry-wide and industry-sector skills and competencies; 2) a "core technical" certificate program, which focuses on building occupation-specific skills and competencies and 3) associate degree programs, which focuses on advanced technical skills and includes liberal arts courses which are also transferrable to universities and articulated bachelor's degrees. After completing each certificate/degree program, participants are prepared to enter and/or advance in the

workforce, obtain industry-recognized credentials and/or continue their education to earn additional postsecondary credentials.

The full details of how to develop stacked and latticed degrees and certificates are quite complex and beyond the scope of this guide. However, the general principles of competency-based curriculum development should be followed: competencies determine scope, depth and breadth of programs of study; the point at which a collection of competencies has "market value" is the point where certificate/degrees are terminated and shared competencies between courses/programs provides opportunities for stacking and latticing curriculum. For example, when looking at the competencies, it might be apparent there are some shared competencies at either the beginning or intermediate course levels between different programs of study. If so, there is opportunity for latticing these courses and/or for the development of a common or shared core curriculum between multiple programs of study. The most important thing to consider when developing stacked and latticed certificates and degrees is involving strategic partners in identifying key exit points where certificates and degrees translate into market value in terms of employment, obtaining industry credentials, transferring to four-year degree programs, and so on. Making decisions on when certificate and degree terminate based on numbers of units earned rather than on meaningful competencies will result in marginal certificates when it comes to employment, career progression and/or transfer to four-year postsecondary institutions. LA Trade Tech has developed several stacked and latticed green programs of study utilizing these principles, such as those in the renewable energy certificate and degree pathways as illustrated.

. . . competencies determine scope, depth and breadth of programs of study; the point at which a collection of competencies has "market value" is the point where certificate/degrees are terminated and shared competencies between courses/programs provides opportunities for stacking and latticing curriculum.

RENEWABLE ENERGY CERTIFICATE AND DEGREE PATHWAYS



Action Step 4

Sustaining Green Programs of Study

An ultimate goal of creating quality green programs of study should be to ensure their market value both in the short- and long-term future. LA Trade Tech had to overcome the viewpoint of "we are committed to green as long as grants are available to pay for it," to be able to work towards long-term institutionalization. Institutionalization, for purposes of the Guide, means ensuring green programs of study are an integrated part of the college's culture and structure and adapt as needed to ensure continued relevance and market value for the college, community, employers and students.

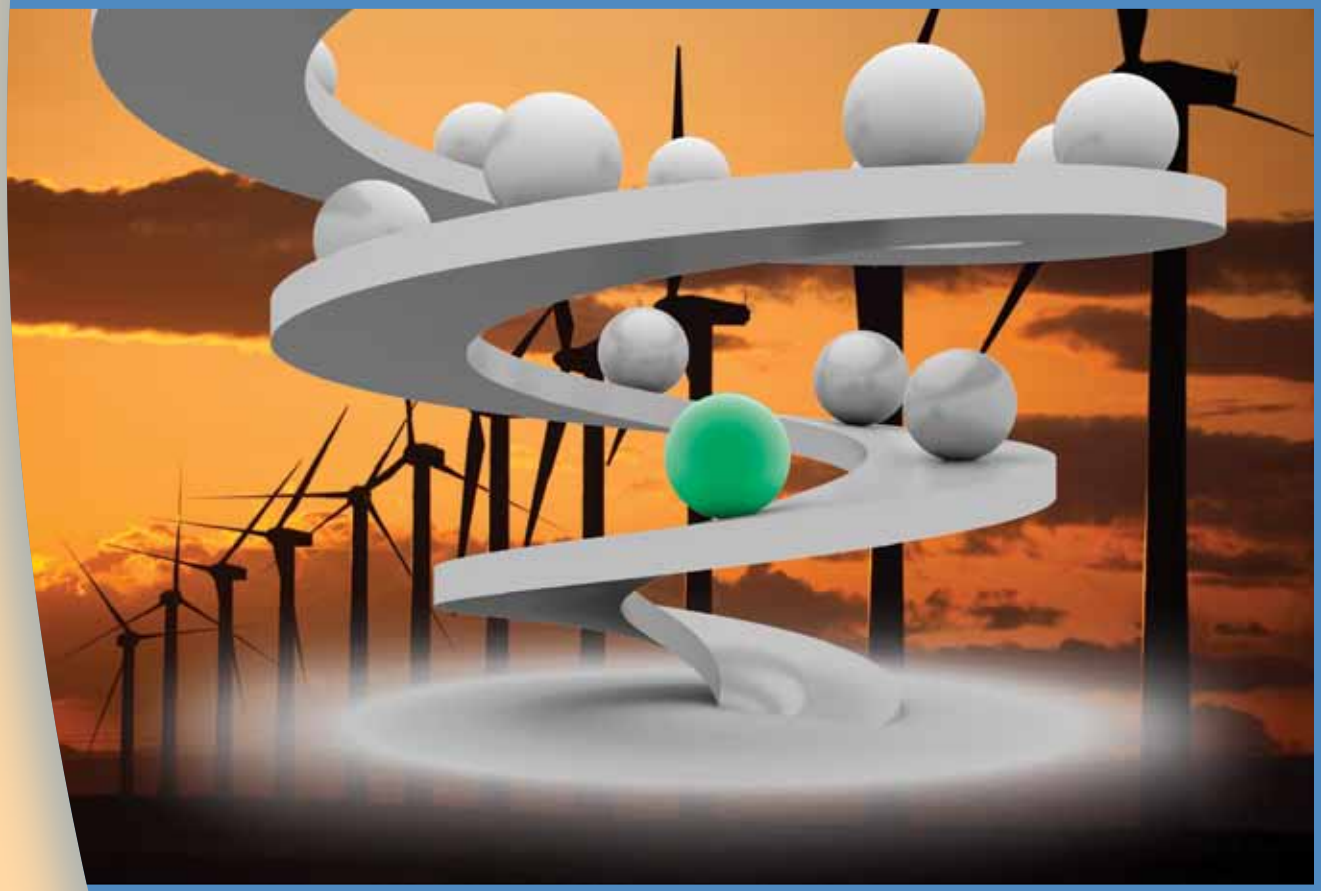
Fostering Institutionalization of Green Programs of Study

By conducting the competitive advantage analysis as part of the green program of study development process, described previously, programs that result will tap market demand and be supported by sufficient institutional capital which, in turn, fosters long-term institutionalization. Recall this analysis helps colleges identify how green programs can/are closely aligned with the college's values, vision, mission and broader sustainability efforts, which results in continued commitment and resources over time. Green programs that serve or involve more than a handful of individuals also will have sustained buy-in and support. Continuance of strategic external partnerships is also important for institutionalizing green programs. When colleges and partners have shared vision, goals, objectives and commitment for sustainability and green workforce development, long-term success is supported. This also reinforces the college's sustainability and green program of study development efforts. By taking these action steps, green will be incorporated in the "DNA" of the institution, according to the AACC Green Genome project (mentioned previously in the Guide).

For LA Trade Tech, we have recognized the ability to institutionalize green programs of study also goes beyond the program development processes and practices in the Guide, but also requires the institution to have the ability to:

• Clearly articulate, be dedicated to and achieve core mission and values of the institution related to green program of study development and sustainability; • Maintain a streamlined, efficient and effective operating structure to implement effective and quality green programming; • Develop the infrastructure and competencies required to manage complex partnerships; • Evolve a diverse financing base and infrastructure to manage multiple funding streams instead of relying one source and • Remain agile and add value within each chosen green area(s) of focus.

Conclusion



The overall goal of the Guide was to provide community colleges with a resource and tools to assist in the design of high quality green programs of study, recognizing that the development and implementation of a strategy may differ for each college. Therefore, the Guide was designed to be useful for those at the beginning of the process of greening existing programs or creating new green education and training programs, as well as for those that are working to enhance and/or sustain green programs already in place.

Formative and successful experiences of creating a comprehensive green program of study development strategy at LA Trade Tech served as the foundation for suggesting several steps colleges can implement to determine their competitive advantage (or "perfect storm of opportunity") and how to use the results of the analysis to create their own program of study development strategies. Several tools were specifically designed for the Guide with the primary one being the Competitive Advantage Analysis Tool. The Guide included insights on how the findings from this analysis can be used to inform the college about which green programs of study to augment, build and/or institutionalize, and to help prioritize decision-making regarding green program of study development.

…the approach is one that is transferable to any workforce development program or initiative as an innovative strategy for developing high quality programs of study.

Lastly, while the focus of this guide was on green program of study development, the approach is one that is transferable to any workforce development program or initiative as an innovative strategy for developing high quality programs of study.

Appendix A

Resource Lists

This Appendix includes the Resource Lists for each of the following topics: Technological Innovations & Advances, Public Policy, Public Demand/Public Will, Economic Conditions, Labor Market Information and Industry Competencies. These Lists represent a snapshot of available websites and other resources that can assist colleges with locating data on some of the factors that need to be considered. The List is not designed to be a comprehensive list and does not purport to contain all needed information, however, there are quite a number of useful resources and websites to get you started. While all of the links and content were up to date and active at the time of publication, data continually changes so some sites might not be accessible. It is suggested that the Resource Lists be augmented by the colleges' own Internet searches, practical experience and input from industry partners — all of which inform the program development process. The Resources Lists, which includes embedded links, can be accessed at: **http://college.lattc.edu/green/green-competitive-advantage-guide/**

Technological Innovation and Advances

Resource	Description
American Solar Energy Society (ASES) and Management Information Services, Inc. (MISI) www.ases.org/	American Solar Energy Society (ASES) leads national efforts to increase the use of solar energy, energy efficiency and other sustainable technologies in the U.S. They publish the award-winning SOLAR TODAY magazine, organize and present the ASES National Solar Conference and lead the ASES National Solar Tour – the largest grassroots solar event in the world.
Business Green Sustainable Thinking www.businessgreen.com/type/news/category/technology	Business Green Sustainable Thinking is a business website offering information on the latest news and best-practice advice on how companies can become more environmentally responsible, while still growing the all-important bottom line. This is a direct link to articles and information about innovations in the field.
California Energy Commission http://www.energy.ca.gov/	The California Energy Commission is the State's primary energy policy and planning agency. This site includes information on technological advances in a number of energy related industries.
Clean Edge, Inc. www.cleanedge.com/research	Clean Edge, Inc. is the world's first research and advisory firm devoted to the clean-tech sector. The firm delivers timely data, expert analysis and comprehensive insights. This link provides information about clean tech industry and technology trends by city, state and region.
Electric Power Research Institute www.epri.com	The Electric Power Research Institute, Inc. (EPRI) is an independent, nonprofit organization that conducts research and development relating to the generation, delivery and use of electricity for the benefit of the public as well as addressing challenges in electricity, including reliability, efficiency, health, safety and the environment. EPRI also provides technology, policy and economic analyses to drive long-range research and development planning and supports research in emerging technologies. Using this link click on "Our Work" tab and find a number of technological articles and resources for a number of electrical power generation industries.

Technological Innovation and Advances

Resource	Description
Environmental Leader www.environmentALLeader.com	Environmental Leader is the leading daily trade publication keeping corporate executives fully informed about energy, environmental and sustainability news. This site includes articles, research and reports about energy and environmental technology.
Greentech Media www.greentechmedia.com	Greentech Media delivers news, research and analysis in the business-to-business green tech market.
U.S. Department of Energy (DOE) Weatherization and Intergovernmental Program http://www1.eere.energy.gov/wip/wap.html	The U.S. Department of Energy (DOE) Weatherization and Intergovernmental Program provides funding and technical assistance to its partners in state and local governments, Indian tribes and international agencies to facilitate the adoption of renewable energy and energy efficiency technologies.
U.S. Environmental Protection Agency (EPA) www.epa.gov/gateway/science/sustainable.html	The U.S. Environmental Protection Agency's (EPA) mission is to protect human health and the environment. EPA is an agency with a variety of federal research, monitoring, standard-setting and enforcement activities to ensure environmental protection. This link provides information about sustainable practices in science and technology.

Public Policy

Resource	Description
American Council for an Energy Efficient Economy http://www.aceee.org/sector/state-policy	The American Council for an Energy-Efficient Economy is a nonprofit, 501(c)(3) organization that acts as a catalyst to advance energy efficiency policies, programs, technologies, investments and behaviors. ACEEE conducts in-depth technical and policy analyses, advises policymakers and program managers, works collaboratively with businesses, government officials, public interest groups and other organizations and other related activities. This link is to their State Energy Efficiency Policy Database, which is searchable by state and provides information on each state's energy efficiency policies.
Autoblog Green http://green.autoblog.com/category/legislation-and-policy/	Autoblog Green is a blog site, start on Earth Day 2006, that covers all environmentally-friendly automotive news. The blog link provides information related to legislation and policy influencing the green transportation industry.
Bipartisan Policy Center (PBC) http://bipartisanpolicy.org/projects/energy-project/strategic-energy-policy-initiative	The Bipartisan Policy Center (BPC) drives principled solutions through rigorous analysis, reasoned negotiation and respectful dialogue. The BPC combines politically-balanced policymaking with strong, proactive advocacy and outreach. This link is to BPC's Strategic Energy Policy Initiative provides information and reports related to energy policies.
Business Green Sustainable Thinking http://www.businessgreen.com/type/news/category/policy	Business Green Sustainable Thinking is a business website offering information on the latest news and best-practice advice on how companies can become more environmentally responsible, while still growing the all-important bottom line. This link will take you to articles and reports on Business Green's site related to policy.

Public Policy

Resource	Description
California Air Resources Board www.arb.ca.gov	The California Environmental Protection Agency is charged with developing, implementing and enforcing the state's environmental protection laws that ensure clean air, clean water clean soil, safe pesticides and waste recycling and reduction. Click on "Laws & Regulations" on the top menu bar for information on administrative hearings, policies and procedures, pollution control laws, stature compliance, air quality legislation and annual legislative summaries.
California Employment Development Department www.labormarketinfo.edd.ca.gov/article.asp?articleid=1215	The California Employment Development Department site provides a listing of all enacted or currently proposed green legislation in California.
California Energy Commission http://www.energy.ca.gov/energypolicy/	The California Energy Commission is the state's primary energy policy and planning agency. This link is to the California Energy Commission's reports on California's Energy Policies.
Electric Markets and Policy Group http://emp.lbl.gov/	The Electricity Markets and Policy Group (EMPG) conducts technical, economic and policy analysis of energy topics centered on the U.S. electricity sector. EMPG's current research seeks to inform public and private decision-making on public-interest issues related to energy efficiency and demand response, renewable energy, electricity resource and transmission planning and electricity reliability. The EMPG site includes information on policies related to electrical power generation and the electrical sector in general.
Database of State Incentives for Renewables & Efficiency (DSIRE) www.dsireusa.org	The Database of State Incentives for Renewables & Efficiency (DSIRE) is a comprehensive source of information on state, federal, local and utility incentives and policies that support renewable energy and energy efficiency. Established in 1995 and funded by the U.S. Department of Energy, DSIRE is an ongoing project of the North Carolina Solar Center and the Interstate Renewable Energy Council, Inc. The resources on the site are searchable by state.

Public Policy

Resource	Description
Electric Power Research Institute www.epri.com	The Electric Power Research Institute, Inc. (EPRI) conducts research and development relating to the generation, delivery and use of electricity for the benefit of the public. An independent, nonprofit organization, EPRI brings together its scientists and engineers as well as experts from academia and industry to help address challenges in electricity, including reliability, efficiency, health, safety and the environment. EPRI also provides technology, policy and economic analyses to drive long-range research and development planning and supports research in emerging technologies.
Green For All – Green Legislation and Policy http://greenforall.org/resources/reports-research/	Green For All is dedicated to improving the lives of all Americans through a clean energy economy. The organization works in collaboration with the business, government, labor and grassroots communities to increase quality jobs and opportunities in the green industry. The link is to their Reports and Research, which includes some reports on current and past legislation and policy initiatives.
Greentech Media **solar:** www.greentechmedia.com/articles/category/markets-and-policy **wind:** www.greentechmedia.com/articles/category/wind-markets-policy **energy:** www.greentechmedia.com/articles/category/policy	Greentech Media provides media feeds and articles for the growing green economy. The links are to Greentech Media's content on policies around solar, wind and energy.

Public Policy

Resource	Description
National Association of Regulatory Utility Commissioners (NARUC) http://www.naruc.org/Policy/	The National Association of Regulatory Utility Commissioners (NARUC) is a non-profit organization dedicated to representing the State public service commissions who regulate the utilities that provide essential services such as energy, telecommunications, water, and transportation. This link is to the section which summarizes NARUC's resolutions, federal testimony, federal advocacy and legal filings.
National Association of State Energy Officials (NASEO) www.naseo.org	The National Association of State Energy Officials (NASEO) was created by the states to improve the effectiveness and quality of state energy programs and policies, provide policy input and analysis, share successes among the states and to be a repository of information on issues of particular concern to the states and their citizens. The site includes some broad-based discussions of energy policies.
National Electrical Contractors Association (NECA) www.necanet.org/take-action/	National Electrical Contractors Association (NECA) supports a comprehensive industry education program by training electricians through apprenticeship and helping contractors improve their management and business operation skills. This link is to NECA's Legislation page, which describes the work of their Government Affairs staff to ensure that policies and legislation focus on top industry issues and policies that directly affect their business.
Red, Green and Blue: Environmental Politics Across the Spectrum http://redgreenandblue.org/category/topics/policy-topics/	Red, Green and Blue is nonprofit internet blog which provides an opportunity for sustainability experts, journalists (both citizen- and professional freelancers), industry leaders and other information-sharers to reach audiences, in a way that positively informs the humanity-wide discussion of important topics. Articles about a myriad of related policy topics can be accessed through this link.

Public Policy

Resource	Description
Regulatory Assistance Project www.raponline.org	The Regulatory Assistance Project (RAP) is a global, non-profit team of experts focused on the long-term economic and environmental sustainability of the power and natural gas sectors, providing assistance to government officials on a broad range of energy and environmental issues. They conduct in-house research and produce a growing volume of publications designed to better align energy regulation with economic and environmental goals. Search for "policy" or other related terms on their searchable site for articles related to policies around energy efficiency, climate control, clean energy and related topics.
The Environmental Defense Fund http://www.edf.org/climate/policy	Environmental Defense Fund's (EDF) mission is to preserve the natural systems on which all life depends. Guided by science and economics, EDF finds practical and lasting solutions to the most serious environmental problems. The link is to the EDF's climate policy and resources page, which includes reports on key policy initiatives related to climate change.
U.S. Department of Energy www.energy.gov http://energy.gov/savings	The U.S. Department of Energy's purpose is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions. This link provides information about energy policies related to tax credits, rebates and savings, searchable by state.
U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE): Energy Efficiency & Renewable Energy in My State http://apps1.eere.energy.gov/states/	The U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) provides State energy efficiency and renewable energy information including statistics, renewable resource maps, policies and incentives and U.S. Department of Energy projects and activities. This link to the "Energy Efficiency & Renewable Energy in My State" section provides state-level information about U.S. Department of Energy projects and activities, energy statistics, renewable energy resource maps, policies, rebates and incentives.

Public Policy

Resource	Description
U.S. Department of Labor Recovery Portal www.dol.gov/recovery/	The U.S. Department of Labor Recovery Portal has a collection information and reports related to the American Recovery and Reinvestment Act of 2009. This link provides an overview of the Act, as well as implementation descriptions.
U.S. Environmental Protection Agency Green Infrastructure http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm	The U.S. Environmental Protection Agency's (EPA) mission is to protect human health and the environment. EPA is an agency with a variety of federal research, monitoring, standard-setting and enforcement activities to ensure environmental protection. Click on the "Laws and Regulations" tabs at the top of each section for policies related to that sector.

Public Demand/Public Will

Resource	Description
Alliance to Save Energy http://ase.org/	The Alliance to Save Energy is a nonprofit organization that promotes energy efficiency worldwide through research, education and advocacy. It encourages business, government, environmental and consumer leaders to use energy efficiency as a means to achieve a healthier economy, a cleaner environment and greater energy security.
BlueGreen Alliance www.bluegreenALLiance.org	The BlueGreen Alliance advocates the growth in the number and quality of jobs in the clean economy by expanding a broad range of industries, including renewable energy, energy efficiency, the substitution of safer, cleaner chemicals, modern transportation systems and advanced vehicle technology, domestic manufacturing, high-speed Internet and a smart, efficient electrical grid, green schools and other public buildings, improving our nation's water infrastructure, recycling and sustainable agriculture.
Build-It-Green – The Certified Green Building Professional (CGBP) Build-It-Green CGBP www.builditgreen.org/cgbp	Build It Green is a membership-supported Bay Area (California) nonprofit, which works with building and real estate professionals, local and state governments and homeowners to increase awareness and adoption of green building practices. Build It Green's mission is to promote healthy, energy- and resource-efficient building practices in California through outreach and education.
Green for All - Community of Practice http://greenforall.org/programs/communities-of-practice/	Green For All is dedicated to improving the lives of all Americans through a clean energy economy. The organization works in collaboration with the business, government, labor and grassroots communities to increase quality jobs and opportunities in the green industry. The Communities of Practice Program link connects leaders to one another so they can share ideas, foster innovation and create results. The program brings together professionals with on-the-ground experience and national experts to shape and advance cutting-edge practices for growing an inclusive green economy.

Public Demand/Public Will

Resource	Description
GreenSage.com – http://www.greensage.com/ezine/ezineFrontPage.html	The Green Sage blog spot focuses on sustainable living and green building, products and experts. Posted information can be used to determine the level of interest and demand for green products and sustainable living.
American Solar Energy Society: Solar Citizen http://www.ases.org/solar-citizen/	Established in 1954, the nonprofit American Solar Energy Society (ASES) is the nation's leading association of solar professionals and advocates. Its mission is to inspire an era of energy innovation and speed the transition to a sustainable energy economy through advancing education, research and policy. The link is to the Solar Citizen page on the site, which claims to be "Building the renewable energy movement from the ground up!" This site is to provide information and support and to share success stories of Americans who have embraced solar energy.
U.S. Environmental Protection Agency – Green infrastructure http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm	The U.S. Environmental Protection Agency's (EPA) mission is to protect human health and the environment. EPA is an agency with a variety of federal research, monitoring, standard-setting and enforcement activities to ensure environmental protection.

Economic Conditions

Resource	Description
Business Green Sustainable Thinking http://www.businessgreen.com/type/news/category/investment	Business Green Sustainable Thinking is a business website offering information on the latest news and best-practice advice on how companies can become more environmentally responsible, while still growing the all-important bottom line. This link is to articles and reports about investments and other economic issues related to the green economy.
CB Insights online venture capital blog www.cbinsights.com/blog/category/venture-capital	CB insights is a tool for those engaged in private equity, venture capital, corporate development, investment banking, corporate innovation and strategy, angel investment and consulting. This link is to reports about investments and other economic issues related to the green economy.
National Portal www.recovery.gov/	This website was created under the Recovery Act to show the American public how Recovery funds are being spent by recipients of contracts, grants and loans and the distribution of Recovery entitlements and tax benefits.
Regulatory Assistance Project (RAP) www.raponline.org	Regulatory Assistance Project (RAP) is a source of innovative and creative thinking that yields practical solutions. RAP meets directly with government officials, regulators and their staffs; leads technical workshops and training sessions; conducts in-house research and produces a growing volume of publications designed to better align energy regulation with economic and environmental goals. Some content is included on the site about cost recovery programs, economic indicators and other economic factors.

Economic Conditions

Resource	Description
The Environmental Defense Fund http://www.edf.org/climate/californias-growing-green-economy	Environmental Defense Fund's (EDF) mission is to preserve the natural systems on which all life depends. Guided by science and economics, EDF finds practical and lasting solutions to the most serious environmental problems. The link is to the Green Economy section of the site, which primarily focuses on California's AB 32 Global Warming Solutions Act and its impact on business and industry.
U.S. Department of Energy http://energy.gov/	The U.S. Department of Energy's purpose is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions.
U.S. Department of Energy (DOE's) Weatherization Assistance Program (WAP) http://www1.eere.energy.gov/wip/wap.html	The U.S. Department of Energy (DOE) Weatherization and Intergovernmental Program provides funding and technical assistance to its partners in state and local governments, Indian tribes and international agencies to facilitate the adoption of renewable energy and energy efficiency technologies.

Labor Market Information

Resource	Description
Advanced Technology Environmental and Energy Center www.ateec.org	The Advanced Technology Environmental and Energy Center focuses on the advancement of environmental and energy technology education through curriculum, professional and program development and improvement.
American Green Jobs Website www.americangreenjobs.com	The American Green Jobs website provides links to green related job opportunities.
California Apprenticeship Coordinators Association – Trade and apprenticeship programs www.calapprenticeship.org/	The California Apprenticeship Coordinators Association is a Registered Apprenticeship system that provides a directory to apprenticeship programs for all trades as well as career information.
California EDD Recovery Portal http://www.edd.ca.gov/Jobs_and_Training/	The California EDD Recovery Portal site provides links to green related jobs and training opportunities.
California EDD Green Page – Understanding the Green Economy http://www.labormarketinfo.edd.ca.gov/	The California EDD Green Page site provides an overview of California's labor market information.
California Green Jobs Council www.cwib.ca.gov/sc_green_collar_jobs_council.htm	The Green Collar Jobs Council is tasked with understanding the current and future workforce needs of the green/clean economy, developing a comprehensive strategy to prepare California's workforce to meet the needs of businesses supporting the economy and ensure that efforts aimed at improving worker's skills are coordinated and effective.
Careers in Green Construction, 2011 www.bls.gov/green/construction/construction.pdf	The U.S. Bureau of Labor and Statistics' "Careers in Green Construction" article examines various occupations in green construction.

Labor Market Information

Resource	Description
Ecological Society of America - Job postings, internships and fellowships http://www.esa.org/careers_certification/employment.php	The Ecological Society of America provides publication, certification and training information and other resources for ecological science. This link goes to green related jobs and internship opportunities.
Economic Modeling Specialist Intl. (EMSI) www.economicmodeling.com	Economic Modeling Specialists Intl. (EMSI) provides high-quality employment data and economic analysis via web tools and custom reports. They also produce comprehensive impact analyses for colleges and universities in the US and internationally.
Environmental Leader http://energy-environment-jobs.environmentalleader.com/a/jbb/find-jobs	Environmental Leader is a daily trade publication keeping corporate executives informed about energy, environmental and sustainability news. This link goes to the listing of energy and environmental related job opportunities.
Environmental Career www.environmentalcareer.info/index.asp	The Environmental Career site provides links to green related job opportunities.
Eco Employ www.ecoemploy.com	The Eco Employ site provides links to green related job opportunities.
Green Career Tracks www.greencareertracks.com/	Green Career Tracks promotes careers that support environmental, economic and social justice.
Great Green Careers www.greatgreencareers.com/	Great Green Careers connects employers and job seekers in the green jobs industries.
Green Biz http://jobs.greenbiz.com/	The Green Biz site provides links to green related job opportunities.
Green Careers Guide www.greencareersguide.com/Good-Green-Jobs.html	The Green Careers Guide site contains a comprehensive database of articles on green jobs, links to green training locations as well as links to green related job opportunities.
Green Careers Partnership www.greencareerspartnership.org/	The Green Careers Partnership mission is to create pathways to prosperity in clean, green technology through a multi-stakeholder partnership that focuses on fostering job creation.

Labor Market Information

Resource	Description
Green Collar Blog http://www.greencollarblog.org/	The Green Collar Blog provides links to green related job opportunities and green articles.
Green Dream Jobs www.greendreamjobs.org	The Green Dream Jobs site provides links to green related job opportunities.
Green Energy Jobs Online. com www.greenenergyjobsonline.com/	The Green Energy Jobs Online site provides links to green related job opportunities.
Green Jobs California http://greenjobscalifornia.org/green-careers	Green Jobs California site was developed by Environmental Defense Fund (EDF) and is a resource for job seekers, students, guidance counselors, policy makers and anyone else interested in joining or learning more about the growing green economy, particularly in the Los Angeles region.
Green Job Spider www.greenjobspider.com	Green Job Spider enables job seekers to search jobs from multiple green job boards and other sources in a single search.
Green Jobs Network http://www.greenjobs.net/	The Green Jobs Network site provides links to green related job opportunities.
Green Teams Engaging Employees In Sustainability www.neefusa.org/pdf/greenbiz-reports-GreenTeams.pdf	This Green Team report provides a summary of the emerging trends and outlines 10 best practices for green teams.
Green Technologies and Practices —August 2011 www.bls.gov/news.release/pdf/gtp.pdf	This U.S. Department of Labor and Statistics report provides information on the use of green technologies and practices in business.
Green Workforce and Training http://energy.ca.gov/cleanenergyjobs/careers.html	The California Energy Commission is the state's primary energy policy and planning agency. Created by the Legislature in 1974 and located in Sacramento, six basic responsibilities guide the Energy Commission as it sets state energy policy. This link goes to a directory of green jobs sites.

Labor Market Information

Resource	Description
Greenjobsearch www.Greenjobsearch.org	The Green Job Search site provides links to green related job opportunities
GreenStart Job Board - Sponsored by the American Solar Energy Society http://www.ases.org/green-jobs/	The American Solar Energy Society (ASES) leads national efforts to increase the use of solar energy, energy efficiency and other sustainable technologies in the U.S. It publishes the SOLAR TODAY magazine, organizes and presents the ASES National Solar Conference and leads the ASES National Solar Tour. This link goes to the ASES green job board.
Green Career Central www.greencareercentral.com/	Green Career Central guides you as you embark on a journey to identify, articulate and land the green career that brings you opportunities to contribute your expertise to the essential issues of our time.
Interstate Renewable Energy Council (IREC) www.irecusa.org	Interstate Renewable Energy Council (IREC), a non-profit corporation, works with industry, government, educators and other stakeholders to ensure that the broader use of renewable energies is possible, safe, affordable and practical for us all. IREC's successes are embedded in national energy policies and in updated utility and industry standards and best practices. Click on "Solar instructor training network" or "Workforce development" for training information.
Los Angeles Trade-Technical College: Green College Initiative Website http://college.lattc.edu/green/	Los Angeles Trade-Technical College's resources on green related initiatives, training, education and other related topics.
Los Angeles Trade-Technical College: Short-Term Training Opportunities (including green training) http://college.lattc.edu/jobtraining/	Los Angeles Trade-Technical College's green related job training opportunities.

Labor Market Information

Resource	Description
Measuring Green Jobs www.bls.gov/green/home.htm	The Measuring Green Jobs website provides information on the BLS green jobs initiative, the status of survey development, the BLS green jobs definition, a link to career information for selected green jobs and other information.
North American Association for Environmental Education Environmental http://eelinked.naaee.net/n/eelink-jobs	The North American Association for Environmental Education Environmental site provides links to green related job opportunities.
O*NET Online www.onetonline.org	The O*NET program is the nation's primary source of occupational information. Central to the project is the O*NET database, containing information on hundreds of standardized and occupation-specific descriptors. The database, which is available to the public at no cost, is continually updated by surveying a broad range of workers from each occupation. Information from this database forms the heart of O*NET OnLine, an interactive application for exploring and searching occupations. The database also provides the basis for their Career Exploration Tools, a set of valuable assessment instruments for workers and students looking to find or change careers.
O*NET Resource Center www.onetcenter.org/green.html	This O*NET link provides comprehensive occupational descriptions and data for use by job seekers, workforce development offices, human resources professionals, students, researchers and others.
Residential Energy Services Network (RESNET) http://www.resnet.us/	The Residential Energy Services Network (RESNET) is an independent, non-profit organization committed to helping homeowners reduce the cost of their utility bills by making their homes more energy efficient. RESNET is responsible for creating the national training and certification standards for HERS Raters and Home Energy Survey Professionals, both are recognized by federal government agencies such as the U.S. Department of Energy, the U.S. Environmental Protection Agency and the U.S. mortgage industry.

Labor Market Information

Resource	Description
Riley Guide http://www.rileyguide.com/env.html#env	The Riley Guide provides links to sites with green related job opportunities.
Solar Career Map www1.eere.energy.gov/solar/careermap	The U.S. Department of Energy (DOE) Solar Program focuses on achieving the goals of the SunShot Initiative, which seeks to make solar energy cost-competitive with other forms of electricity by the end of the decade. This link goes to solar career map which explores solar-energy occupations, describing diverse jobs across the industry, charting possible progression between them and identifying the high-quality training needed for these occupations.
Sustainable Business www.sustainablebusiness.com/index.cfm/go/greendreamjobs.main	The Sustainable Business site provides links to green related job opportunities.
The Environmental Defense Fund's Green Economy Map www.edf.org/cagreen	Environmental Defense Fund's (EDF) mission is to preserve the natural systems on which all life depends. Guided by science and economics, EDF finds practical and lasting solutions to the most serious environmental problems. This link goes to the "California's growing green economy" page which contains reports on the green economy as well as a snapshot map of the state's green economic growth.
Tree Hugger http://jobs.treehugger.com	TreeHugger is a media outlet dedicated to driving sustainability mainstream and acts as a one-stop shop for green news, solutions and product information. This link goes to green related job opportunities.

Labor Market Information

Resource	Description
U.S. Department of Labor – Bureau of Labor Statistics www.bls.gov/green/#overview	The Bureau of Labor Statistics of the U.S. Department of Labor is the principal Federal agency responsible for measuring labor market activity, working conditions and price changes in the economy. Its mission is to collect, analyze and disseminate essential economic information to support public and private decision-making. As an independent statistical agency, BLS serves its diverse user communities by providing products and services that are objective, timely, accurate and relevant.
U.S. Green Building Council http://new.usgbc.org/resources/list/reports	The U.S. Green Building Council (USGBC) is a 501(c)(3) nonprofit organization committed to a prosperous and sustainable future for our nation through cost-efficient and energy-saving green building. This link goes to the "Resources" page that houses several reports related to the green labor market.
Veterans Green Jobs http://veteransgreenjobs.org	Veterans Green Jobs connects military veterans of all eras with training and employment opportunities in the green sector economy. They also directly employ veterans. View descriptions of their programs and read testimonials from veterans who have participated in their programs.

Industry Competencies and Credentials

Resource	Description
Advanced Technology Environmental and Energy Center www.ateec.org	The Advanced Technology Environmental and Energy Center focuses on the advancement of environmental and energy technology education through curriculum, professional and program development and improvement.
Center for Energy Workforce Development (CEWD) www.cewd.org/documents/energymodel.pdf	The CEWD framework, which articulates utility career requirements from eligibility and interpersonal skills to industry- and occupation-specific technical competencies, can be adapted by training networks for other utility careers. This link goes to the Building Block Competencies for Energy Careers newsletter.
Ecological Society of America http://www.esa.org/careers_certification/employment.php	The Ecological Society of America provides publication, certification and training information and other resources for ecological science. This link goes to the Ecologist Certification Information page.
Green Careers – Workforce Development Council of Seattle and King County, Washington http://www.mapyourcareer.org/green/	Green Careers site lists the entry-level, middle-level and higher-level green occupations in six industry sectors. In addition, information is provided on the experience, skills and education required for each occupation. This link goes to a regional career mapping resource.
Los Angeles Trade-Technical College: **Short-Term Training Opportunities (including green training)** http://college.lattc.edu/jobtraining/	Los Angeles Trade-Technical College's green related job training opportunities.
Los Angeles Trade-Technical College: **Green College Initiative Website** http://college.lattc.edu/green/	Los Angeles Trade-Technical College's resources on green related initiatives, training, education and other related topics.

Industry Competencies and Credentials

Resource	Description
North American Board of Certified Energy Practitioners (NABCEP) http://www.nabcep.org/	The North American Board of Certified Energy Practitioners (NABCEP) is the "gold standard" for PV and Solar Heating Installation and PV Technical Sales Certification. Raising industry standards and promoting consumer confidence, NABCEP offers certification and certificate programs to renewable energy professionals throughout North America.
O*Net OnLine http://www.onetcenter.org/ladders.html	Using O*Net's occupational search feature, one can locate an overall description and the tasks, tools and technology; knowledge, skills, abilities work activities associated with green occupations. This information can be downloaded to enable further data analysis. For deeper research and analysis, the O*Net production and analyst databases can be downloaded from the O*Net Resource Center. This link goes to the Career Ladders and Lattices resource page.
Oregon's Green Statewide Career Pathway Roadmaps http://www.oregongreenpathways.org/	The Oregon's Green Statewide Career Pathway Roadmaps provides existing and emerging green career maps and occupations with specific and detailed information on the skills needed for these careers.
Solar Career Map – Interstate Renewable Energy Council http://www1.eere.energy.gov/solar/careermap/	The Solar Career Map – Interstate Renewable Energy Council visual interactive career map explores 36 solar-energy occupations deemed essential to building a robust, high quality solar industry, describing diverse jobs across the industry, charting possible progression between them and identifying the high-quality training necessary to do them well.
U.S. Department of Labor – Competency Model Clearinghouse www.careeronestop.org/CompetencyModel/	Sponsored by the U.S. Department of Labor, the Competency Model Clearinghouse provides validated industry competency models and tools to build a custom model and career ladder/lattice. Also available are user guides for developing competency models, other useful resources and links to competency models developed.
U.S. Department of Labor – Competency Model Clearinghouse www.careeronestop.org/credentialing/credentialinghome.asp www.careerinfonet.org/certifications_new/Default.aspx	Sponsored by the U.S. Department of Labor, the Certification Finder and the Occupations Licensed tool are useful for locating information on certifications, credentials, and licensures.

Appendix B

Competitive Advantage Analysis Tool

This Appendix includes samples of the External and Internal Factor Summary Sheets and the Competitive Advantage Analysis Tool (CAAT). We have included an example of the blank forms, as well as the two samples for solar energy and wind energy that were referred to in the Guide. The content in the samples represent information available to LA Trade Tech circa 2007 - 08, when LA Trade Tech was in the beginning stages of the development of green education programs.

The External and Internal Factor Summary Forms (fillable Word file), and the complete Competitive Advantage Analysis Tool (fillable Excel file), which includes Instructions, External and Internal Factor rating questionnaires and the Factor Analysis spider diagram, can be accessed and downloaded from: http://college.lattc.edu/green/green-competitive-advantage-guide/

Competitive Advantage Analysis Tool

Determining areas of competitive advantage for a college is done through careful analysis of data gathered about key external and internal factors. This analysis considers the inter-relationship between and the combined strength of these key factors which collectively represent an area of competitive advantage for a college when determining which green programs of study have the greatest market value. Using data gathered, rate the favorability of elements related to each external and internal factor on a scale of one (1) to five (5).

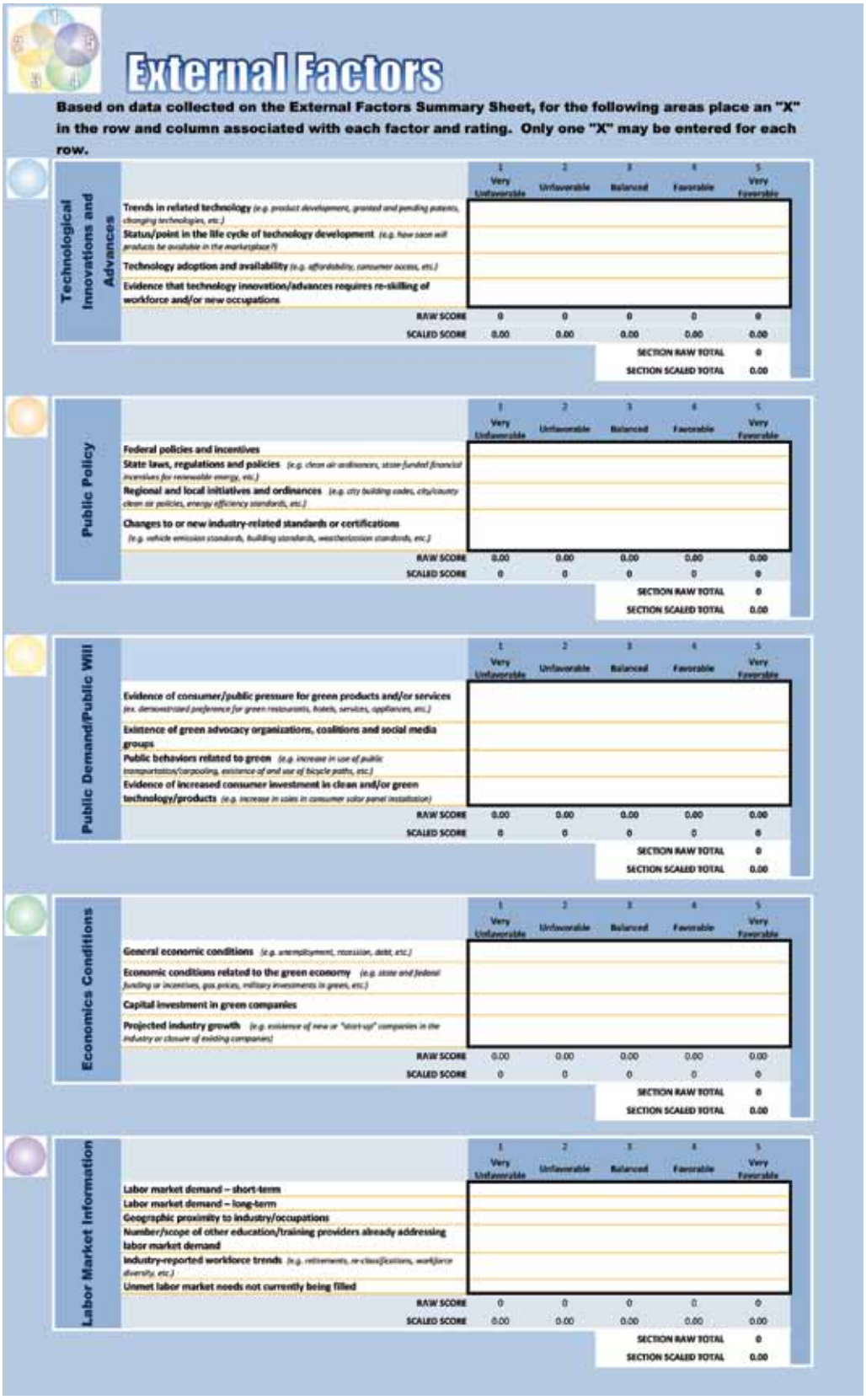
The Guide entitled "*Defining Your College's Competitive Advantage in the Emerging Green Economy: A Blueprint for Building High Quality, Green Programs of Study* (Los Angeles Trade-Technical College, 2013) provides additional resources to assist with this analysis. It is suggested that the Internal and External Factors Summary Sheets, included with the Guide, be used as a reference when determining ratings. In addition, the "Questions to Consider" in the Guide can assist with further reflection. This tool is designed to focus on one industry or green program of study at a time. Colleges considering multiple industries and/or programs of study should complete an analysis for each one separately.

Enter One Industry of Interest

It is recommended that several individuals complete this worksheet independently then come together to compare results and reach consensus on conclusions. Including individuals who do not have a "vested interest" in the results such as the college researcher, faculty/administrators from other program areas, business/industry advisors, etc. is strongly encouraged.

The CAAT is divided into three sections with navigation buttons on the top on each worksheet. Select one of the links below to begin.

External Factors | Internal Factors | Factor Analysis



External Factors

Based on data collected on the External Factors Summary Sheet, for the following areas place an "X" in the row and column associated with each factor and rating. Only one "X" may be entered for each row.

Technological Innovations and Advances

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Trends in related technology *(e.g. product development, granted and pending patents, changing technologies, etc.)*					
Status/point in the life cycle of technology development *(e.g. how soon will products be available in the marketplace?)*					
Technology adoption and availability *(e.g. affordability, consumer access, etc.)*					
Evidence that technology innovation/advances requires re-skilling of workforce and/or new occupations					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
SECTION RAW TOTAL					0
SECTION SCALED TOTAL					0.00

Public Policy

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Federal policies and incentives					
State laws, regulations and policies *(e.g. clean air ordinances, state-funded financial incentives for renewable energy, etc.)*					
Regional and local initiatives and ordinances *(e.g. city building codes, city/county clean air policies, energy efficiency standards, etc.)*					
Changes to or new industry-related standards or certifications *(e.g. vehicle emission standards, building standards, weatherization standards, etc.)*					
RAW SCORE	0.00	0.00	0.00	0.00	0.00
SCALED SCORE	0	0	0	0	0
SECTION RAW TOTAL					0
SECTION SCALED TOTAL					0.00

Public Demand/Public Will

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Evidence of consumer/public pressure for green products and/or services *(ex. demonstrated preference for green restaurants, hotels, services, appliances, etc.)*					
Existence of green advocacy organizations, coalitions and social media groups					
Public behaviors related to green *(e.g. increase in use of public transportation/carpooling, existence of and use of bicycle paths, etc.)*					
Evidence of increased consumer investment in clean and/or green technology/products *(e.g. increase in sales in consumer solar panel installation)*					
RAW SCORE	0.00	0.00	0.00	0.00	0.00
SCALED SCORE	0	0	0	0	0
SECTION RAW TOTAL					0
SECTION SCALED TOTAL					0.00

Economics Conditions

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
General economic conditions *(e.g. unemployment, recession, debt, etc.)*					
Economic conditions related to the green economy *(e.g. state and federal funding or incentives, gas prices, military investments in green, etc.)*					
Capital investment in green companies					
Projected industry growth *(e.g. existence of new or "start-up" companies in the industry or closure of existing companies)*					
RAW SCORE	0.00	0.00	0.00	0.00	0.00
SCALED SCORE	0	0	0	0	0
SECTION RAW TOTAL					0
SECTION SCALED TOTAL					0.00

Labor Market Information

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Labor market demand – short-term					
Labor market demand – long-term					
Geographic proximity to industry/occupations					
Number/scope of other education/training providers already addressing labor market demand					
Industry-reported workforce trends *(e.g. retirements, re-classifications, workforce diversity, etc.)*					
Unmet labor market needs not currently being filled					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
SECTION RAW TOTAL					0
SECTION SCALED TOTAL					0.00

Competitive Advantage Analysis Tool

Internal Factors

Based on data collected on the Internal Factors Summary Sheet, for the following areas place an "X" in the row and column associated with each factor and rating. Only one "X" may be entered for each row.

College Plans, Priorities and Initiatives

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Green-related vision and goal(s) are included in college plans *(e.g. strategic plan, educational master plan, mission, green initiative, etc.)*					
Sustainability and green programs of study are short and/or long-term college objectives					
College has a standing committee(s) and/or working group(s) responsible for oversight of sustainability and green program objectives					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
				SECTION RAW TOTAL	0
				SECTION SCALED TOTAL	0.00

Educational Programs and Leadership

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Reputation in industry and/or related areas					
Uniqueness of related programs					
Existing/related curriculum and/or feasibility of developing new curriculum					
Existing/related facilities and/or feasibility of acquiring					
Existing equipment and supplies and/or feasibility of acquiring					
Faculty/staff expertise in existing/related fields					
Alignment with long-term programmatic objectives *(e.g. program growth, diversification, improving reputation, re-engineering program design and/or delivery, etc.)*					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
				SECTION RAW TOTAL	0
				SECTION SCALED TOTAL	0.00

Resources to Support and Sustain Programs

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Existing or feasibility of acquiring funding to develop program *(e.g. Perkins, reallocating other college funding, etc.)*					
Existing or feasibility of start-up capital resources *(e.g. facilities, equipment)*					
Existing or feasibility of start-up operational resources *(e.g. professional development, curriculum development, etc.)*					
Existing or feasibility of commitment from industry or other partners to support program through funding or in-kind donations					
Existing or feasibility of on-going resources to support program delivery and continuance					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
				SECTION RAW TOTAL	0
				SECTION SCALED TOTAL	0.00

Strategic Partnerships with Industry

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Existing or feasibility of developing employer partnerships *(e.g. current sector-based initiatives, industry advisories, etc.)*					
Existing or feasibility of developing community and/or other strategic partnerships *(e.g. labor organizations, industry associations, local and regional community leaders, credentialing/accrediting agencies, etc.)*					
Track record of developing and maintaining strategic partnerships					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
				SECTION RAW TOTAL	0
				SECTION SCALED TOTAL	0.00

Institutional Buy-in

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Key administrator/staff implementer interest					
Champions to commit to advocating for and/or implementing green programs					
Supportive or feasibility of developing/adopting supportive and flexible policies and procedures *(e.g. faculty union contract, flexible curriculum development policies and procedures, etc.)*					
Constituents view green programs of study as contributing to long-term objectives *(e.g. green-college initiatives, sustainability policies, academic/CTE integration, college/community initiatives, etc.)*					
RAW SCORE	0	0	0	0	0
SCALED SCORE	0.00	0.00	0.00	0.00	0.00
				SECTION RAW TOTAL	0
				SECTION SCALED TOTAL	0.00

Appendix C

Competitive Advantage Analysis Tool
Solar Energy Sample

The authors of this Guide did not have the benefit of the use of the Competitive Advantage Tool in 2008 when LA Trade Tech was determining which programs of study to develop. However, we did engage in the process that is described in this Guide. Examining reports that were completed by REDI and the recollections of those involved in the early activities of the Green College Initiative, this Sample represents the facts considered in the decision to develop solar energy programs of study.

External Factors Summary Sheet

SOLAR SAMPLE

The following External Factors Summary Sheet for the solar energy industry is a sample of one that would have been completed by LA Trade Tech in 2008, as we were considering the green programs of study on which to focus. It is based on actual data and information available to us at the time.

1 Technological Innovations and Advances

There are a number of technological advances that are related to solar technology including the recent patent of the photo voltaic cell, rainbow solar cells and the boron nitride nanotube (loaded polymer and OVPSs). CA accounted for 44% of all US patents in solar and 37% in wind.

NASA recently published their research into Quantum Dots for Solar Cells, which will expand exponentially the power of solar energy. However, this will require further research and development will likely not have an impact on the industry until 2015.

2 Public Policy

AB 32 – The Global Warming Solutions Act of 2006; mandates that California limit its greenhouse emissions back below 1990 standards by 2020.

SB1 – The Million Solar Roofs Bill provides funding, incentives, and mandates to increase solar panels throughout the state.

HR 2847- Green Jobs Act of 2007; an act to move the US to greater energy efficiency.

3 Public Demand/ Public Will

The Los Angeles Business Council (LABC) created a solar working group consisting of civic leaders in the private, environmental and educational sectors to investigate the promise of a solar feed-in tariff (FiT) policy in Los Angeles. A FIT allows businesses and residents to install solar panels on their roofs and sell the power generated back to the local utility. The CLEAN LA solar plan is a comprehensive, fully researched proposal that has won support from business, community, labor and environmental group.

4 Economic Conditions

Crude oil and gasoline prices have provided strong incentives to find alternative forms of energy. In the last 10 years, energy prices have tripled, along with the average price per barrel of crude oil.

High rates of unemployment and economic crisis looming.

5 Labor Market Information

Based on a January 2008 survey of 212 of the 772 solar businesses and companies tied to the solar industry located in California, solar businesses and businesses tied to the solar industry, solar occupations in greatest demand will grow by an average of 77% in the six-county Southern California Region in the next 12 months.

Renewable energy was ranked as the most important technology of those that were tested.

Based on Economic Roundtable Jobs in L.A.'s Green technology Sector, there are 92 Green technology Businesses related to solar power in Los Angeles.

Internal Factors Summary Sheet

SOLAR SAMPLE

The following Internal Factors Summary Sheet for the solar energy industry is a sample of one that would have been completed by LA Trade Tech in 2008, as we were considering the green programs of study on which to focus. It is based on a realistic assessment of the college's institutional capital at that time.

1 College Plans and Strategic Initiatives

College has a Green College Initiative, including a plan for workforce development. There are some enthusiastic faculty and staff, but the support is not broad-based across constituencies.

The VP of Academic Affairs and the Director of College Facilities both sit on the District's Sustainability Committee.

2 Educational Programs and Leadership

LA Trade Tech offers a myriad of construction programs including building, plumbing, carpentry, architecture tech, electrical construction, etc. Courses about basic electrical and power generation principles are in place.

LA Trade Tech's construction department is well known and respected in the community.

There are no faculty members already familiar with alternative energy or solar technology.

Although there are no existing facilities or equipment in place, space is available on the rooftop of the "B" building for an outdoor solar lab. Space for an indoor lab is possible in the "F" building.

3 Resources

Perkins funds for innovation and equipment.

4 Strategic Partnerships with Industry

Through REDI, LATTC has a long-term partnership with local public and investor owned utility companies including DWP, Sempra, PG & E and others.

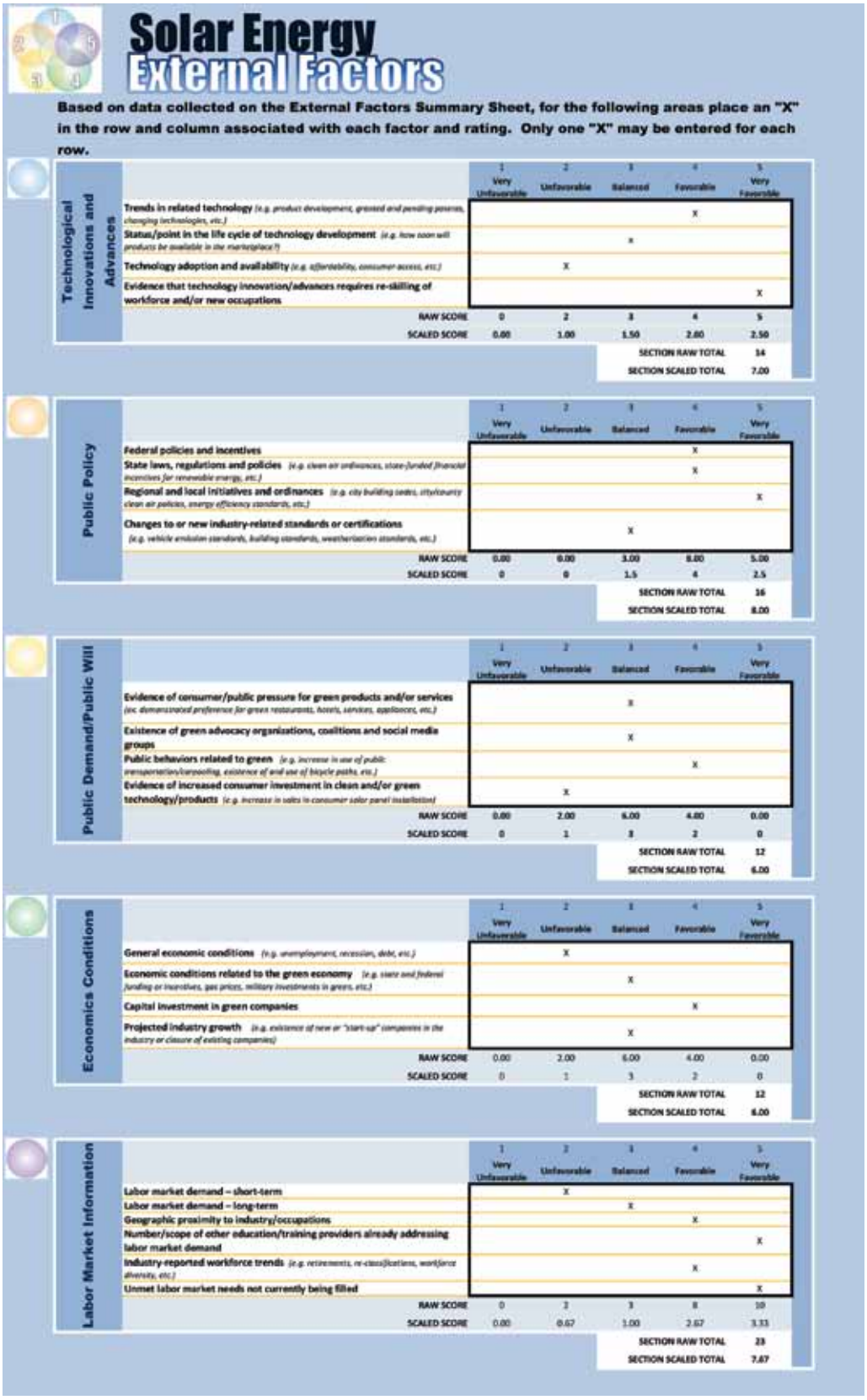
Strong partnerships with labor unions.

No established relationships with solar companies. Can develop an advisory group based on solar companies found during the industry scan.

5 Institutional Buy-in

The following "champions" have been identified: Dean of Workforce Development, Chair of the Construction Design and Manufacturing department; and two faculty members from CDM department. The President is generally supportive of building renewable energy programs.

The CDM department chair is very interested in exploring green construction and solar related renewable energy; however there may be some resistance from faculty, if resources become an issue.



Solar Energy External Factors

Based on data collected on the External Factors Summary Sheet, for the following areas place an "X" in the row and column associated with each factor and rating. Only one "X" may be entered for each row.

Technological Innovations and Advances

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Trends in related technology *(e.g. product development, grossed and pending patents, changing technologies, etc.)*				X	
Status/point in the life cycle of technology development *(e.g. how soon will products be available in the marketplace?)*			X		
Technology adoption and availability *(e.g. affordability, consumer access, etc.)*		X			
Evidence that technology innovation/advances requires re-skilling of workforce and/or new occupations					X
RAW SCORE	0	2	3	4	5
SCALED SCORE	0.00	1.00	1.50	2.00	2.50
SECTION RAW TOTAL					14
SECTION SCALED TOTAL					7.00

Public Policy

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Federal policies and incentives				X	
State laws, regulations and policies *(e.g. clean air ordinances, state-funded financial incentives for renewable energy, etc.)*				X	
Regional and local initiatives and ordinances *(e.g. city building codes, city/county clean air policies, energy efficiency standards, etc.)*					X
Changes to or new industry-related standards or certifications *(e.g. vehicle emission standards, building standards, weatherization standards, etc.)*			X		
RAW SCORE	0.00	0.00	3.00	8.00	5.00
SCALED SCORE	0	0	1.5	4	2.5
SECTION RAW TOTAL					16
SECTION SCALED TOTAL					8.00

Public Demand/Public Will

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Evidence of consumer/public pressure for green products and/or services *(ex. demonstrated preference for green restaurants, hotels, services, appliances, etc.)*			X		
Existence of green advocacy organizations, coalitions and social media groups			X		
Public behaviors related to green *(e.g. increase in use of public transportation/carpooling, existence of and use of bicycle paths, etc.)*				X	
Evidence of increased consumer investment in clean and/or green technology/products *(e.g. increase in sales in consumer solar panel installation)*		X			
RAW SCORE	0.00	2.00	6.00	4.00	0.00
SCALED SCORE	0	1	3	2	0
SECTION RAW TOTAL					12
SECTION SCALED TOTAL					6.00

Economics Conditions

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
General economic conditions *(e.g. unemployment, recession, debt, etc.)*		X			
Economic conditions related to the green economy *(e.g. state and federal funding or incentives, gas prices, military investments in green, etc.)*			X		
Capital investment in green companies				X	
Projected industry growth *(e.g. existence of new or "start-up" companies in the industry or closure of existing companies)*			X		
RAW SCORE	0.00	2.00	6.00	4.00	0.00
SCALED SCORE	0	1	3	2	0
SECTION RAW TOTAL					12
SECTION SCALED TOTAL					6.00

Labor Market Information

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Labor market demand – short-term		X			
Labor market demand – long-term			X		
Geographic proximity to industry/occupations				X	
Number/scope of other education/training providers already addressing labor market demand					X
Industry-reported workforce trends *(e.g. retirements, re-classifications, workforce diversity, etc.)*				X	
Unmet labor market needs not currently being filled					X
RAW SCORE	0	2	3	8	10
SCALED SCORE	0.00	0.67	1.00	2.67	3.33
SECTION RAW TOTAL					23
SECTION SCALED TOTAL					7.67

Solar Energy Internal Factors

Based on data collected on the Internal Factors Summary Sheet, for the following areas place an "X" in the row and column associated with each factor and rating. Only one "X" may be entered for each row.

College Plans, Priorities and Initiatives

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Green-related vision and goal(s) are included in college plans *(e.g. strategic plan, educational master plan, mission, green initiative, etc.)*				X	
Sustainability and green programs of study are short and/or long-term college objectives				X	
College has a standing committee(s) and/or working group(s) responsible for oversight of sustainability and green program objectives					X
RAW SCORE	0	0	0	8	5
SCALED SCORE	0.00	0.00	0.00	5.33	3.33
				SECTION RAW TOTAL	13
				SECTION SCALED TOTAL	8.67

Educational Programs and Leadership

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Reputation in industry and/or related areas				X	
Uniqueness of related programs				X	
Existing/related curriculum and/or feasibility of developing new curriculum		X			
Existing/related facilities and/or feasibility of acquiring				X	
Existing equipment and supplies and/or feasibility of acquiring		X			
Faculty/staff expertise in existing/related fields		X			
Alignment with long-term programmatic objectives *(e.g. program growth, diversification, improving reputation, re-engineering program design and/or delivery, etc.)*					X
RAW SCORE	0	6	0	12	5
SCALED SCORE	0.00	1.71	0.00	3.43	1.43
				SECTION RAW TOTAL	23
				SECTION SCALED TOTAL	6.57

Resources to Support and Sustain Programs

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Existing or feasibility of acquiring funding to develop program *(e.g. Perkins, reallocating other college funding, etc.)*				X	
Existing or feasibility of start-up capital resources *(e.g. facilities, equipment)*				X	
Existing or feasibility of start-up operational resources *(e.g. professional development, curriculum development, etc.)*			X		
Existing or feasibility of commitment from industry or other partners to support program through funding or in-kind donations		X			
Existing or feasibility of on-going resources to support program delivery and continuance			X		
RAW SCORE	0	1	2	2	0
SCALED SCORE	0.00	0.80	2.40	3.20	0.00
				SECTION RAW TOTAL	5
				SECTION SCALED TOTAL	6.40

Strategic Partnerships with Industry

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Existing or feasibility of developing employer partnerships *(e.g. current sector-based initiatives, industry advisories, etc.)*	X				
Existing or feasibility of developing community and/or other strategic partnerships *(e.g. labor organizations, industry associations, local and regional community leaders, credentialing/accrediting agencies, etc.)*			X		
Track record of developing and maintaining strategic partnerships					X
RAW SCORE	1	0	3	0	5
SCALED SCORE	0.67	0.00	2.00	0.00	3.33
				SECTION RAW TOTAL	9
				SECTION SCALED TOTAL	6.00

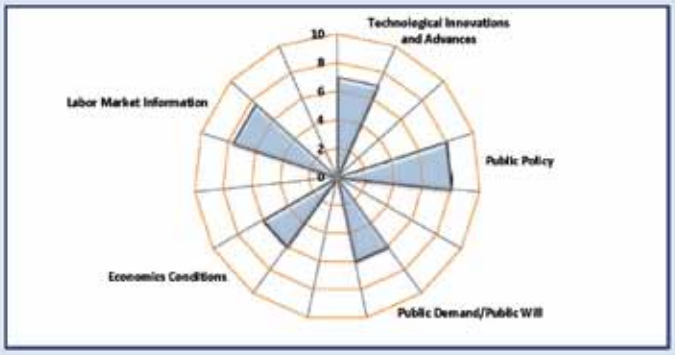
Institutional Buy-In

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Key administrator/staff implementer interest				X	
Champions to commit to advocating for and/or implementing green programs					X
Supportive or feasibility of developing/adopting supportive and flexible policies and procedures *(e.g. faculty union contract, flexible curriculum development policies and procedures, etc.)*				X	
Constituents view green programs of study as contributing to long-term objectives *(e.g. green college initiatives, sustainability policies, academic/CTE integration, college/community initiatives, etc.)*			X		
RAW SCORE	0	0	3	8	5
SCALED SCORE	0.00	0.00	1.50	4.00	2.50
				SECTION RAW TOTAL	16
				SECTION SCALED TOTAL	8.00

Solar Energy FACTORS DIAGRAMS

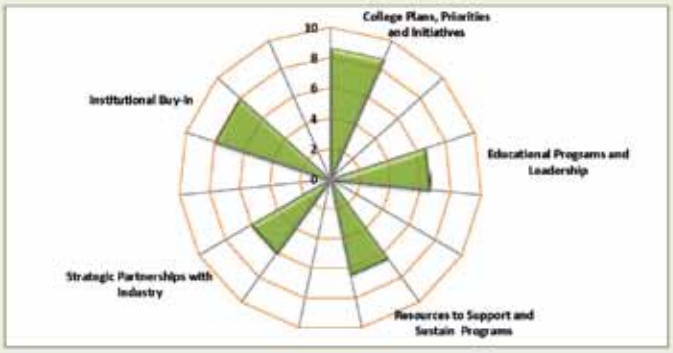
External Factors Spider Diagram

FACTORS	SCORE
Technological Innovations and Advances	7.00
Public Policy	8.00
Public Demand/Public Will	6.00
Economics Conditions	6.00
Labor Market Information	7.67



Internal Factors Spider Diagram

FACTORS	SCORE
College Plans, Priorities and Initiatives	8.67
Educational Programs and Leadership	6.57
Resources to Support and Sustain Programs	6.40
Strategic Partnerships with Industry	6.00
Institutional Buy-In	8.00



All Factors Spider Diagram

FACTORS	External	Internal
Technological Innovations and Advances	7.00	
Public Policy	8.00	
Public Demand/Public Will	6.00	
Economics Conditions	6.00	
Labor Market Information	7.67	
College Plans, Priorities and Initiatives		8.67
Educational Programs and Leadership		6.57
Resources to Support and Sustain Programs		6.40
Strategic Partnerships with Industry		6.00
Institutional Buy-In		8.00

Competitive Advantage Analysis Tool • Solar Energy Sample

The External and Internal Factor Summary Sheets include data and information that were available when LA Trade Tech was first considering the development of green programs of study. The information included in this Sample is an edited version of the information. It is likely that as a college engages in this process, there will be more data and detailed information that one might include on the Summary Sheets. The downloadable Summary Sheet templates posted at http://college.lattc.edu/green/green-competitive-advantage-guide/ allows for multiple pages of data to be included. Most who have piloted the use of the External and Internal Summary Sheets have indicated that they are most useful when bullet lists or short statements are used.

As one can see, when considering the External Factors, several were rated as Favorable or Very Favorable, with several rated as Balanced and only a few rated as Unfavorable. The lack of evidence of actual adoption and widespread availability of solar energy technology, the lack of evidence for consumer demand and the lack of data to support the need for short-term labor market were of concern. However, the favorable factors including the trends in technology advances and product development; federal, state and local policy support that were specifically targeted towards the use of solar energy; the labor market trends in data reported by our utility industry partners and the fact that there were no other educational and training providers already addressing the labor demand, outweighed the unfavorable factors.

The CAAT Solar Energy External Factors Diagram visually presents this information. One can see that the Labor Market Demand and Public Policy are the strongest factors, however, where there were some concerns and lower favorability ratings with the remaining factors, those are still relatively favorable.

When looking at the Internal Factors, the fact that LA Trade Tech had included the Green College Initiative in college master plans; had favorable Institutional Buy-In; and an existing Construction and Related Technology Department with an excellent reputation statewide and space for both and indoor and outdoor solar energy lab were all favorable factors. The lack of existing curriculum, equipment, supplies, as well as a lack of industry partners resulted in unfavorable ratings.

The All Factors Spider Diagram for Solar Energy visually demonstrates that this “web” is generally well developed, with many of the factors extending towards the outer edges, representing a competitive advantage. It also shows areas of potential challenges, which for solar energy seemed to be in the areas of Strategic Partnerships with Industry, Public Demand/Public Will and Economic Conditions. In actuality, these factors have indeed proven to the most challenging aspects of LA Trade Tech’s solar PV and solar thermal renewable energy programs of study.

Appendix D

Competitive Advantage Analysis Tool
Wind Energy Sample

The authors of this Guide did not have the benefit of the use of the Competitive Advantage Tool in 2008 when LA Trade Tech was determining which programs of study to develop. However, we did engage in the process that is described in this Guide. Examining reports that were completed by REDI and the recollections of those involved in the early activities of the Green College Initiative, this Sample represents the facts considered in the decision not to develop a wind energy program of study.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External Factors Summary Sheet

WIND SAMPLE

The following External Factors Summary Sheet for the wind energy industry is a sample of one that would have been completed by LA Trade Tech in 2008, as we were considering the green programs of study on which to focus. It is based on actual data and information available to us at the time.

1 Technological Innovations and Advances

Over 300 million dollars have been invested in clean technology companies in Los Angeles and Orange County. 45% of venture capital investments in energy technology invested in the U.S. went to firms in CA.

Information about patents related to wind technology were not apparent.

Urban wind technology solutions are not widely available.

2 Public Policy

AB 32 – The Global Warming Solutions Act of 2006; mandates that California limit its greenhouse emissions back below 1990 standards by 2020.

HR 2847- Green Jobs Act of 2007; an act to move the US to greater energy efficiency.

3 Public Demand/ Public Will

Although broad-based public demand and public will regarding clean energy can be concluded to be strong in Los Angeles, there is no specific indication that wind energy is a preferred solution.

4 Economic Conditions

Crude oil and gasoline prices have provided strong incentives to find alternative forms of energy. In the last 10 years, energy prices have tripled, along with the average price per barrel of crude oil.

High rates of unemployment and economic crisis looming.

Local energy companies are not utilizing wind as a renewable energy source.

5 Labor Market Information

Renewable energy was ranked as the most important technology of those that were tested.

Based on Economic Rountable Jobs in L.A.'s Green technology Sector, there are only 4 Green Technology Businesses related to wind power in Los Angeles County, only one of them is located in the City of Los Angeles.

This growth is projected to create fewer than 100 new jobs related to wind energy.

Internal Factors Summary Sheet

WIND SAMPLE

The following Internal Factors Summary Sheet for the wind energy industry is a sample of one that would have been completed by LA Trade Tech in 2008, as we were considering the green programs of study on which to focus. It is based on a realistic assessment of the college's institutional capital at that time.

1 College Plans and Strategic Initiatives	2 Educational Programs and Leadership	3 Resources	4 Strategic Partnerships with Industry	5 Institutional Buy-in
College has a Green College Initiative, including a plan for workforce development. There are some enthusiastic faculty and staff, but the support is not broad-based across constituencies. The VP of Academic Affairs and the Director of College Facilities both sit on the District's Sustainability Committee.	LA Trade Tech offers a myriad of construction programs including building, plumbing, carpentry, architecture tech, electrical construction, etc. Courses about basic electrical and power generation principles are in place. LATTC's construction department is well known and respected in the community. There are no faculty members familiar with wind energy or wind power technology. No existing facilities or equipment. No available space for wind energy equipment.	Perkins funds for innovation and equipment.	Through REDI, LATTC has a long-term partnership with public and investor owned utility companies including DWP, Sempra, PG & E and others. Strong partnerships with labor unions. No established relationships with wind generation or wind energy companies or related manufacturers. No companies located in the LA metropolitan area.	The following "champions" have been identified: VP of Academic Affairs, Dean of Workforce Development, Chair of the Construction Design and Manufacturing Department.; and two faculty members from CDM. The President is generally supportive of building renewable energy programs. The CDM Department Chair is hesitant regarding building wind energy programs.

Wind Energy External Factors

Based on data collected on the External Factors Summary Sheet, for the following areas place an "X" in the row and column associated with each factor and rating. Only one "X" may be entered for each row.

Technological Innovations and Advances

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Trends in related technology *(e.g. product development, granted and pending patents, changing technologies)*			X		
Status/point in the life cycle of technology development *(e.g. how soon will products be available in the marketplace?)*		X			
Technology adoption and availability *(e.g. affordability, consumer access, etc.)*		X			
Evidence that technology innovation/advances requires re-skilling of workforce and/or new occupations			X		
RAW SCORE	0	4	6	0	0
SCALED SCORE	0.00	2.00	3.00	0.00	0.00
SECTION RAW TOTAL					10
SECTION SCALED TOTAL					5.00

Public Policy

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Federal policies and incentives				X	
State laws, regulations and policies *(e.g. clean air ordinances, state-funded financial incentives for renewable energy, etc.)*				X	
Regional and local initiatives and ordinances *(e.g. city building codes, city/county clean air policies, energy efficiency standards, etc.)*					X
Changes to or new industry-related standards or certifications *(e.g. vehicle emission standards, building standards, weatherization standards, etc.)*			X		
RAW SCORE	0.00	0.00	3.00	8.00	5.00
SCALED SCORE	0	0	1.5	4	2.5
SECTION RAW TOTAL					16
SECTION SCALED TOTAL					8.00

Public Demand/Public Will

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Evidence of consumer/public pressure for green products and/or services *(ex. demonstrated preference for green restaurants, hotels, services, appliances etc.)*			X		
Existence of green advocacy organizations, coalitions and social media groups		X			
Public behaviors related to green *(e.g. increase in use of public transportation/carpooling, existence of and use of bicycle paths, etc.)*			X		
Evidence of increased consumer investment in clean and/or green technology/products *(e.g. increase in sales in consumer solar panel installation*	X				
RAW SCORE	1.00	2.00	6.00	0.00	0.00
SCALED SCORE	0.5	1	3	0	0
SECTION RAW TOTAL					9
SECTION SCALED TOTAL					4.50

Economics Conditions

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
General economic conditions *(e.g. unemployment, recession, debt, etc.)*		X			
Economic conditions related to the green economy *(e.g., state and federal funding or incentives, gas prices, military investments in green, etc.)*			X		
Capital investment in green companies			X		
Projected industry growth *(e.g. existence of new or "start-up" companies in the industry or closure of existing companies)*		X			
RAW SCORE	0.00	4.00	6.00	0.00	0.00
SCALED SCORE	0	2	3	0	0
SECTION RAW TOTAL					10
SECTION SCALED TOTAL					5.00

Labor Market Information

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Labor market demand – short-term	X				
Labor market demand – long-term			X		
Geographic proximity to industry/occupations	X				
Number/scope of other education/training providers already addressing labor market demand				X	
Industry-reported workforce trends *(e.g. retirements, re-classifications, workforce diversity, etc.)*		X			
Unmet labor market needs not currently being filled			X		
RAW SCORE	2	2	6	4	0
SCALED SCORE	0.67	0.67	2.00	1.33	0.00
SECTION RAW TOTAL					14
SECTION SCALED TOTAL					4.67

Wind Energy Internal Factors

Based on data collected on the Internal Factors Summary Sheet, for the following areas place an "X" in the row and column associated with each factor and rating. Only one "X" may be entered for each row.

College Plans, Priorities, and Initiatives

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Green-related vision and goal(s) are included in college plans *(e.g. strategic plan, educational master plan, mission, green initiative, etc.)*				X	
Sustainability and green programs of study are short and/or long-term college objectives				X	
College has a standing committee(s) and/or working group(s) responsible for oversight of sustainability and green program objectives					X
RAW SCORE	0	0	0	8	5
SCALED SCORE	0.00	0.00	0.00	5.33	3.33
				SECTION RAW TOTAL	13
				SECTION SCALED TOTAL	8.67

Educational Programs and Leadership

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Reputation in industry and/or related areas			X		
Uniqueness of related programs				X	
Existing/related curriculum and/or feasibility of developing new curriculum		X			
Existing/related facilities and/or feasibility of acquiring	X				
Existing equipment and supplies and/or feasibility of acquiring		X			
Faculty/staff expertise in existing/related fields		X			
Alignment with long-term programmatic objectives *(e.g. program growth, diversification, improving reputation, re-engineering program design and/or delivery, etc.)*			X		
RAW SCORE	1	6	6	4	0
SCALED SCORE	0.29	1.71	1.71	1.14	0.00
				SECTION RAW TOTAL	17
				SECTION SCALED TOTAL	4.86

Resources to Support and Sustain Programs

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Existing or feasibility of acquiring funding to develop program *(e.g. Perkins, reallocating other college funding, etc.)*				X	
Existing or feasibility of start-up capital resources *(e.g. facilities, equipment)*				X	
Existing or feasibility of start-up operational resources *(e.g. professional development, curriculum development, etc.)*			X		
Existing or feasibility of commitment from industry or other partners to support program through funding or in-kind donations		X			
Existing or feasibility of on-going resources to support program delivery and continuance			X		
RAW SCORE	0	1	2	2	0
SCALED SCORE	0.00	0.80	2.40	3.20	0.00
				SECTION RAW TOTAL	5
				SECTION SCALED TOTAL	6.40

Strategic Partnerships with Industry

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Existing or feasibility of developing employer partnerships *(e.g. current sector-based initiatives, industry advisories, etc.)*	X				
Existing or feasibility of developing community and/or other strategic partnerships *(e.g. labor organizations, industry associations, local and regional community leaders, credentialing/accrediting agencies, etc.)*	X				
Track record of developing and maintaining strategic partnerships					X
RAW SCORE	2	0	0	0	5
SCALED SCORE	1.33	0.00	0.00	0.00	3.33
				SECTION RAW TOTAL	7
				SECTION SCALED TOTAL	4.67

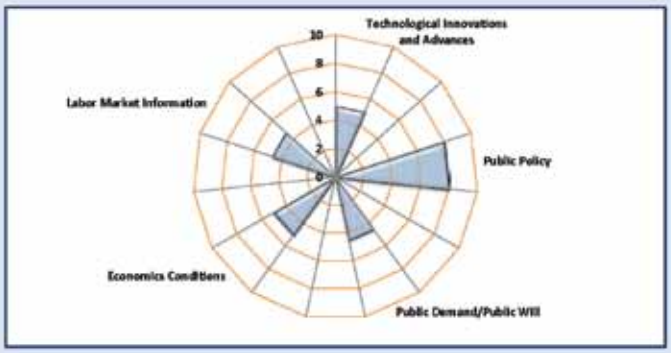
Institutional Buy-In

	1 Very Unfavorable	2 Unfavorable	3 Balanced	4 Favorable	5 Very Favorable
Key administrator/staff implementer interest				X	
Champions to commit to advocating for and/or implementing green programs			X		
Supportive or feasibility of developing/adopting supportive and flexible policies and procedures *(e.g. faculty union contract, flexible curriculum development policies and procedures, etc.)*				X	
Constituents view green programs of study as contributing to long-term objectives *(e.g. green college initiatives, sustainability policies, academic/CTE integration, college/community initiatives, etc.)*			X		
RAW SCORE	0	0	6	8	0
SCALED SCORE	0.00	0.00	3.00	4.00	0.00
				SECTION RAW TOTAL	14
				SECTION SCALED TOTAL	7.00

Wind Energy FACTORS DIAGRAMS

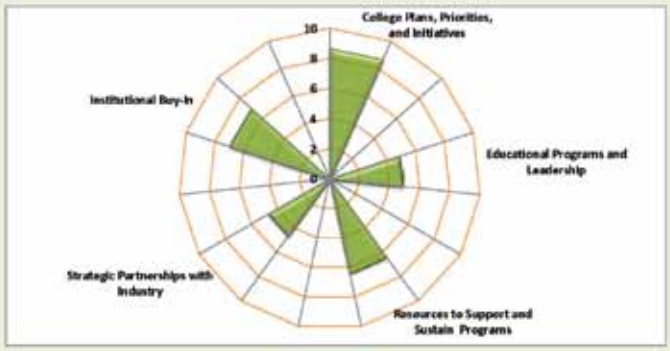
External Factors Spider Diagram

FACTORS	SCORE
Technological Innovations and Advances	5.00
Public Policy	8.00
Public Demand/Public Will	4.50
Economics Conditions	5.00
Labor Market Information	4.67



Internal Factors Spider Diagram

FACTORS	SCORE
College Plans, Priorities, and Initiatives	8.67
Educational Programs and Leadership	4.86
Resources to Support and Sustain Programs	6.40
Strategic Partnerships with Industry	4.67
Institutional Buy-In	7.00



All Factors Spider Diagram

FACTORS	External	Internal
Technological Innovations and Advances	5.00	
Public Policy	8.00	
Public Demand/Public Will	4.50	
Economics Conditions	5.00	
Labor Market Information	4.67	
College Plans, Priorities, and Initiatives		8.67
Educational Programs and Leadership		4.86
Resources to Support and Sustain Programs		6.40
Strategic Partnerships with Industry		4.67
Institutional Buy-In		7.00

Competitive Advantage Analysis Tool • Wind Energy Sample

The External and Internal Factor Summary Sheets include data and information that were available when LA Trade Tech was first considering the development of green programs of study. The information included in this Sample is an edited version of the information. It is likely that as a college engages in this process, there will be more data and detailed information that one might include on the Summary Sheets. The downloadable Summary Sheet templates posted at http://college.lattc.edu/green/green-competitive-advantage-guide/ allows for multiple pages of data to be included. Most who have piloted the use of the External and Internal Summary Sheets have indicated that they are most useful when bullet lists or short statements are used.

As one can see, when considering the External Factors, a few were rated as Favorable or Very Favorable, with several rated as Balanced, yet many were rated as Unfavorable. The favorable factors were very similar to those in the Solar Energy example in were mostly in the areas of federal, state and local policy which were supportive of renewable energy in general, yet none were geared specifically for wind energy. The rest of the External Factors were rated as Balanced or Unfavorable. The indication that wind energy technology development was years away from widespread availability and the fact that broad based consumer access was limited, were of concern. The short-term labor market demand was generally unfavorable in the local community; even though there was some indication of potential jobs in the long-term market analysis, the data were somewhat weak.

The CAAT Wind Energy External Factors Diagram visually presents this information. One can see that the Public Policy Factor was strong, but all other factors were relatively weak.

When looking at the Internal Factors, many of factors are rated the same as for Solar Energy, however, there are some key differences. In terms of the Educational Programs and Leadership, the lack of an existing wind energy lab, or a suitable place to put one, was considered to be a very unfavorable factor. Further, although LA Trade Tech had relationships with local utility companies, none were exploring wind energy as a source of renewable energy therefore Strategic Partnerships with Industry was also rated as very unfavorable. And although Institutional Buy-In for green was generally high, the support for wind energy was tepid and a "champion" for this particular type of renewable energy did not emerge.

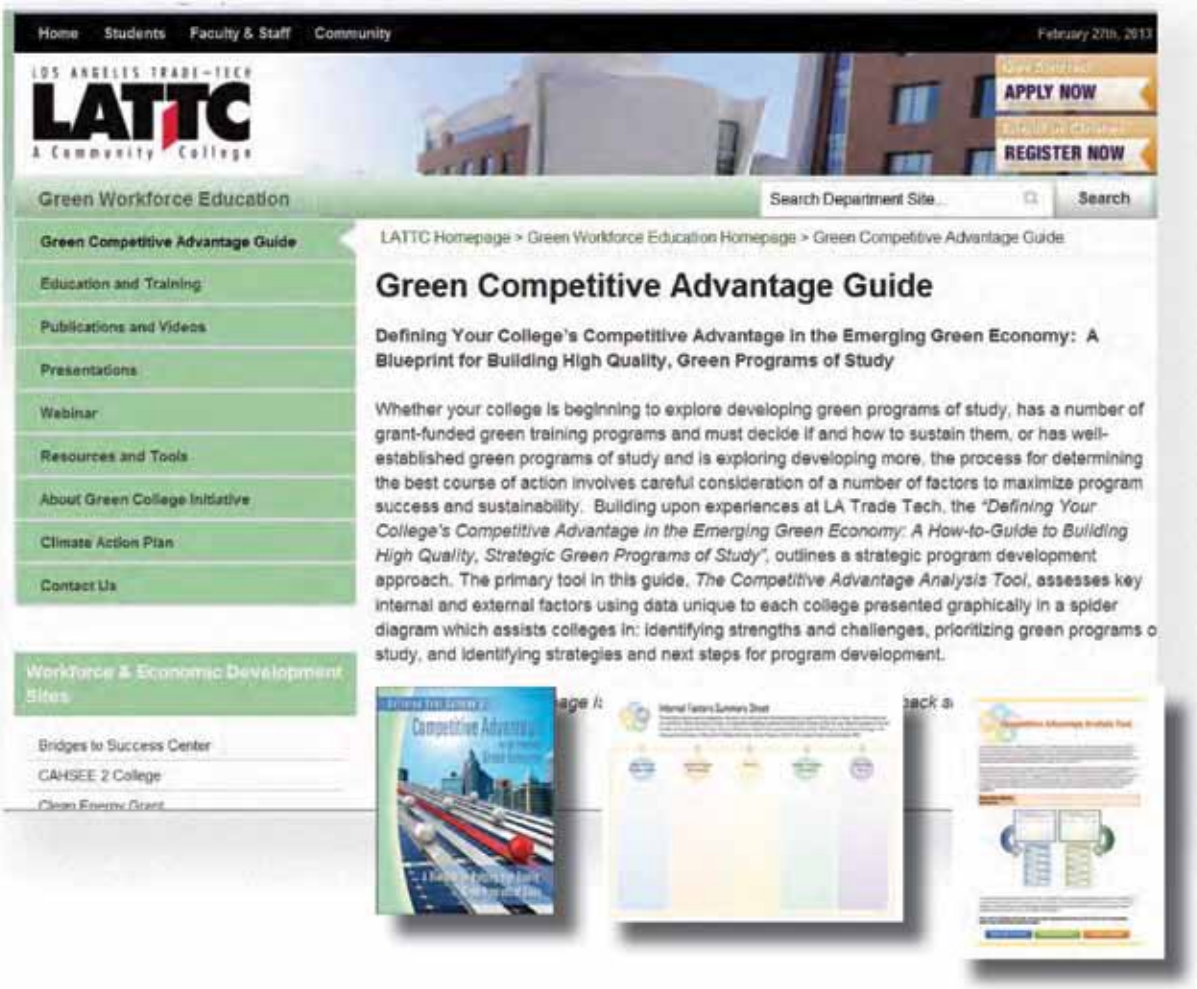
The All Factors Spider Diagram for Wind Energy visually demonstrates that this "web" is generally not as strong as the college might have hoped. While the Public Policy Factor, the College Plans, Priorities and Initiatives and, the Resources to Support and Sustain Programs and Institutional Buy-In factors were all relatively strong, all of the other factors seemed to be problematic. As a result, LA Trade Tech decided not to develop a wind energy option in its renewable energy certificate and degree program of study.

Links

... to the Guide, Tools and Resource Lists

The Guide along with the tools and resources discussed can be accessed through the Green Competitive Advantage Guide tab on Los Angeles Trade-Technical College's Green Workforce Education webpage.

http://college.lattc.edu/green/green-competitive-advantage-guide/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Green Competitive Advantage Guide
Defining Your College's Competitive Advantage in the Emerging Green Economy: A Blueprint for Building High Quality, Green Programs of Study
Whether your college is beginning to explore developing green programs of study, has a number of grant-funded green training programs and must decide if and how to sustain them, or has well-established green programs of study and is exploring developing more, the process for determining the best course of action involves careful consideration of a number of factors to maximize program success and sustainability. Building upon experiences at LA Trade Tech, the "Defining Your College's Competitive Advantage in the Emerging Green Economy: A How-to-Guide to Building High Quality, Strategic Green Programs of Study", outlines a strategic program development approach. The primary tool in this guide, The Competitive Advantage Analysis Tool, assesses key internal and external factors using data unique to each college presented graphically in a spider diagram which assists colleges in: identifying strengths and challenges, prioritizing green programs o study, and identifying strategies and next steps for program development.

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