Green Manufacturing in Dayton:

A Policy Roadmap towards Green Job Growth

December, 2010

Report Prepared by:

emersion DESIGN
Shawn Hesse
Heather Wehby

BLUEGREEN ALLIANCE | emersion DESIGN.

This report made possible by a generous donation from the IUE-CWA Local 755

Additional thanks to the following individuals for volunteering their time, effort, and intelligence to this report.

Lauren Asplen, Assistant to the President, IUE-CWA; Brewster Rhoads, Governor Strickland's Regional Director; Judy Dodge, Commissioner, Montgomery County; Debra Lieberman, Commissioner, Montgomery County; Angelia Erbaugh, Executive Director, Dayton Tooling and Manufacturing Association; Michael Davis, Director of Economic Development, City of Moraine; James Menart, Professor, Wright State University; Bob Steinbach, Director of Regional Initiatives, Miami Valley Regional Planning Commission; Kevin Hallinan, Professor, University of Dayton; Timothy Downs, Deputy Director, City of Dayton; Christopher Lipson, Senior Development Specialist, City of Dayton; Chris Meyer, Director of Energy Programs, Dayton Development Coalition; Nasra Mesmer, Community and Communications Manager, Laborers' International Union of North America; Robert Woods, Researcher, Laborers' International Union of North America; Jonathan White, Marketing, Laborers' International Union of North America; Kenny Woolum, Southwest Ohio AFL Field Coordinator, AFL-CIO; James Winship, President, IUE-CWA Local 155; Chris Wimsatt, Director of Economic Development, Dayton Area Chamber of Commerce; Stephanie Precht, Director of Public Policy, Dayton Area Chamber of Commerce; Lee Geisse, Regional Program Manager, Blue Green Alliance; John Dybvig, Economic Development Manager, Blue Green Alliance

Research Assistance provided by Harry Snyder, Ohio Skills Bank, Great Oaks

Table of Contents

A. Executive Summary

This report identifies the policies and programs that could be put in place to support and expand the growth of "Green Jobs" within the manufacturing industries best suited for the Dayton region. The report has identified five key findings and eight key recommendations for policy and program implementation – each discussed in detail throughout the report.

Key Findings of the report:

1. There is no clear definition of "Green Jobs" in the Dayton Region.
2. The regional strength in R&D in Aerospace and Advanced Material Technologies has the potential to support Green Jobs in manufacturing.
3. The existing manufacturing skills in the Dayton Region are vital for green growth industries specifically wind turbine components and green car manufacturing.
4. Manufacturing in the Dayton Region can remain a vital economic sector.
5. Government policy, incentives, and training exist for Green Jobs, but they are not coordinated to work together with economic development strategies.

Key Recommendations of the report:

1. Create a Green Jobs Council for the Dayton Region
2. Define Green Jobs for the Dayton Region
3. Support existing companies to Green their facilities and processes
4. Support existing companies to enter Green markets
5. Develop marketing programs to promote the Green manufacturing capability of the region
6. Add 'Green Strings' to existing government incentives
7. Develop strong funding models to support additional investment
8. Add, enhance, and align policies for Green Jobs

B. Project Background

In June of 2009, the Pew Charitable Trusts released *The Clean Energy Economy*, listing Ohio as having the 4th most "Clean Jobs" in the US. The study evaluated each State across five categories of the "Clean Energy Economy" including Clean Energy, Energy Efficiency, Environmentally Friendly Production, Conservation and Pollution Mitigation, and Training and Support jobs. Pew reports that, "Ohio ranked among the top five states with the most jobs in clean energy, energy efficiency, and environmentally friendly production in 2007," and classifies Ohio as having a "Large and Growing Clean Energy Economy", meaning that the total number of green jobs in 2007 exceeded the national average and that these markets have grown by an average of 1% annually. Other states with similar economies included California, Florida, Georgia, Indiana, Massachusetts, Michigan, Minnesota, North Carolina, Texas, Virginia, and Washington.

Specifically within the Environmentally Friendly Production category, Ohio ranked 4th in the country with a total of 2,800 green manufacturing related jobs trailing Oregon and Minnesota by just over 1,000 jobs, but California was the run-away leader in this jobs race with 13,666 manufacturing related green jobs. However, the Pew report analyzed only a "double bottom line of economic growth and environmental sustainability", and makes no effort of identifying the social sustainability of the jobs in their report.

As Green Collar jobs advocate Van Jones states in his book, The Green Collar Economy,

> "Opportunities abound to make things better for everyone…. The key to this is setting high standards and expectations for what a green-collar job even is. That starts by baking high quality and good values into the very definition of a green-collar job. My definition of a green-collar job is this: it is a *family-supporting, career-track job that directly contributes to preserving or enhancing environmental quality*."

The shortcoming of the Pew report comes in their definition of a green job. There is no mention of the social objectives of family-supporting or career-track in the definitions of green jobs.

The definition of any green job must include the socially equitable standards of family-supporting and career-track. The ability of families to improve their circumstances over generations is the backbone of the middle and upper-middle class families in this country. According to US Census data, in 2008 nearly 25% of all 25-35 year olds had a college degree, but only 10% of their grandparents (those 75 years and older) did. This trend is the common story of middle-class families across the United States; grandparents who worked in a factory, or in other skilled trades, who were able to support their family over their career, who's children were able to attain higher levels of education, earning family-supporting wages in career-track jobs, and so on.

At a time when low-educational attainment, high-skill jobs are decreasing, it is more important than ever to find ways to support these jobs. Green Collar Jobs provide the chance for communities to reinvigorate their skilled workforce, support a middle-class, and provide opportunity for families to improve their circumstances from generation to generation.

The Blue Green Alliance has begun initiating projects at the local level in Minneapolis, Cincinnati and now Dayton in an attempt to jump-start this process for local economies. This report is focused on finding the strategies that Dayton area government, non-profit, and other community organizations can employ to support Green Collar Jobs that are family-supporting and career-track. According to the Economic Modeling Specialist data, available through the Ohio Skills Bank, manufacturing jobs in the U.S. are projected to increase approximately 3% by 2020, while in Ohio, manufacturing occupations are projected to lose 6%, and the Dayton Region is projected to lose 14%. The objective of this report is to provide tools and resources through case-study examples, policy proposals, and guidance for reversing that projection and retaining and attracting green manufacturing to the Dayton area.

C. Report Objectives

Through discussion and recommendation from the study's Steering Committee, the objectives of this study included the following research goals related to manufacturing jobs:

1. Identification of existing workforce skills in the Dayton Region that are capable of supporting Green Manufacturing markets.
2. Identification of barriers to green manufacturing jobs and green business expansion/relocation to the Dayton Region.
3. Identification of incentives and policies to attract and retain green manufacturing jobs and businesses in the Dayton Region.
4. Identification of incentives, policies, and resources available to transition existing manufacturing to green-"er" manufacturing.

It was also important to make sure that the proposed incentives, policies, and strategies do not conflict with existing economic development frameworks such as the Montgomery County Strategic Initiatives, The Greater Downtown Dayton Plan, and the Miami Valley Regional Planning Commission Going Places: Land Use Vision, in addition to aligning with efforts by the State of Ohio Department of Development strategies where appropriate.

D. Report Methodology

Between September and December of 2010, emersion DESIGN led several steering committee meetings consisting of local leaders in educational and training institutions, representative labor unions, and government representatives to gather information about existing training, existing jobs, and existing policies related to green manufacturing in the Dayton Region. Throughout this time, emersion DESIGN conducted additional research through available workforce data, publicly available records of government investment and policies, and training programs to supplement and give context to the report.

In addition to this research, emersion DESIGN conducted an on-line survey of member companies of the IUE-CWA Local 798, IUE-CWA Local 755, and the Dayton Tooling and Manufacturing Association from December 1 to December 17, 2010. Results of this survey helped to inform recommendations included in this report and can be used by the Dayton Green Jobs Council to guide implementation of policies, incentives, and assistance programs. The results of this survey are included in Appendix B.

E. Committee Structure

The Blue Green Alliance identified many key stakeholders to be involved with the steering committee for the project. The steering committee met monthly to review research findings and provide guidance for the research team about which factors would be most critical and important to make confident decisions about policy implementation. Proposed definitions of green jobs, green businesses, policy examples, funding mechanisms, and report findings and proposals were all reviewed by members of the steering committee.

Additional meetings were conducted as individual briefings or one-on-one meetings to ensure that the recommendations and proposals were discussed with key stakeholders as identified by the Steering Committee members. Several key stakeholders were unable to attend the regularly scheduled meetings; however, the Steering Committee felt their feedback or involvement was critical. Two of these meetings were conducted, and these key stakeholders were subsequently included in draft report reviews, and their comments were included in the report as appropriate.

F. Definitions

Through discussion with the project's Steering Committee, the geographical boundaries of the study were decided to coincide with the Ohio Department of Development's Economic Development Region 4; "Southwest Central Ohio". This includes the 9 Ohio counties of Montgomery, Preble, Darke, Miami, Shelby, Champaign, Clark, Greene, and Clinton.

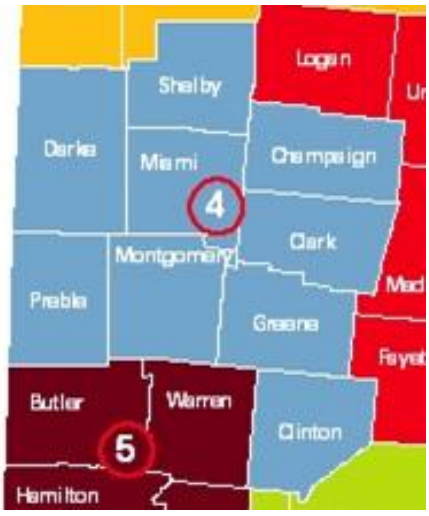


Figure F1: Map of Economic Development Region 4 from the Ohio Department of Development

Clearly, policy, incentive, and program recommendations that are local in nature might differ from county to county and city to city. Some of the proposals in this report are targeted specifically at the city of Dayton or Montgomery County, while others require broader support of adjacent counties, or even the state. Polices that are city or county specific are proposed with the understanding that effective policy models can be emulated in similar counties and other older industrial cities throughout the state and the country.

In addition to the geographical boundaries, the need to develop agreed upon definitions for what constitutes a "green" job is a critical component for any proposed policy and incentive strategy moving forward. For the purposes of this report, the following definitions were used during discussions. Further clarification on some definitions is included in the proposals later in this report.

Green Market:

- Market sectors that provide 'green' jobs within their workforce. These markets include;
  - Green Buildings/Retrofitting
  - Green Building Product Manufacturing
  - Renewable Energy Installation or Manufacturing
    - Wind
    - Solar
    - Biofuels
    - Biomass
    - Geothermal
  - Mass Transit/Rail
  - Clean Automobiles
  - Waste Management/Recycling
  - Green Chemical Manufacturing

Green Job:

- For purposes of workforce skill analysis, the U.S. Department of Labor Bureau of Labor Statistics definitions of Green Jobs was used;
    - "Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources, or,
    - Jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources."
- The O*Net Resource Center, sponsored by the U.S. Department of Labor, has determined which Standard Occupation Classification (SOC) codes can be considered a "Green Occupation", and adds the following clarification to the definition:
    - Green Increased Demand Occupations – "The impact of green economy activities and technologies is an increase in the employment demand for an existing occupation. However, this impact does not entail significant changes in the work and worker requirements of the occupation. The work context may change, but the tasks themselves do not."
    - Green Enhanced Skills Occupations – "The impact of green economy activities and technologies results in a significant change to the work and worker requirements of an existing O*NET-SOC occupation. This impact may or may not result in an increase in employment demand for the occupation. The essential purposes of the occupation remain the same, but tasks, skills, knowledge, and external elements, such as credentials, have been altered."
    - Green New and Emerging Occupations – "The impact of green economy activities and technologies is sufficient to create the need for unique work and worker requirements, which results in the generation of a new occupation relative to the O*NET taxonomy. This new occupation could be entirely novel or "born" from an existing occupation."

G. Existing Economic Development Strategies

The City of Dayton, Montgomery County, and the Miami Valley Region as a whole has committed significant effort to several strategic plans addressing economic development, regional marketing, land use planning, and sustainability initiatives. It is important that the findings of this report and the proposals moving forward align with existing strategies rather than compete. These reports, the Greater Downtown Dayton Plan, Montgomery County Strategic Initiatives 2009-2010, and Going Places: An Integrated Land Use Vision for the Miami Valley, provide recommendations that could support green jobs or provide the framework for further recommendations. These strategies should continue to be pursued. The proposals of this report are intended to supplement, enhance, and reinforce the findings of existing strategies.

Greater Downtown Dayton Plan

Released in June of 2009 and created by the Downtown Dayton Partnership, the Greater Downtown Dayton Plan is a community-driven project establishing a blueprint for future development of the city. The plan presents a vision for the city that strengthens connections and assets to become a sustainable urban core that attracts new business, employees, residents, students, and visitors. The plan outlines priority recommendations in three areas: Economic Development, Vibrancy, and Public Spaces and Infrastructure.

One key recommendation of the plan is to evaluate and nationally rank Dayton's "greenness" and create and implement a Sustainability Action Plan. The plan explains that "to attract business, investment and residents, it's critical Greater Downtown's appeal as a sustainable community and green place to live, work and play be enhanced." Also recommended is the appointment of a City of Dayton Sustainability Officer to manage these efforts and guide the implementation of the Sustainability Action Plan.

Another key recommendation is to develop and nurture green job growth and economic development. Strategies include conducting an inventory and survey of Greater Downtown businesses, examining the feasibility of establishing a Green Resource Center in Greater Downtown, and creating and implementing a marketing campaign to attract targeted businesses and organizations to Greater Downtown.

Implementation teams have been formed and will be led by a "private sector champion" along with public sector partners to spearhead momentum in key areas. The Greater Downtown Dayton Plan Community Council is charged with overseeing the implementation of the plan.

Montgomery County Strategic Initiatives 2009-2010

This document outlines strategies in the categories of economic development, regional collaboration, human services safety net, quality of life, and operational efficiency. One strategy presented is the support of a greener community by focusing on the development of policy and the implementation of education in sustainability. The areas of focus to support a greener community are recycling, renewable and alternative energy sources, and sustainable building design and construction practices. Another key strategy outlined is support of the 3C&D passenger rail project.

Going Places: An Integrated Land Use Vision for the Miami Valley Region

Conducted by the Miami Valley Regional Planning Commission, Going Places is a 4-year, three phase effort to create a plan for the physical development of the Miami Valley Region through the year 2040. The planning process began in July of 2007. Phase One was an Existing Condition Assessment which examined the Region's physical landscape and review

of development and demographic trends to provide a comprehensive overview of the Miami Valley Region.

Phase Two is called "Future Landscape Exploration: Future Land Use Scenario Development and Assessment" which consists of 17 community workshops in 4 counties in which participants are asked to pick one of five predetermined land use themes or create their own. Predetermined themes are Infill/Conservation Development, Asset-based Development, Business as Usual Development, Radial Corridor Development or Unrestricted Development

Phase Three is called "Regional Land Use Framework: Scenario Selection and Consensus Building." This is the phase of the process that will establish and promote a desired path forward for future development.

Although not an economic development plan, the Going Places process and vision is important to the future of the region and potentially sets forth priorities to support sustainable development, green businesses, and green jobs.

These existing economic development and land use reports are poised to support and enhance sustainable development and potentially create green jobs within the region. Many of their conclusions regarding market opportunities reinforce the findings of this report.

Integration of the key recommendations from this green jobs report can and should be coordinated with the existing plans and networks outlined. It is imperative that the creation of a Green Jobs Council include these existing coalitions including local government, the Dayton Area Chamber of Commerce, the Dayton Development Coalition, local union leaders, local colleges and technical schools, and workforce investment boards to ensure that the recommendations of this report are integrated to enhance current efforts.

H. Regional Market and Workforce

This report attempts to answer the following – What green markets could be supported by the workforce in the Dayton Region, and how many jobs could the region expect to gain? To answer these questions, emersion DESIGN engaged with the Ohio Skills Bank, a consortium of Ohio community colleges, to collect and analyze current Department of Labor job statistics for the Dayton Metropolitan Statistical Area (MSA). Using Economic Modeling Specialists, Inc. (EMSI), data from the 2nd quarter of 2010, occupation data was pulled for selected manufacturing Standard Occupational Classification (SOC) codes based upon the potential for that occupation to contribute to a green market (see full jobs data in Appendix C). According to Department of Labor and EMSI data, the Dayton MSA supports around 37,600 total manufacturing jobs. As indicated in figure H1, manufacturing jobs have seen a severe decline since 2000, especially during the 2008-2009 recession. Excluding Food Processing occupations and other industries such as Medical and Dental, this leaves approximately 28,000 of those jobs that could be involved with green technology markets including renewable energy manufacturing, waste management, green chemistry, or building material production based on their classification.

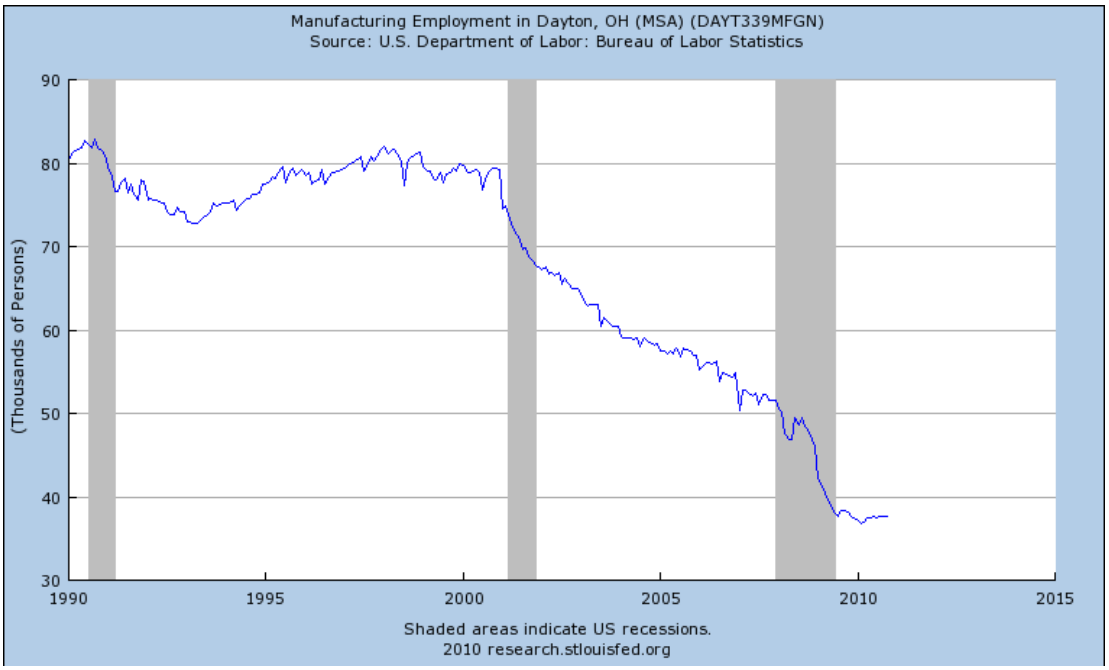


Figure H1: Manufacturing Employment in Dayton, Ohio

Data Source: FRED, Federal Reserve Economic Data, Federal Reserve Bank of St. Louis: Manufacturing Employment in Dayton, OH (MSA); U.S. Department of Labor: Bureau of Labor Statistics; http://research.stlouisfed.org/fred2/graph/fredgraph.pdf?id=DAYT339MFGN

According to the EMSI overall trends, manufacturing is projected to decline 14% over the next 10 years in the Dayton region. However, as seen in figure H2, while there is a predicted decline in manufacturing within the Dayton area, and the State of Ohio, National manufacturing is expected to increase by 3%. While these numbers are based on historical trends, they are by no means set in stone. The fact that manufacturing jobs are expected to grow nationwide implies that they are increasing *somewhere*. This presents an opportunity for the Dayton Region – to put the right policies, plans, and proposals in place to retain existing manufacturing (to de-bunk the EMSI projection), and to

attract new jobs, making the Dayton Region growth rate match or exceed the national growth rate, rather than post the projected declines.

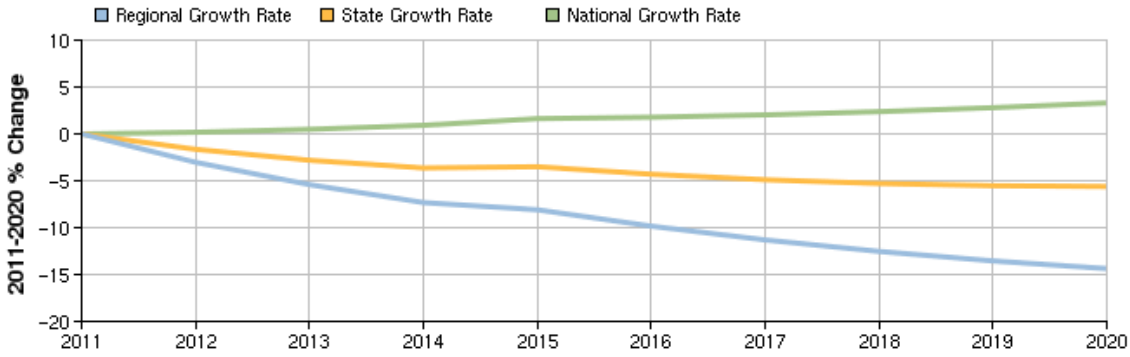


Figure H2: Occupational Change

Data Source: EMSI

In addition to the Department of Labor and EMSI database, the O*Net database was referenced. O*Net is a DOL funded project that provides a comprehensive definition of Green Occupations using the SOC Codes. The resulting list of occupations in the Dayton Region derived from the EMSI report, was cross referenced using the O*Net list of Green Occupations (see Appendix C) to determine the relative strength of the Dayton area workforce for supporting green industry.

Figure H3 indicates the percentage and total number of each occupation within the 28,000 potential green manufacturing occupations selected. It is clear from this analysis that there is not one specific occupation that represents a majority of the skill set for the region. While many of the top occupations are involved with machining, metalworking, and tool and die making, there is not a single occupation that dominates the occupation profile.

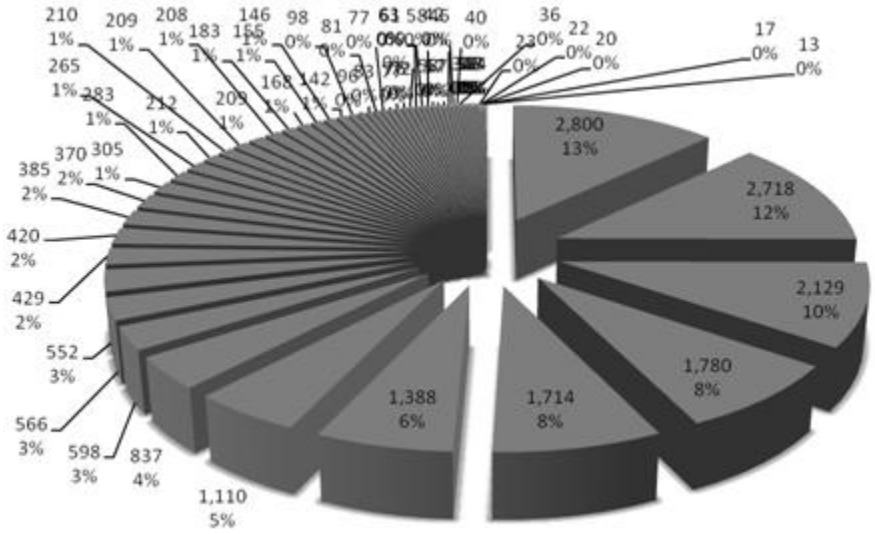


Figure H3: Manufacturing Occupations in Dayton, OH (MSA)

Data Source: EMSI

In Figure H4, the occupations that have been identified by O*Net as green occupations are highlighted in green. Upon first review, it seems that the skill profile for the Dayton Region is well suited for Green industries requiring skilled metal working and advanced manufacturing.

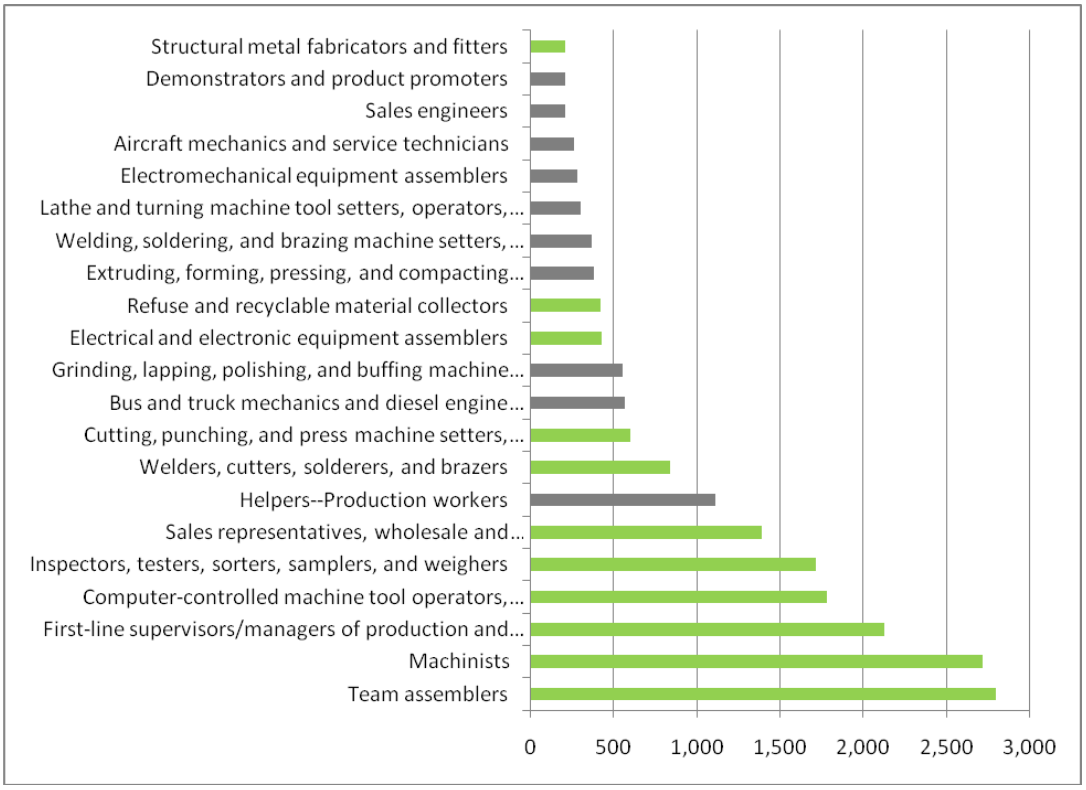


Figure H4: Manufacturing Occupations in Dayton, OH (MSA)

Data Source: EMSI and O*Net

These charts analyze the occupation data based on total number, but do not give a good indication of whether that represents a high or low number relative to similar regions throughout the country. The location quotient for a particular job category is an indicator of how concentrated that particular occupation is in comparison to a national average. A location quotient of 1 indicates an average representation of a particular job within the region as compared to the rest of the nation. A location quotient below 1 indicates below average concentrations and a lack in regional skill, and a location quotient above 1 indicates a regional strength.

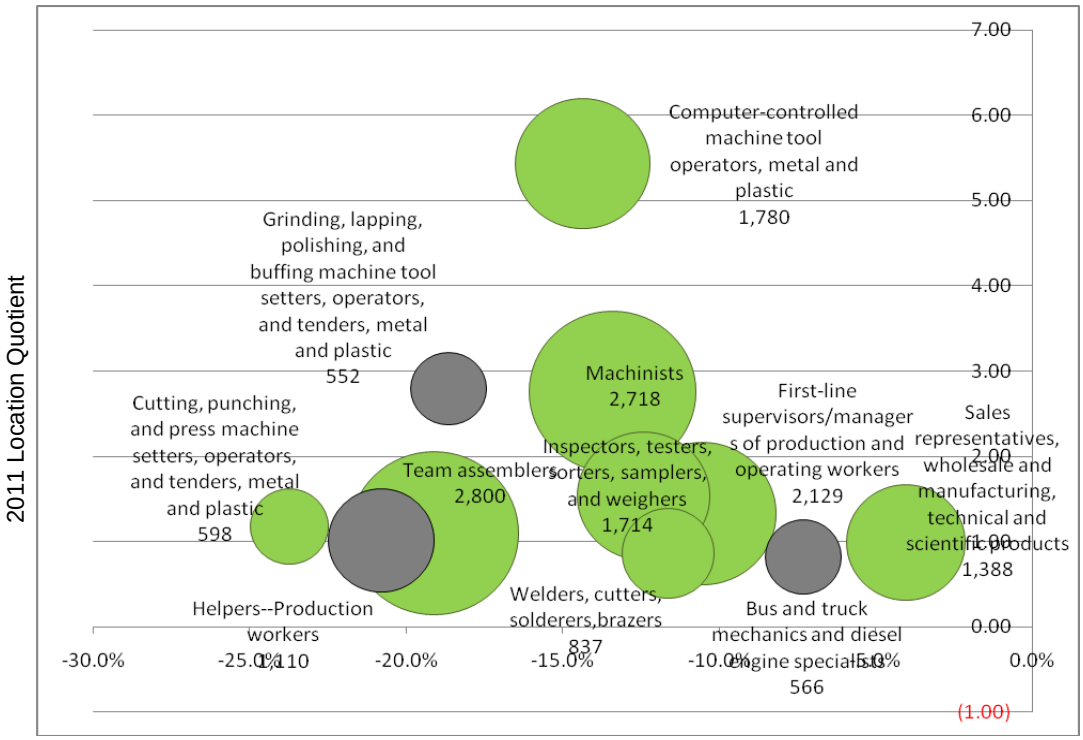


Figure H5: Manufacturing Occupations: Location Quotient 2011-2020
Source Data: EMSI and O*Net

Figure H5 represents the same top ten occupations in the Dayton region by total number, graphed based on their location quotient. In the figure, each circle represents the occupation as indicated, with the size of the circle being representative of the total number in each occupation. Those occupations indicated by O*Net as being a 'Green' Occupation are indicated by color. The position of the circle relative to the y-axis represents the location quotient for that occupation. As can be seen, all of the top occupations for the region are also regional strengths as indicated by location quotients above 1. The relative position on the x-axis indicates the EMSI predicted percent change between the current location quotients, and projected 2020 employment. From this analysis, it is clear that the current workforce in the Dayton Region has the skills necessary to support green manufacturing industry in metal working and advanced manufacturing – both great for the wind power industry, and lightweight green transportation, and they are present in much higher concentrations than other similar regions in the U.S., indicating a real strength for the region; however, they are all projected to decline over the next ten years.

Because all of these manufacturing occupations are projected to decline, we also examined the occupations that EMSI predicts will be fastest growing for the region. In Figure H6, the top ten manufacturing occupations predicted by EMSI to see an increase in their location quotient over the next 10 years are plotted. The same color-coding scheme has been applied which indicates that the occupations predicted to increase the most in the region are also aligned with the O*Net definitions of Green Manufacturing occupations. The highest growth occupation, Refuse and recyclable material collectors, shows a significant projected increase. Although this indicates a potential strength for the region in its workforce, it only represents 420 jobs – less than 2% of the manufacturing/production workforce.

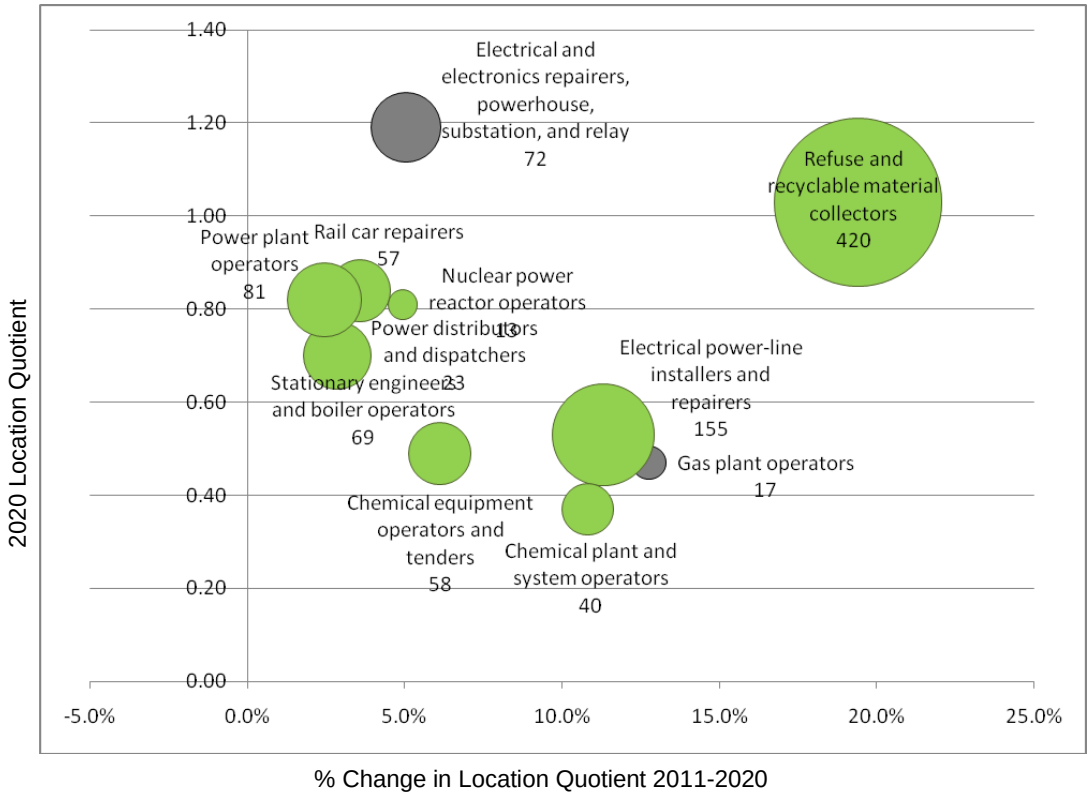


Figure H6: Manufacturing Occupations: Location Quotient 2011-2020
Source Data: EMSI and O*Net

From the analysis of the existing workforce data, we can conclude that the regional skill strengths of the workforce are ideal for green industries; specifically wind turbine component manufacturing, and green transportation/vehicle manufacturing. Additionally, these skills are projected to decline over the next 10 years, and will not be replaced with the faster growing industries, although even the fast growing occupations within this sector can also be considered green jobs. Seeing the projected declines within the context of national growth for the same occupations leads to a conclusion that there could still be a vital manufacturing market in the U.S., and that it could in fact be the same for the Dayton Region, provided that efforts are made to retain and attract those jobs.

This leads to the question – how many green jobs could the Dayton Region expect? To answer this question, the team compared the Department of Labor and EMSI jobs data with a 2008 U.S. Conference of Mayors report titled, *Current and Potential Green Jobs in the U.S. Economy.* According

to this report, the Dayton area reported 1,180 green jobs in 2006 and projects 9,334 new green jobs by 2038. These jobs span manufacturing and construction occupations as well as power generation, agriculture, engineering, consulting, and government administration. The data presented in the Conference of Mayors report does not breakdown over-all market area totals by job category; however, it does provide a breakdown by national average. Of total "Green Jobs" indicated in the report, approximately 1% were in Green Construction, and 8% were in Green Manufacturing. Applying this ratio to the Dayton area, data yields a Green Manufacturing market of 95 jobs in 2006 with a projected growth to approximately 750 Green Manufacturing jobs in 2038. While an additional 750 Green manufacturing jobs would be a great victory, it is a relatively small number of jobs. This would amount to a 2.6% increase in green manufacturing jobs. This pales in comparison to the EMSI projection of a 14% decline in these jobs in the Dayton area.

The methodology of the Conference of Mayors report assumes a national increase in renewable energy production to 40% of U.S. electricity by the year 2038. According to the U.S. Energy Information Administration (EIA), the U.S. currently produces almost 9% of its electricity from renewable sources. To increase that figure to 40% would require a steady increase in renewable energy production of just over 6% every year. Between 2004 and 2008, renewable energy production increased an average of 4.3%.

In Ohio, the Renewable Energy Portfolio Standard authorized by S.B. 221 requires that by 2025, 6.25% of all electricity sold in the state must be derived from renewable energy sources located within the state. According to EIA data, to reach that target, utility providers must increase renewable energy production by close to 15% each year. This indicates that due to S.B. 221, the increase in green manufacturing jobs in Ohio is likely to be faster than projected by the U.S. Conference of Mayors report, perhaps even by 2.5 times. Unfortunately, even with a growth 2.5 times as large, that would create approximately 1,900 green manufacturing jobs, (approximately 5% of current manufacturing jobs). This is not nearly enough to turn around the projected 14% decline predicted by EMSI.

In light of these predicted numbers, the opportunity for the Dayton Region to bolster its manufacturing base with Green Manufacturing jobs is clearly not going to be accomplished only through new markets. To be successful, any Green Manufacturing initiative must include an effort to preserve and green existing manufacturing jobs, regardless of what market they are involved in. A true success would preserve the existing 37,600 manufacturing jobs by greening those jobs – making them more efficient, less toxic, less wasteful, and THEN adding the additional 750 – 1,900 green jobs as projected by the U.S. Conference of Mayors.

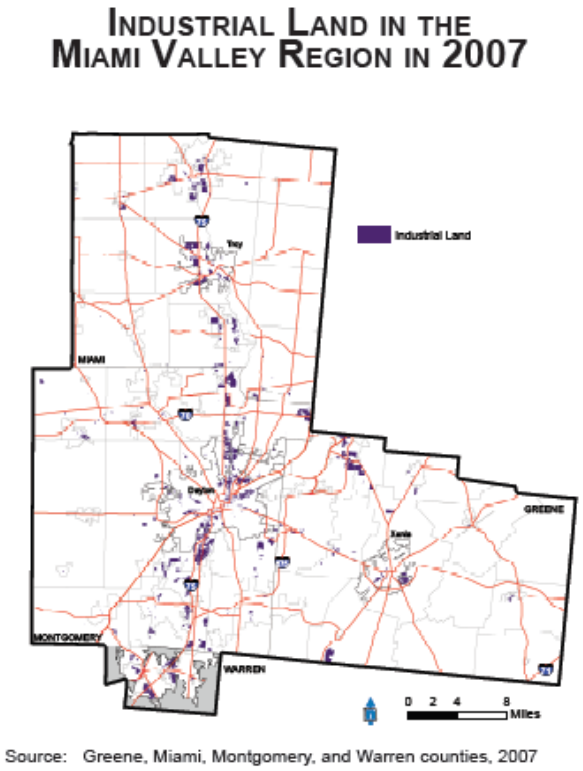
I. Local Manufacturing Trends

In addition to understanding key skills and occupations of the region, it is important to consider the impact of historical and future employment trends on land use development. The Going Places: Phase One Existing Conditions Assessment by the Miami Valley Regional Planning Commission (MVRPC) evaluated industrial land use and manufacturing employment in the Dayton metropolitan region. The study area was defined as Montgomery, Miami, and Greene Counties, as well as the cities of Carlisle, Franklin, and Springboro in Warren County.

According to the report, although the entire study area gained approximately 2,000 acres of industrial land between 1975 and 2000, the percentage of industrial land as a portion of all developed land decreased during this period. In 1975, 7% of the region's developed land was industrial, while in 2000 it was 5%. By 2007, the percentage decreased to 2% (See Figure I1 and I2). A look at manufacturing employment from this study reveals a decline during the same time period. Projected trends in manufacturing employment in the region prepared by MVRPC align with projections from EMSI described in the previous section of this report. MVRPC projects a significant decrease in manufacturing employment between 2010 and 2040.

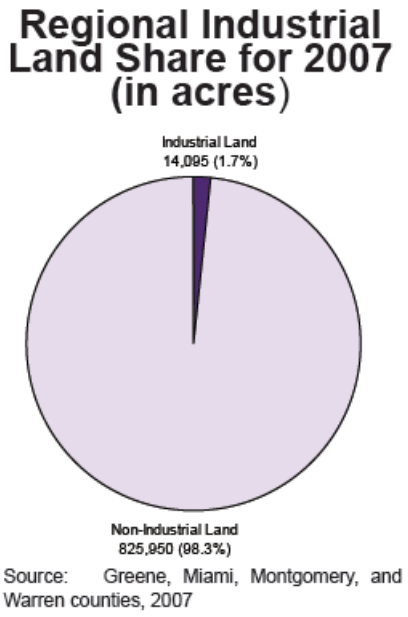
Based on these projections, the report concludes that the dominant sectors of employment will change as the manufacturing sector continues to decline and the commercial sectors, specifically the service industry, continue to increase. Due to the different space requirements of different employment sectors, land use demand is predicted to be quite modest. In other words, the area required per manufacturing job is much greater than the area required per service sector job. If many manufacturing jobs are replaced with commercial or service sector jobs, much less land is required to support the businesses of the future.

A few critical questions arise from this data. If manufacturing employment trends are successfully reversed, what is the effect on industrial land use demand and planning? Is 2% or less of overall developed land enough to support a thriving manufacturing community in the Green emerging markets? If a turnaround in the manufacturing sector is successful and employment increases, the existing land use planning for industrial development will need to be reevaluated.



Source: Greene, Miami, Montgomery, and Warren counties, 2007

Figure I1: Map from "Going Places: Miami Valley Industrial Development Assessment," 2008



Source: Greene, Miami, Montgomery, and Warren counties, 2007

Figure I2: Chart from "Going Places: Miami Valley Industrial Development Assessment," 2008

J. Federal, State, and Local Green Jobs Investment

Investment in green projects, activities and technologies creates green jobs. Without contracts in hand, consumer demand or orders placed, no new jobs are needed. The key challenge facing any community fostering green job creation is to understand the current investment in green strategies, including public and private investment, and shape their future policies and programs to fill gaps and enhance existing investment frameworks.

Federal Investment Overview

2010 marks a historic point for investment in green technologies throughout the world. The amount of money being invested in green technology and green markets through national government economic stimulus spending is staggering.

Nearly every developed nation is pumping billions of dollars into green industry research and development at the same time. According to the Financial Times, China leads the way with over $218 billion, followed by the United States with $117.2 billion. Although the total economic stimulus spending of the US government eclipses most all other countries spending combined, the percentage targeted specifically for green investment is relatively low. When China invests $100 billion dollars more in green markets, it is clear that the US as a whole will have to be more creative, inventive, and targeted with its investment in green markets in order to remain competitive in global markets.

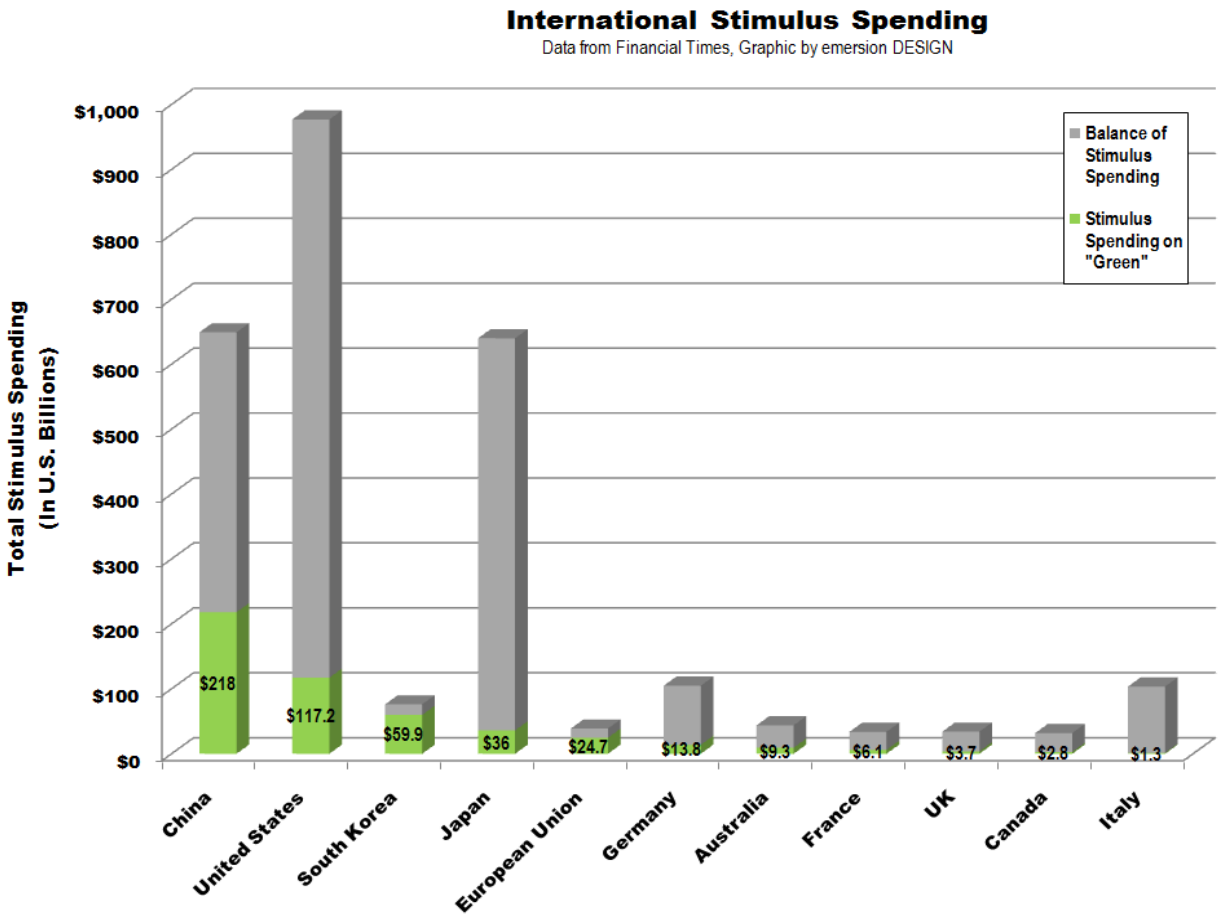
Below are two federal investment programs that channel significant funding to manufacturing projects in green industry.

U.S. Department of Treasury – Renewable Energy Grants

Funded through the American Recovery and Reinvestment Act of 2009 (ARRA), this federal grant is available to commercial, industrial, and agricultural applicants for installation of renewable energy technology including solar electric, solar thermal, fuel cells, small wind turbines, microturbines, and combined heat and power systems. Grant amounts are 30% of cost for fuel cells, solar systems, and small wind, and 10% of cost for all other systems.
Program Information: http://www.treas.gov/recovery/1603.shtml

U.S. Department of Energy – Loan Guarantee Program

This program will provide loan guarantees for projects over $25 million for manufacturing facilities and manufacturing projects that incorporate or produce components related to solar electric, solar thermal process heat, wind, hydroelectric, renewable transportation fuels, fuel cells, biodiesel, tidal energy, and significantly improved daylighting technology.
Program Information: http://www.lgprogram.energy.gov


International Stimulus Spending
Data from Financial Times, Graphic by emersion DESIGN
Total Stimulus Spending (In U.S. Billions)
$1,000
$900
$800
$700
$600
$500
$400
$300
$200
$100
$0
Balance of Stimulus Spending
Stimulus Spending on "Green"
$218
$117.2
$59.9
$36
$24.7
$13.8
$9.3
$6.1
$3.7
$2.8
$1.3
China
United States
South Korea
Japan
European Union
Germany
Australia
France
UK
Canada
Italy

State of Ohio Investment Overview

The State of Ohio has a significant number of programs and initiatives already in place to support and invest in green jobs. The Pew Charitable Trusts report on the Clean Energy Economy lists Ohio venture capital investment in the green markets at $74,224,000 from 2006-2008, putting Ohio in 17th place when it comes to investing private money. But venture capital is only half the story. Several statewide programs have provided significant investment in green technologies and markets.

Ohio's Third Frontier Program

The Third Frontier Program is a 10 year, $1.6 billion dollar investment program that began in 2002. According to a report just released by SRI International, approximately $681 million dollars has already been invested through this program through various research, development, and start-up grants. Of the total awards so far, $39.9 million dollars has been awarded for fuel cell research and development programs, and $19.9 million has gone into other forms of advanced energy programs. Additional R&D grants in advanced technology including polymers, nanotechnology, PV's, and fuel cells are expected to continue to be awarded through 2012.

Ohio Job Stimulus Plan – Advanced Energy Program (Ohio Air Quality Development Authority)

This fund was created in 2008 to provide grants of $50,000 to $250,000 and loans of $1 million to $2 million for a wide variety of advanced energy projects including energy efficiency, cogeneration, solar, wind, geothermal, hydroelectric, fuel cells, biogas, electricity storage, and some biomass and solid waste technologies. Funds are also available to support technologies, products, activities, and management practices or strategies that reduce energy consumption.

Many sectors are eligible for this program including industrial; however, advanced energy manufacturing centers partnered with any Edison Technology Center will be evaluated under a separate RFP process. The goals of this program are to support workforce development in advanced energy, support projects that will make a substantial difference for the industry, and strengthen Ohio's existing manufacturing and technology base while preparing the workforce for future products and industries.
Program Information:
http://ohioairquality.org/advanced_energy_program/program_details.asp

Ohio Public Benefits Fund

Public Benefits Funds are a common model used in the United States to generate funding for renewable energy and energy efficiency grant programs state-wide. Typically, these funds are collected by the publicly regulated utility companies in a given state through rate payer fees.

Ohio is one of only 16 states plus the District of Columbia that has a public benefit fund dedicated to renewable energy and energy efficiency programs. The Public Benefit Fund in Ohio is key to generating funding for programs like the Department of Development's Advanced Energy Grants; however, there is clearly more that could be accomplished with a more generous fund. See the recommendations section of this report for further discussion of methods to raise additional funding through the Ohio Public Benefits Fund.

Montgomery County Investment Overview

ARRA Funds

Montgomery County has received over $300 million in stimulus funding through the American Recovery and Reinvestment Act. According to Ohio Recovery Accountability reports, this money has been allocated to six different program areas including "Infrastructure, Crime and Public Safety, Education, Energy and Environment, Healthcare, and Work, Opportunity, and Poverty."

The majority of the funding (over 80%) will be allocated for programs that do not explicitly link the program to Green investment, although several of the categories could be counted as 'Green'.

One example includes an award of $18M under the category of Infrastructure to the Greater Dayton Regional Transit Authority to invest in public transportation by purchasing new replacement buses that meet or exceed current Clean Air Act standards and the Americans with Disabilities Act. GDRTA is also using funds to perform maintenance on existing vehicles, facilities and equipment.

Approximately 14% of the ARRA Funding reported to the State of Ohio is being spent in the Energy and Environment category which includes $20M (48% of Energy & Environment funds) for additional remediation at the Mound site in Miamisburg. Also included in this category is around $4.5 million through the Energy Efficiency and Conservation Block Grant program and $18M allocated to the Weatherization Assistance for through the Community Action Partnership of the Greater Dayton Area. This award is part of a larger allocation for the State of Ohio. It is projected that 32,000 homes in the State will be weatherized with this grant funding. This could significantly impact manufacturing by increasing the demand for insulation and high efficiency equipment throughout the state.

Energy Efficiency and Conservation Block Grant (EECGB)

The Energy Efficiency and Conservation Block Grant funding was distributed through the State of Ohio to each community throughout Ohio. The focus of these funds is to reduce energy use in government owned facilities through energy efficiency upgrades and management programs. Many municipalities utilize Energy Service Contracts to capture guaranteed energy savings. Although this program does not specifically target manufacturing, the resulting increased demand for energy efficient fixtures, insulation, and other green building products could affect this sector.

City of Dayton Investment Overview

Energy Efficiency and Conservation Block Grant (EECBG)

The City of Dayton was awarded $1.6 million in EECBG funding from the U.S. Department of Energy. The City will utilize the grant funds for expansion of curbside recycling, new cooling units for the City of Dayton's Information Technology Division data center, an energy efficiency and conservation strategy which includes a new, full-time Environmental Manager for one year, a high-efficiency HVAC system at the Street Maintenance Building and a LED streetlight retrofit for 56 fixtures.

The effect of the EECBG funds from the City of Dayton will increase demand for energy efficiency products and technicians, but does not appear to impact the green manufacturing sector in other ways.

Private Rebate Programs

Green Energy Ohio (GEO) Solar Thermal Rebate Program

This private rebate program is managed by the non-profit Green Energy Ohio. The rebate is available for solar water heating systems for residential and school applications. While this is not a direct investment in manufacturing technology, it supports and creates demand for solar thermal hot water systems in the region.

Program Information:
http://www.greenenergyohio.org/page.cfm?pageId=2295

Dayton Power & Light Energy Efficiency Rebate Programs

A public electric utility in west central Ohio, Dayton Power & Light offers rebate incentives for energy improvements to existing facilities as well as additions or new construction that exceed standard building codes for business and government customers. DP&L also offers a rebate program for government customers for energy audits. For residential customers, modest rebates are available for installation of a new high efficiency air conditioner or heat pump. This type of program supports the market for energy efficiency technology and installation in the region.

Program Information:
http://www.dpandl.com/save-money/

Vectren Appliance/Product Rebate Program

A public utility based in Indiana, Vectren provides natural gas service to west central Ohio and offers rebates for residential and business customers who install new energy efficient gas appliances. The business incentive program offers up to $25,000 for qualified natural gas projects.

Program Information:
https://www.vectrenenergy.com/selectState.do

K. Federal, State, and Local Green Jobs Policies

The objective of this report is to identify policies and proposals to encourage Green Jobs in the Dayton Region. In order to better understand what policies and incentives might work best for this region, it is first necessary to understand the existing policy frameworks in place from Federal, State, and local agencies. After understanding the full picture, policy proposals can be considered that might enhance existing programs, or fill gaps in the existing overlapping policies and incentives.

A Policy Matrix for the Dayton Region was created to document the current economic development and sustainability policies that exist at the local level (see Appendix D). These programs were evaluated as to whether they contribute to the creation of green jobs in construction, manufacturing or transportation. This Matrix can be referenced to understand the existing policy landscape and evaluate needs for future policy. Some of the key programs are described in more detail in this section.

Federal Policy

Qualifying Advanced Energy Manufacturing Investment Tax Credit

The ARRA established a new investment tax credit to encourage the development of a U.S.-based renewable energy manufacturing sector. In any taxable year, the investment tax credit is equal to 30% of the qualified investment required for an advanced energy project that establishes, re-equips or expands a manufacturing facility that produces any of the following:

- Equipment and/or technologies used to produced energy from the sun, wind, geothermal or "other" renewable resources
- Fuel cells, microturbines or energy-storage systems for use with electric or hybrid-electric motor vehicles
- Equipment used to refine or blend renewable fuels
- Equipment and/or technologies to produce energy-conservation technologies (including energy-conserving lighting technologies and smart grid technologies)*

Program Information: http://www.energy.gov/recovery/48C.htm

Energy-Efficient Appliance Tax Credit for Manufacturers

The Energy Policy Act of 2005 established tax credits for manufacturers of high-efficiency residential clothes washers, refrigerators, and dishwashers produced in calendar years 2006 and 2007. The Energy Improvement and Extension Act of 2008 (H.R. 1424, Division B) extended the credits for additional years depending on the efficiency rating of the manufactured appliance. Manufacturers only receive these credits for the increase in production of qualifying appliances over a two-year rolling baseline, and only appliances produced in the United States are eligible.
Program Information:
http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US42F&re=1&ee=1

State of Ohio Policy

House Bill 1 – Special Energy Improvement Districts

In July of 2009, Ohio House Bill 1 established the authority for local municipalities within Ohio to borrow money to pay for solar photovoltaics and solar thermal energy projects that would eventually be owned by the individual property owners within the community. In June 2010, legislation expanded options by providing additional authorization to municipalities to allow for financing of geothermal, customer-generated systems (including wind, biomass, and

gasification systems) and energy efficiency improvements that are permanently fixed to the property. The bill requires the creation of Special Improvement Districts (SID) in the city, with signed consent of all participating property owners in the district. The bill allows the municipality to purchase and contract the installation of the systems on all properties within the SID, and to collect payment from the property owners through a property tax assessment for up to 25 years.

Property-Assessed Clean Energy (PACE) financing has proved to be a successful financial model for homeowners in California and Colorado, and this has the potential to drive demand for these systems within the state of Ohio.

Edison Technology Centers

The Ohio Department of Development operates seven "Edison Technology Centers" throughout the state providing a variety of product and process innovation and optimization services for technology-based businesses. TechSolve is an Edision Technology Center based in Cincinnati that delivers Federal and State Manufacturing Small Business Assistance programs. TechSolve provides advanced manufacturing process and system services including productivity improvement training and machining technology assistance.

As a free consulting service, TechSolve provides assistance to small manufacturing companies in areas of management, human relations, marketing, sales, operations, and strategic planning. Additional consulting services cover advanced machining research and development covering new product testing and validation, parts cost reduction, and machining system optimization.

TechSolve partners with several Dayton area organizations including Citywide Development Corporation, Dayton Tooling & Manufacturing Association, EMTEC and the Ohio Aerospace Institute to expand its delivery footprint.

EMTEC, the Edison Materials Technology Center, is located in Dayton. This non-profit organization develops technology and business strategies, sponsors and manages collaborative technology projects and programs, and provides technology and business based assistance that facilitates the commercialization of new technology. EMTEC's focus is on products and technologies in Advanced Materials, Advanced Energy, and Instruments, Controls, and Electronics.

Renewable Energy Portfolio Standard

Ohio is one of 29 states that have Renewable Energy Portfolio Standards for its utility providers. According to the Renewable Portfolio Standard in Ohio, all retail electricity distribution utilities and service companies must provide 25% of their retail electricity supply from alternative energy resources by 2025. At minimum, 12.5% of that supply must be generated from renewable energy resources. Additionally, 50% of the renewable energy sources must be genera ted in the state. Utilities that fail to meet the benchmarked goals between 2009 and 2025 will be subject to financial penalties that could be paid into the Ohio Department of Development's Advanced Energy Fund.

City of Dayton Policy

Sustainable Practices Policy

In 2007, the Dayton City Commission approved the Sustainable Practices Policy, which sets direction and guiding principles for the City's energy use and development of sustainable practices. This policy follows Mayor Rhine McLin's signing of the U.S. Conference of Mayors Climate Protection Agreement in 2005. The policy outlines initiatives in energy efficiency, curbside recycling, water efficiency and calls for City operations to move toward environmental sustainability when possible. Sustainability initiatives are implemented with the support of the Dayton City Commission's Environmental Advisory Board and an employee group called the Cool Energy Team.

L. Training Pathways

There are many training pathways into green jobs in the Dayton region. The challenge is to connect existing opportunities to workers and employers in the manufacturing sector. A report by Policy Matters Ohio entitled "Mapping Green Career Pathways: Job Training Infrastructure Opportunities in Ohio", explains that many workers lack the skills necessary to access middle-skill jobs. Middle-skill jobs have been identified as the type of jobs that are and will be in demand as the region transitions to "Green" sustainable technologies in the energy and manufacturing sectors.

Efforts are under way to provide easy and clear access to information about training opportunities in Green markets. The Ohio Green Pathways Project was launched in July 2009 by the Ohio Board of Regents in collaboration with the Ohio Environmental Council to strategically position Ohio as a green workforce leader. The first initiative of the Pathways project is a downloadable catalog of the University System of Ohio's community college green associate degree and certificate training programs. The project is led by the Green Pathways Advisory Panel.

Ohio Skills Bank is an initiative for adult education delivery in the state. Sinclair Community College plays an important role in workforce development and economic development programs for the region. The College works to align its academic programs with the current and emerging workforce needs of the region. Sinclair Community College Workforce Development serves as the coordinator for Ohio Skills Bank Region 4, an employer driven program to develop career pathways. Educators and workforce professionals work closely with Ohio employers to ensure that the Ohio's public universities, community colleges, and adult career centers provide curriculum, programs and training aligned with industry demand.

The key to successful training pathways to Green Jobs lies in ensuring that existing companies and employees are aware of current programs and incentives. In addition, local economic development offices and the Dayton Area Chamber of Commerce should be fully coordinated with community colleges and adult training centers to address the needs of new companies considering locating in the Dayton Region.

M. Research Findings and Conclusions

From this context of existing programs, incentives, training programs, and workforce data, there are five key findings which will set the stage for the proposals and recommendations of this report. While not all of the research findings are negative, effort has been made to identify recommendations that will address the research finding, either by supporting the positive attributes of the finding, or addressing the negative attributes. These recommendations will be discussed in detail in the next chapter of the report.

Key Finding #1:
No Clear Definition of "Green Jobs"

The fact that there is not a single accepted definition of green jobs within the Dayton region is not surprising. Throughout the country and the world, there are varying definitions of what a green job really is. Additionally, the methods used to classify jobs and determine whether they meet the specific adopted definition of green jobs varies from report to report, and policy to policy.

This difficulty results from the fact that any job could be a green job. Green Jobs range from skilled labor, to consulting and policy experts. A major task moving forward for the region is to collectively define what jobs will qualify for incentives, and promotion as 'Green'.

Key Finding #2:
Regional strength in R&D in Aerospace and Advanced Material Technologies has the potential to support Green Jobs in Manufacturing

The Dayton area has been quite successful in leveraging its strengths to attract new business in Research & Development. Because of assets at Wright-Patterson Air Force Base in Greene and Montgomery Counties and research conducted at the University of Dayton, the Ohio Department of Development designated Dayton at the Ohio Aerospace Hub. One critical accomplishment is a $51 million research facility to be built by General Electric on the University of Dayton campus. The new Electrical Power Integrated Systems Research and Development Center (EPISCENTER) will be built on the Ohio Aerospace Hub of Innovation and Opportunity.

Numerous technology incubators have been established such as TechTown to attract new businesses in high-tech industries by utilizing local, state and federal funding. Many of these technologies will be applied to the development of green products. As these new technologies are commercialized, the local manufacturing base could benefit creating green jobs.

In addition, the successful partnerships and strategies that have attracted high-tech companies could be utilized to attract Green businesses and connect local manufacturing companies to the supply chain.

Key Finding #3:
Existing Workforce and Skills in the Dayton Region are Vital for Green Industries

The skill set of the workforce in the Dayton region aligns very well with the skills and occupations needed for many of the new green industries. As described in this report, the existing skills in advanced materials and metalworking are vital for green industries such as wind turbine and green vehicle manufacturing.

Key Finding #4:
Manufacturing in the Dayton Region can Remain a Vital Economic Sector

As outlined, there are many indicators that manufacturing can remain a vital part of the Ohio economic base. There has been a steady increase in productivity and value of goods produced in Ohio, there is a strong workforce of skilled manufacturing labor on which to build, and there are many communities throughout Ohio that have seen an increase in manufacturing jobs. In addition to the indicators that manufacturing as a whole can continue to succeed in Ohio, the policy environment from Senate Bill 221 to the strong Research & Development base in Dayton will create a market for this work that could be translated into local manufacturing jobs.

Key Finding #5:
Policy, Incentives, and Training Exist, but are not Coordinated to Work Together

It is clear from the large amount of information available on programs, incentives, and training programs that there is significant work being done in the region to stimulate economic development and promote and support green jobs. Government entities, non-profits, unions, and education and job training centers are working on programs to support the growth of existing companies, encourage new companies to locate in the region and provide training for the existing workforce to meet the demands of emerging markets with advanced skills. The challenge is to coordinate all of these efforts in a broader context with a cohesive economic development strategy and policy framework.

N. Key Recommendations and Proposals

For each of the Key Research Findings, effort has been made to identify recommendations in response to those findings. Each recommendation will be discussed in detail with strategies identified containing policy examples, program models, and resources for implementation.

Key Recommendation #1: Create a Green Jobs Council for the Dayton Region

The formation of a local Green Jobs Council is perhaps the most important recommendation of this report. The time and effort of this report's steering committee, plus the research work that has been completed thus far, runs the risk of sitting un-used without a consistent effort that a Green Jobs Council could provide. In addition, it will provide continued momentum for implementation of the other recommendations.

An effective Green Jobs Council will be a broad coalition of parties, and include community organizations, unions, businesses, workforce development, K-12 schools, community colleges, and universities. The Dayton Green Jobs Council could provide the guidance, coordination, and the venue for all organizations that are interested in promoting green jobs to collaborate and coordinate their efforts. The Green Jobs Council will also advocate for green job policies and programs at the state and local levels.

Strategy: Sign the Local Government Green Jobs Pledge

The non-profit organizations Green For All, the Apollo Alliance, the Center for American Progress, and ICLEI – Local Governments for Sustainability, developed the Green Jobs Pledge. In June of 2008, the U.S. Conference of Mayors passed a resolution to support the pledge, which is intended for local government leaders to commit to a "Focus on green-collar jobs as a central strategy for advancing environmental, economic, and climate protection goals." To date, the current signatories include only 20 municipalities, including Toledo, Ohio. The City of Dayton or Montgomery County should sign the Green Jobs Pledge, and convene a Green-Collar Jobs Council.

The Dayton Green Jobs Council should start by adopting a community wide definition of Green Jobs, then identify goals and opportunities for green job creation and develop a plan of action to align job creation and job training for the Dayton region using this report as a starting point for their work.

Strategy: Develop a Green Business Definition Framework

A key role of the Green Jobs Council should include developing a framework to identify and measure green jobs and green businesses. The Dayton Area Chamber of Commerce has developed a Green Business Certification program and plans to launch a pilot program in 2011. The Green Jobs Council should coordinate with this existing program.

Key Recommendation #2:
Define Green Jobs

This is challenge for all communities as they move forward with economic development policies and incentives targeted for green markets.

This report utilizes the Department of Labor definitions for green jobs; however, consideration should be given to requirements such as full-time living wages, affordable quality health care, retirement benefits and a safe working environment. The challenge moving forward for the region is to collectively define what jobs will qualify for incentives, and promotion as 'Green'. The responsibility for this task could lie with a Green Jobs Council.

Key Recommendation #3:
Support Existing Companies to Green their Facilities and Processes

There continues to be a strong manufacturing base in the Dayton region that consists primarily of numerous, small companies. Often these companies do not have the time or resources to investigate and implement sustainable practices and operations. In a survey of local manufacturing companies conducted by emersion DESIGN, 63% of respondents identified 'upfront costs' as the greatest challenge to implement green strategies in operations.

In the same survey, the top two types of assistance programs to encourage green operations rated by respondents are 'financing' and 'business planning.' Support in the form of business consulting and financial incentives could encourage existing companies to green their processes and facilities and move toward a sustainable manufacturing model.

By developing policies and incentive programs that support sustainable manufacturing, the region will not only create green jobs out of grey ones, but it will save existing jobs by enhancing the existing manufacturing skills, knowledge, and ability of the Dayton area workforce. This strategy builds on existing strengths, and reinforces a unique identity and trait of the region. This recommendation could be pursued and implemented by any organization independent of a Green Jobs Council.

The strategies presented here are intended to address assistance programs for an existing company to "go green" including business consulting and development of workforce skills. Policies that deal with capital funding for projects and facility improvements should also be available to assist existing businesses. These are discussed in Key Recommendation #8.

Strategy: Assist Companies with Assessment of Green Opportunity

As discussed in the Existing Policy section of this report, the State of Ohio Department of Development currently supports the operation of several "Edison Technology Centers". These non-profits serve as manufacturing business incubators and start-up consultants. Montgomery County and the City of Dayton support similar business incubators that provide entrepreneurial training, administrative support services, and other business development consulting.

In addition to business consulting, the services offered at these centers could be expanded to include "Green Assessment Services" ranging from energy audits to sustainability strategy consulting including product and process certification assistance. This service would allow existing established companies to assess their current practices, and chart a roadmap for a transition to green jobs, whether that means demonstrating compliance with Green Business

or Green Job definitions, or assistance navigating the grants, loans, and incentives that are available through different entities.

Strategy: Provide Workforce Training for Existing Workers

The Ohio Workforce Guarantee Program is a statewide grant program that will reimburse employers for the cost of workforce training for employees that receive fair pay, and are trained in target areas.

Another statewide offering is the Energizing Careers Program which provides Original Equipment Manufacturers (OEMs) or Tier 1 Suppliers in the sectors of wind, solar or biomass with a grant for approved training and apprenticeship programs that end with Certificates for occupations with the targeted sectors.

These programs could be duplicated at the city and county level to enhance and supplement the state level program, with a focus on the training needed to shift from traditional job skills to green job skills.

Strategy: Ensure Policies Reward Shades of Green Appropriately

It is important to recognize varying "shades of green" when implementing new incentives. Many existing companies are not prepared to commit entirely to a complete sustainability over-haul of their operations, facilities, or products, but are interested in starting the process.

A great way to reward companies for taking their first steps at being 'green-er', while at the same time incentivizing them to continue to pursue higher levels of performance is to utilize a graduated system of incentives. Under a "shades of green" system, companies that have pursued the most rigorous and objective green jobs efforts should be recognized and rewarded at the highest level available. While a company that has just begun the process of going green should not get the same level, they should receive an incentive that is generous enough to encourage continued investigation of green projects.

Under this system, the efforts of a Green Jobs Council would be imperative in helping to establish what thresholds are appropriate, the number of thresholds, and what the objective criteria are for determining the achievement of successful green efforts.

Key Recommendation #4: Support Existing Companies Entering Green Markets

The challenges facing existing companies in moving toward a Sustainable Manufacturing model also affect their ability to enter emerging, green markets. In a survey of local manufacturing companies conducted by emersion DESIGN, 57% of respondents identified 'access to customers' as the greatest challenge to entering green markets. The top two types of assistance programs to encourage entrance into green markets rated by respondents are 'sales and marketing' and 'market research'. The following strategies address the need for access to customers and sales and marketing support. This recommendation could be pursued and implemented by any organization independent of a Green Jobs Council.

Strategy: Provide Pre-Certification of Component Manufacturers

Providing pre-certification services for component manufacturers of turbine, solar panel, electric cars, and other technologies would provide an opportunity for small manufacturers to

gain recognition from large Original Equipment Manufacturers (or OEMs) such as GE, Siemens, Ford, GM, etc. These pre-certification services could be supported by the State of Ohio, City, or County through the existing Edison Center or business incubator models, and could be an additional consulting service that is offered as part of the Green Opportunity Assessment.

Strategy: Provide Networks for Component Manufacturers

The Great Lakes Wind Network (http://www.glwn.org) is a coalition of wind component manufacturers that provides access and exposure for component manufacturers to OEM's for wind turbines. The Great Lakes Wind Network was developed with an Ohio Department of Energy research grant in 2008. Similar programs should be developed for each of the green industry markets, to link smaller manufacturers with large companies. This strategy is critical in light of the EMSI research indicating that most of the growing manufacturing companies in Ohio are smaller companies.

The Edison Manufacturers Network developed by TechSolve is a free online database of local and regional manufacturers designed to drive business to Ohio Manufacturers. This tool could be utilized to target green markets and connect smaller companies to large company supply chains. The Dayton Tooling and Manufacturing Association could provide the venue for a network of small local companies to collectively market their capability to large OEMs.

Key Recommendation #5:
Develop Marketing Programs to Promote the Green Manufacturing Capability of the Region

The Dayton area continues to be a strong manufacturing center with specialization in metal fabrication, advanced materials, sensors and controls. The City of Dayton, The Dayton Area Chamber of Commerce and the Dayton Development Coalition have created marketing programs to attract businesses, residents and students to the region. It is apparent that there is no comprehensive strategy for marketing the green manufacturing capability of the region. Since this is a core strength of the community and an opportunity for economic development, this asset should be identified and marketed to companies looking to locate in the region or purchasing goods from area suppliers. This recommendation could be pursued and implemented by any organization independent of a Green Jobs Council.

Key Recommendation #6:
Add Green Strings to Existing Incentives

The city and county offices of Economic Development, and the Ohio Department of Development, have a number of incentives and packages that are offered to businesses that are relocating, expanding, or looking to move. An easy strategy to implement that requires no additional funding is to simply add "Green Strings" to these existing incentive packages.

An example of a 'Green Strings' policy for the City of Dayton would be a revision to the Dayton Economic Attraction Program (DEAP). Under this existing program companies are offered annual grants equal to 50% or 75% of income tax withholding from new job creation for up to three years. To qualify for the 75% grant program, the business must be currently located in or planning to locate in downtown Dayton. To qualify for the 50% grant program, the business must be currently located or

planning to locate anywhere in the City of Dayton and fit within one of the following targeted industry sectors: Aerospace Research & Development, Human Sciences & Health Care, Information Technology, and Advanced Materials & Advanced Manufacturing. In addition, the business must intend to create and maintain no less than five net new full-time-equivalent (FTE) jobs or no less than $200, 000 net new payroll as a result of net new jobs. A 'Green String' to this program could be including eligibility for a 75% grant for creation of new 'Green' jobs within any industry sector located within the City of Dayton.

This strategy should be pursued on all existing incentives, whether it is a revision, replacement, or simply an alternative (easier) path to achieve the same incentive. By simply revising existing programs to utilize "Green Job" or "Green Business" definitions for eligibility, the majority of the legislative and administrative work is complete, and no additional funding is required for implementation.

Key Recommendation #7: Develop Funding Models for Additional Investment

Clearly, any additional incentive, investment, program, or grant will require additional funding to support it. Especially with city, county, state, and federal budgets in extremely high deficit, it is foolish to believe that even the staunchest green job supporter could easily implement any new spending items to promote green jobs. The strategies for generating funds range from large scale national investment banks, to feebates that can easily be set up in cities or counties.

Regardless of the other strategies that are pursued, the need to establish effective, financially sustainable models for generating funding to complete these projects is critical to the success of the green jobs movement.

Strategy: Increase Ohio Public Benefits Fund Contributions

According the American council for an Energy Efficient Economy (ACEEE), the rate-payers of Ohio pay approximately .1% of their utility bill into the Public Benefits Fund managed by the Public Utilities Commission of Ohio. This generated an over-all Public Benefits Fund of approximately $3.2 million in 2009, according to the Database of State Incentives for Renewables and Efficiency. The same year, the California Public Benefits Fund had a value of over $363 million in 2009. According to the California Public Utility Commission, California rate-payers pay approximately 4% of their utility bill into the fund.

Clearly, the ability of the Public Benefits Fund to have a significant impact on the economy of Ohio towards a green economy is severely limited by the total amount available in the fund. In context, although the population of Ohio is well above all but 4 other states with Public Benefits Funds, the value of the Ohio fund is almost $30 M below the average fund. Because the funds are supplied by all utility customers in the state, the amount that each rate payer is charged should be increased to support further investment and raise additional funding for these programs.

Strategy: Implement Green Car and Green Building Feebate Programs

Feebate programs are extremely simple concepts, and much more complicated in practice. In concept, a FEE is charged on items, in this case inefficient or high polluting vehicles, and a re-BATE is offered for high efficiency or low emitting vehicles. In theory, the program can be established to be revenue neutral or positive, and in many cases, *all* purchases are charged the fee, and the fee is simply waived for purchase of items that are preferred. In this model, the program should generate funds for investment.

A Green Car Feebate could be established at the State level to incentivize the purchase of fuel efficient vehicles, and discourage the purchase of less efficient ones. The feebate structure can be arranged in several ways; all cars registered in the state pay an additional "fee", unless the vehicle is on the ACEEE Green Car list with a score of 40 or above, or a ranking of "Superior", for example, in which case the fee is waived.

Feebates could also be established and charged at the point of purchase of a vehicle, and they can be determined by MPG, or total greenhouse gas emissions, or even triggered by being American made.

This method creates funding that can then be used to invest in development of fuel efficient vehicles, or create incentives for the purchase of new fuel efficient vehicles. Strategies for determining the balance point to allow this program to be revenue neutral or positive are available through the Rocky Mountain Institutes report: *Feebates - A Legislative Option to Encourage Continuous Improvements to Automobile Efficiency*.

France implemented a "Bonus/Malus" Green Car Feebate program in December of 2007; however, there are no examples of this type of program in the US. A feebate program called the California Clean Car Discount Act was introduced in 2008 into the California Assembly; however, it failed to pass out of committee.

A Green Building Feebate program could operate at the city or county level very effectively because fees are typically collected at city or county building departments during the permit application process.

Arlington County, Virginia has a feebate program in place to incentivize the construction of LEED Certified green buildings. All buildings are charged a 'Green Building Fee' in addition to building permit and site approval fees, unless the project can prove that the project has been certified as green by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Rating System. Projects that achieve LEED Certification receive a waiver for this fee. This program generates funds that are then used to implement education and green building grant and loan programs throughout the county.

This strategy could easily be implemented in Southwest Ohio by any city or county that collects building, or site permits.

Key Recommendation #8:
Add, Enhance, and Align Policies for Green Jobs

In addition to new policies, a successful green jobs initiative requires an overt effort to align policies and programs in support of green jobs. Without a consistent and strong effort, many of the initiatives that would help businesses "go green", or attract new green businesses will fall flat.

After the implementation of the previous recommendations, it is time to add new policies, and enhance or align existing ones to focus on green jobs. Many of the strategies listed below simply increase demand for more green products. Some simply create additional indicators so that the region understands the unique needs of green business and a green workforce, and that the region is ready to

support them. While others create necessary tools to assist businesses in navigating the municipal maze of policies and incentives.

Strategy: Green Existing Buildings

By greening existing buildings, city and county governments will lower their energy costs and create demand for energy efficient products like energy star windows and insulation, while at the same time creating and supporting green construction jobs. The City of Dayton is currently utilizing performance contract measures to improve the energy efficiency of municipally owned buildings, paid for out of the energy savings. Programs that align with this report's definition of "green jobs" are supported. Examples for helping the private sector participate in similar programs are demonstrated by the Center on Wisconsin Strategy (COWS) and the Greater Cincinnati Energy Alliance (GCEA). The COWS Milwaukee Energy Efficiency (Me2) program allows small property owners and even renters to participate in energy efficiency upgrades paid for by the savings through their energy bill.

Strategy: Create Special Energy Improvement Districts

The State of Ohio recently passed legislation authorizing municipalities to create Special Energy Improvement Districts. These districts are tools that allow municipalities to take advantage of bulk purchasing power to implement renewable energy installations on several properties at once, and then levy the costs of the improvements on the property taxes to pay back the cost of the projects.

Implementation of this program would require significant funding from the municipality, but several of the programs discussed in recommendation number two could be earmarked specifically for this purpose.

This system allows homeowners to implement renewable energy projects, and pay back the municipality for the cost of these installations over time, allowing the energy savings to be realized by the owner. An additional benefit to this system lies in the fact that it is not a direct loan to the owner; rather, it stays with the property through taxes, so if the property is sold, the new owner will continue to pay the cost of the improvements back, and will also continue to see a net savings.

Municipalities should take advantage of the new authority given to them, and begin gathering information from business and home owners that are interested in participating in Special Energy Improvement Districts.

The Milwaukee Energy Efficiency (Me2) program is an example of this type of program.

Strategy: Establish and Implement a Carbon Reduction Goal

The City of Dayton should establish a carbon reduction goal. By implementing a carbon reduction goal, the city will inherently be creating green jobs by improving energy efficiency of existing buildings, reducing waste, and planning for strategies that reduce traffic, and promote rail transportation. All municipalities in the region should also establish a carbon reduction goal and follow through with an action plan to implement the reductions.

Strategy: Support Transit-Oriented-Development

Transit oriented development is a development strategy that emphasizes dense, walkable neighborhoods, located along mass-transit lines and hubs incorporating multiple transportation options including bus, rail, car, and bicycle.

The promotion of transit oriented development would not only create and support jobs, but provides additional access to jobs for everyone by emphasizing public transportation options and walk-ability. This development strategy is essential for the transition to a more sustainable economy.

Strategy: Create a Green Business Development Officer

With the myriad of existing grants, loans, incentives, policies, and legislation already in place, in addition to the strategy proposals outlined here, efforts need to be made to assist companies in understanding the multiple pathways to green that are available to them.

The creation of a Green Business Development Officer in the city, county, or even the state level, will provide a single point of contact for companies that want to head down a path towards greening their jobs. This position will also ensure that the emphasis on providing green jobs is clear for relocating businesses during their negotiations and discussions with the offices of economic development.

The City of Chicago has a clear, single point of contact to understand all of the city's environmental policies, incentives, and legislation through their Department of the Environment. By consolidating all of these efforts with the economic development efforts, Dayton will be able to integrate environmental policy and green job creation.

Appendix A:
Committee Meeting Agendas and Notes

STEERING COMMITTEE MEETING #1

LOCATION: Dayton Development Coalition
Kettering Tower, 40 N. Main Street, 9th Floor Board Room
September 10, 2010
10:00-11:30 AM

Meeting Agenda

10:00 – 10:15 Introductions

10:15 – 10:25 Review Project Goals and History

1. Review Cincinnati Report
2. Establish Green Jobs Council for Dayton
3. Identification of existing 'green' markets in Dayton
4. Identification of potential 'green' markets in Dayton
5. Identification of barriers to 'green' jobs and businesses in Dayton
6. Identification of incentives and policies to attract 'green' jobs and businesses to Dayton

10:25 – 10:35 Review Process and Timeline

1. Monthly meetings of Steering Committee – review schedule and location
2. Who are we missing?
3. Individual stakeholder meetings/interviews – who?
4. Presentations of Draft and Final Report

10:35 – 11:25 Set Boundaries and Definitions

1. Geographical Boundaries
2. 'Green' Market
3. 'Green' Job
4. 'Green' Business

11:25 - 11:30 Review of Next Meeting

STEERING COMMITTEE MEETING #1
LOCATION: Dayton Development Coalition
Kettering Tower, 40 N. Main Street, 9th Floor Board Room
September 10, 2010
10:00- 11:00 AM ~~11:30 AM~~

Meeting Notes

1. **Introductions**
    a. See attached sign-in sheet for attendance
    b. The agenda was compressed to accommodate a 1 hour meeting time
    c. It was agreed upon that future meetings should be planned for 1 hour duration

2. **Review Project Goals and History**
    a. Review of Cincinnati Report recommendations, lessons learned
    b. Establish Green Jobs Council for Dayton
    c. Identification of existing 'green' markets in Dayton
        i. It was discussed and agreed upon that the objective of this initiative is not to create a comprehensive list of existing green *jobs* in Dayton, but rather to examine general trends and major *market sectors* on which to build a strategic policy agenda. If the group decides that a comprehensive database of existing "green" jobs is necessary, that scope of work could be pursued under a separate initiative.
    d. Identification of potential 'green' markets in Dayton
    e. Identification of barriers to 'green' jobs and businesses in Dayton
    f. Identification of incentives and policies to attract 'green' jobs and businesses to Dayton

3. **Review Process and Timeline**
    a. Monthly meetings of Steering Committee – review schedule and location
        i. It was agreed upon that future meetings can continue to be held at the Dayton Development Coalition board room
        ii. Proposed schedule of meetings was agreed upon (see attached)
    b. Who are we missing?
        i. Greene and Miami County Commissioners – Commissioner Dodge and Bob Steinbach agreed to contact commissioners
        ii. Sinclair College – Chris Meyer agreed to contact
        iii. Downtown Dayton Plan – Chris Meyer agreed to contact
        iv. Wright-Patterson AFB – Chris Meyer agreed to contact
        v. Heapy Engineering – Chris Meyer agreed to contact
        vi. Staco Energy Products – John Dybvig and James Winship will coordinate
    c. Individual stakeholder meetings/interviews – who?
        i. No key stakeholders were identified for individual interviews at this time

4. **Set Boundaries and Definitions**
    a. Geographical Boundaries
        i. Geographical boundaries were agreed upon as follows:
            1. For workforce data analysis, use the United States office of Management and Budget's "Dayton MSA" (Montgomery, Greene, Miami, and Preble Counties)
            2. For identification of existing green assets/markets, use the Ohio Dept. of Development's "Economic Development Region 4" (Montgomery, Preble, Darke, Miami, Shelby, Champaign, Clark, Greene, and Clinton Counties) + Warren County
            3. For strategic policy proposals, target City of Dayton, plus Montgomery, Preble, Miami, and Greene Counties
    b. 'Green' Market
    c. 'Green' Job
    d. 'Green' Business
        i. Discussion of Green Job/Market/Business definitions postponed to next meeting.

5. **Review of Next Meeting**
    a. Friday, October 8, 2010 [10:00 am – 11:00 am]
    9th Floor Board Room, Dayton Development Coalition, 40 N. Main Street
    b. Agenda
        i. Green Job/Business/Market Definitions
        ii. Review of existing workforce data and trends
        iii. Identify existing assets

STEERING COMMITTEE MEETING #2

LOCATION: Montgomery County Administration Building
451 W 3rd Street, Room 1002
October 8, 2010
10:00-11:00 AM

Meeting Agenda

10:00 – 10:05 Introductions / Opening Round

10:05 – 10:25 Review Definitions

5. Geographical Boundaries
6. 'Green' Market
7. 'Green' Job
8. 'Green' Business

10:25 – 10:55 Presentation/Discussion of Existing and Missing Data

5. Manufacturing Jobs Data and Trends
6. Existing Policy and Incentives
7. Existing Green Markets?
8. Who else do we need to talk to?

10:55 - 11:00 Review of Next Meeting / Closing Round

STEERING COMMITTEE MEETING #2
LOCATION: Montgomery County Administration Building
451 W 3rd Street, Room 1002
October 8, 2010
10:00-11:00 AM

Meeting Notes

1. **Introductions**
    a. See attached sign-in sheet for attendance

2. **Review Boundaries**
    a. Geographical Boundaries
        i. For workforce data analysis, use the United States office of Management and Budget's "Dayton MSA" (Montgomery, Greene, Miami, and Preble Counties)
        ii. For identification of existing green assets/markets, use the Ohio Dept. of Development's "Economic Development Re gion 4" (Montgomery, Preble, Darke, Miami, Shelby, Champaign, Clark, Greene, and Clinton Counties) + Warren County
        iii. For strategic policy proposals, target City of Dayton, plus Montgomery, Preble, Miami, and Greene Counties

3. **Presentation/Discussion of Existing and Missing Data**
    a. O-NET Online
        i. Resource for job analysis created for US Department of Labor
        ii. New Green Occupation codes added to the database in 3 categories:
            1. Green Increased Demand Occupations
            2. Green Enhanced Skills Occupations
            3. Green New & Emerging (N&E) Occupations
        iii. Sort by Green Economy Sectors, such as Manufacturing
    b. Ohio Job Outlook to 2016
        i. Loss in manufacturing employment projected but still large sector of the economy
        ii. Decrease in manufacturing jobs in urban centers. Increase in rural communities.
    c. Unemployment rates July 2010
        i. Dayton MSA above Ohio rate of 10.3% but below 14%
    d. Occupation Report (Dayton MSA)
        i. Occupational Change Summary
            1. Regional Growth Rate below State and National rates
        ii. Largest number of Team assemblers, Machinists, First-line supervisors/managers and Computer-controlled machine tool operators
        iii. Location Quotient is high for these occupations especially machine tool operators and machinists (An asset for the region)
        iv. Current decline in employment for these occupations locally
        v. Potential for these occupations to be green jobs with the same skills or enhanced skills and increase demand.

e. Local Policies and Initiatives
    i. City of Dayton - Sustainability Policy
    ii. Miami Valley Regional Planning Commission – Integrated Land Use
    iii. Dayton Development Coalition – Economic Development
    iv. University of Dayton - Sustainability Policy
    v. Wright State University - Sustainability Policy
    vi. What are we missing?
        1. Montgomery County - Green Policy and Workforce Strategy
        2. Sinclair Community College
        3. DP&L
        4. Vectren
        5. City of Moraine – Project LEAP (CEDS)

f. Who are we missing?
    i. Miami County Commissioners – Commissioner Dodge will contact again
    ii. Sinclair College (Bob Gilbert or Deb Norris) – Chris Meyer will contact again
    iii. Greater Downtown Dayton Partnership – Chris Meyer agreed to contact
    iv. Wright-Patterson AFB – Chris Meyer agreed to contact
    v. Dayton Area Chamber of Commerce
    vi. Miamisburg Mound

4. Conclusion

a. Director of Sustainable Pittsburgh will be speaking in Dayton on Thursday, November 11, 2010 at 7:00 pm

b. Next Meeting
    i. Friday, November 5, 2010 [2:00 pm – 3:00 pm]
    Room 1002, Montgomery County Administration Building, 451 W 3rd Street

STEERING COMMITTEE MEETING #3
LOCATION: Montgomery County Administration Building
451 W 3rd Street, Room 1011
November 5, 2010
2:00-3:00 PM

Meeting Agenda

2:00 – 2:05 [1] Introductions / Opening Round

2:05 – 2:25 [2] Review Existing Policy Matrix

9. Any missing initiatives?
10. Gap identification

2:25 – 2:35 [3] Manufacturing Assistance Categories

9. NYC White Paper
10. Survey of Dayton manufacturers?

2:35 – 2:55 [4] Missing Stakeholders Identification

a) One-on-one reviews with key stakeholders
   i. City or County government leaders (elected or staff)?
   ii. Major employers?
   iii. Major education representatives?
   iv. Major labor representatives?

2:55 - 3:00 [5] Review of Next Meeting / Closing Round

STEERING COMMITTEE MEETING #3
LOCATION: Montgomery County Administration Building
451 W 3rd Street, Room 1002
November 5, 2010
2:00-3:00 PM

Meeting Notes

1. **Introductions**
    a. See attached sign-in sheet for attendance
    b. Agenda modified to discuss stakeholder meetings first

2. **Missing Stakeholders Identification**
    a. One-on-one interview
        1. Rick Perales, Greene County Commissioner and University of Dayton Campus Planning Director
    b. Group recommends two small focus groups:
        i. Union focus group
            1. Lauren Asplen, IUE-CWA
            2. Kenny Woolum, Ohio AFL-CIO
            3. John Dybvig, Blue Green Alliance
        ii. Dayton City/Chamber/DDC focus group
            1. Donna Winchester, City of Dayton
            2. Timothy Downs, City of Dayton
            3. Dayton Area Chamber of Commerce representative
            4. Chris Meyer, Dayton Development Coalition
    c. Meetings will be scheduled as soon as possible.

3. **Review Existing Policy Matrix**
    a. Matrix lists local plans and initiatives that promote job growth and/or support business development. Those that support green markets within the industries of construction, manufacturing and rail transit are identified.
    b. Large number of initiatives in the "Research and Outreach" category (e.g. Strategic Plans, Policy Recommendations, etc.)
    c. Missing Initiatives:
        i. City of Dayton – Timothy Downs will provide information on green initiatives that should be included as well as a new business incubator with a green technology focus.
    d. Committee to review matrix and inform Shawn or Heather of regional initiatives that should be included by next Friday, November 12th.

4. **Conclusions**
    a. Within existing initiatives there is a strong focus on Aerospace, Medical and Advanced Materials/Controls industries. Limited examples of support for manufacturing industry.
        i. R&D will primarily support jobs in engineering and science.

ii. Look for areas where manufacturing and technology industries can support each other. Create incentives to boost local manufacturing of commercialized products.
iii. Many existing examples of this relationship such as companies at the Mound that have received Third Frontier Grants.
iv. Dayton area still has a strong manufacturing industry but it is composed of many small companies (approx. 2500) rather than large companies of the past.

b. Less than 2% of the Region's developed land is classified industrial. Resist pressure to re-zone manufacturing property. Strive to redevelop existing manufacturing vacancy with green manufacturing.
   i. Is 2% a high, low or average number for this type of community? A lot of agricultural and sprawling residential land may skew number to appear low.
   ii. There seems to be plenty of land to accommodate industry in the foreseeable future.

c. Form a Local Green Jobs Council and encourage local elected officials to sign the local green jobs pledge and participate in the Council.

5. Policy Recommendations

a. Add 'Green Strings' to existing initiatives.
b. Assist manufacturing base to transition to Green
   i. Energy, Waste, Water or Product Efficiency
      1. Certification of products or process
      2. Financial assistance for new, more efficient equipment
      3. Training of employees for energy, water or waste reduction
      4. Technical assistance – process retooling for efficiency (NACFAM tools)
c. Develop marketing programs to promote green manufacturing capability
   i. Promote Awareness within the region (Wright-Patt, The Mound, Tech Town)
   ii. Assist with Green business plans
   iii. Chamber/DRG Task Force – Green Business Certification
      1. Include Manufacturing
      2. Assist with OEM Certification/Supply Chain

6. Survey Manufacturers

a. NYC White Paper surveyed existing companies to determine the type of assistance they need to encourage green manufacturing.
b. Shawn and Heather will create a survey for Dayton and coordinate with Angelia Erbaugh and Lauren Asplen to distribute to their members.

7. Conclusion

a. Next Meeting
   i. Friday, December 3, 2010 [10:00 am – 11:00 am]
   Room 1002, Montgomery County Administration Building, 451 W 3rd Street

STEERING COMMITTEE MEETING #4
LOCATION: Montgomery County Administration Building
451 W 3rd Street, Room 1002
December 3, 2010
10:00-11:00 AM

Meeting Agenda

10:00 – 10:05 [1] Introductions / Update

11. One-on-One Meetings
12. Survey of Dayton Manufacturers

10:05 – 10:30 [2] Review Findings of Research

a) Refer to Outline of Report
b) Feedback

10:30 – 10:55 [4] Review Recommendations

b) Refer to Outline of Report
c) Feedback

10:55 - 11:00 [5] Next Steps / Closing Round

Appendix B:
Dayton Green Manufacturing Survey

DAYTON GREEN MANUFACTURING SURVEY

***RESULTS INDICATED IN RED**

INTRODUCTION

The Blue Green Alliance, a national non-profit organization focused on building a green-collar manufacturing economy, is working on a project to promote green manufacturing within the Dayton Region. Please take a few moments to click on this link and answer 10 simple questions about your company and "Green" manufacturing – your responses will help to shape the types of incentives and assistance programs that will be promoted within the Dayton Region. Please know that all responses are anonymous. Thank you for your time!

PAGE 1 – DEMOGRAPHIC INFORMATION

1) Select the industry code that represents your company best (please refer to the US Bureau of Labor Statistics for full descriptions – www.bls.gov)

- Food Manufacturing (NAICS 311) 0.0%
- Beverage and Tobacco Product Manufacturing (NAICS 312) 0.0%
- Textile Mills (NAICS 313) 0.0%
- Textile Product Mills (NAICS 314) 0.0%
- Apparel Manufacturing (NAICS 315) 0.0%
- Leather and Allied Product Manufacturing (NAICS 316) 0.0%
- Wood Product Manufacturing (NAICS 321) 0.0%
- Paper Manufacturing (NAICS 322) 0.0%
- Printing and Related Support Activities (NAICS 323) 0.0%
- Petroleum and Coal Products Manufacturing (NAICS 324) 0.0%
- Chemical Manufacturing (NAICS 325) 0.0%
- Plastics and Rubber Products Manufacturing (NAICS 326) 13.6%
- Nonmetallic Mineral Product Manufacturing (NAICS 327) 0.0%
- Primary Metal Manufacturing (NAICS 331) 11.4%
- Fabricated Metal Product Manufacturing (NAICS 332) 31.8%
- Machinery Manufacturing (NAICS 333) 18.2%
- Computer and Electronic Product Manufacturing (NAICS 334) 2.3%
- Electrical Equipment, Appliance, and Component Manufacturing (NAICS 335) 9.1%
- Transportation Equipment Manufacturing (NAICS 336) 6.8%
- Furniture and Related Product Manufacturing (NAICS 337) 0.0%
- Miscellaneous Manufacturing (NAICS 339) 6.8%
- Other (please specify) 11.4%

2) How many full-time employees are in your company?

- 1-4 4.5%
- 5-9 9.1%
- 10-19 20.5%
- 20-49 25%
- 50-99 15.9%
- 100-249 13.6%

- 250-499 9.1%
- 1,000 Plus 2.3%

3) What is the geographic focus of your sales efforts in new markets?
   - Local 15.9%
   - Regional 40.9%
   - National 47.7%
   - International 38.6%

PAGE 2 – GREEN MARKETS

When considering 'Green Markets' in the next few questions, please consider the following markets as 'Green':

- Wind Turbines/Components
- Solar Energy Panels/Components
- Bio-Fuels
- Batteries/Fuel Cells
- Green Building Products
- Energy Efficiency Controls/Sensor Technology
- Rail Transportation

1) What percentage of your business currently comes from one or more 'Green' Markets?
   - More than 90% 2.5%
   - 60-90% 2.5%
   - 30-59% 5.0%
   - Less than 30% 35.0%
   - Zero 55.0%

   [Please specify which 'Green' Markets your business currently comes from:]

   Responses: Energy Efficiency controls; Solar, energy efficiency lighting; Frames for solar panels; Wind turbine components, solar energy panels; batteries; Solar, hydro; Bio-fuels; Wind, Bio-fuels, Energy Efficiency Controls, Rail Transportation; Diesel engines; Wind turbines/Components, Solar Energy Panels/Components, Batteries/Fuel Cells; Wind Turbines/Components and Solar energy panels/components; Fuel cells; Fuel cells, Rail transportation; Wind turbines; Wind turbine components.

2) To what extent is one or more 'Green' Markets part of your business plans in the next 10 years?
   - Significant, we anticipate more than 60% of our work to be in 'Green' markets. 7.5%
   - Somewhat, we anticipate 'Green' markets to support our existing work by as much as 30%. 27.5%
   - Very little, we are not counting on 'Green' markets to provide more than 10% of our work. 52.5%
   - None, we are not anticipating any work from 'Green' markets. 12.5%

[Please specify which 'Green' Markets are part of your business plans:]

Responses: Energy Efficiency controls; Energy efficiency lighting, solar; Batteries; Solar, Hydro; Wind turbines/components; Wind Turbine, Energy Efficiency

3) What challenges do you face entering 'Green Markets?

- Access to Customers 57.5%
- Production Issues 12.5%
- Technical Issues 22.5%
- Costs & Financing 25.0%
- Educating Customers 10.0%
- Knowledge of Market Trends 40.0%
- Design to Ship Time 2.5%
- Other (please specify) 10.0%
  - Low volume; Small market; Don't see a pressing need in our area

4) Please rank these types of assistance programs as to their effectiveness in encouraging your company to enter 'Green Markets. [1 – MOST effective / 8 – LEAST effective]

- Business Planning 6
- Financing 4
- Market Research 2
- Identification of Suppliers 3
- Manufacturing Performance 8
- Product Design/Development 5
- Sales and Marketing 1
- Technical Problem Solving 7

[Please list other types of assistance programs that would be effective:]

Response: We can make the products… just need to find out who needs it!

PAGE 3 – 'GREENING' THE PROCESS

For the next few questions, please answer in regard to the "Green-ness" of your current and future operations, regardless of which market the work is supporting. Please consider the following categories when answering these questions:

- Electricity Use
- Fuel Use
- Water Use
- Material Use
- Waste Generated
- Employee Satisfaction

1) Please indicate your company's level of commitment to 'Green-er' operations.

- We are only committed to meeting environmental regulations — 28.9%
- We will exceed environmental regulations only if it saves us money immediately — 21.1%
- We have taken some steps to improve our environmental impacts beyond environmental regulations, but are focused on projects that have a quick (less than 5 year) pay-back — 39.5%
- We have begun taking steps to improve our environmental impact well beyond environmental regulations, and are interested in long-term (10 years or more) pay-back — 5.3%
- We demonstrate environmental leadership in our industry, and are fully committed to improving our environmental impacts by implementing our comprehensive environmental plan. — 5.3%

2) What challenges does your company face in implementing 'Green-er' operations.

- Upfront cost to implement 'Green' strategies — 63.2%
- Lack of financial incentives — 47.4%
- Lack of resources to tap into City, State and Federal assistance programs — 34.2%
- Not enough interest or awareness from customers — 31.6%
- Lack of tools to evaluate appropriate 'Green' strategies — 34.2%
- Access to employee training — 15.8%

3) Please rate these types of assistance programs as to their effectiveness in encouraging your company to implement 'Green-er' operations. [1 – MOST effective / 7 – LEAST effective]

- Business Planning — 2
- Employee Training — 6
- Facility Audits — 4
- Financing — 1
- Individual Firm Assistance — 5
- Sales and Marketing — 3
- Technical Problem Solving — 7

[Please list other types of assistance programs that would be effective:]

No Responses.

Appendix C:
2010 Jobs Data

Browse by Green Economy Sector

All Green Economy Sectors

Category	Code	Occupation	Sectors
Green New & Emerging	11-1011.03	Chief Sustainability Officers	Governmental and Regulatory Administration
Green Enhanced Skills	11-1021.00	General and Operations Managers	Agriculture and Forestry; Energy Efficiency
Green New & Emerging	11-2011.01	Green Marketers	Research, Design, and Consulting Services
Green Enhanced Skills	11-2021.00	Marketing Managers	Research, Design, and Consulting Services
Green Increased Demand	11-3051.00	Industrial Production Managers	Manufacturing
Green New & Emerging	11-3051.02	Geothermal Production Managers	Renewable Energy Generation
Green New & Emerging	11-3051.03	Biofuels Production Managers	Renewable Energy Generation
Green New & Emerging	11-3051.04	Biomass Production Managers	Renewable Energy Generation
Green New & Emerging	11-3051.05	Methane/Landfill Gas Collection System Operators	Renewable Energy Generation
Green New & Emerging	11-3051.06	Hydroelectric Production Managers	Renewable Energy Generation
Green Enhanced Skills	11-3071.01	Transportation Managers	Transportation
Green Enhanced Skills	11-3071.02	Storage and Distribution Managers	Renewable Energy Generation
Green Enhanced Skills	11-9012.00	Farmers and Ranchers	Agriculture and Forestry
Green Enhanced Skills	11-9021.00	Construction Managers	Environment Protection; Green Construction
Green Enhanced Skills	11-9041.00	Engineering Managers	Environment Protection; Research, Design, and Consulting Services
Green New & Emerging	11-9041.01	Biofuels/Biodiesel Technology and Product Development Managers	Renewable Energy Generation
Green Increased Demand	11-9121.00	Natural Sciences Managers	Environment Protection
Green New & Emerging	11-9121.02	Water Resource Specialists	Environment Protection
Green New & Emerging	11-9199.01	Regulatory Affairs Managers	Governmental and Regulatory Administration
Green New & Emerging	11-9199.02	Compliance Managers	Governmental and Regulatory Administration
Green New & Emerging	11-9199.04	Supply Chain Managers	Manufacturing; Research, Design, and Consulting Services; Transportation
Green New & Emerging	11-9199.06	Logistics Managers	Manufacturing; Research, Design, and Consulting Services; Transportation
Green New & Emerging	11-9199.09	Wind Energy Operations Managers	Renewable Energy Generation
Green New & Emerging	11-9199.10	Wind Energy Project Managers	Renewable Energy Generation
Green New & Emerging	11-9199.11	Brownfield Redevelopment Specialists and Site Managers	Environment Protection
Green Increased Demand	13-1021.00	Purchasing Agents and Buyers, Farm Products	Agriculture and Forestry
Green Enhanced Skills	13-1022.00	Wholesale and Retail Buyers, Except Farm Products	Research, Design, and Consulting Services
Green New & Emerging	13-1041.07	Regulatory Affairs Specialists	Governmental and Regulatory Administration
Green Enhanced Skills	13-1073.00	Training and Development Specialists	Energy Efficiency; Green Construction; Research, Design, and Consulting Services
Green New & Emerging	13-1081.01	Logistics Engineers	Manufacturing; Research, Design, and Consulting Services; Transportation

Browse by Green Economy Sector

All Green Economy Sectors

Category	Code	Occupation	Sectors
Green New & Emerging	13-1081.02	Logistics Analysts	Manufacturing; Research, Design, and Consulting Services; Transportation
Green New & Emerging	13-1199.01	Energy Auditors	Energy Efficiency; Governmental and Regulatory Administration
Green New & Emerging	13-1199.05	Sustainability Specialists	Governmental and Regulatory Administration
Green Enhanced Skills	13-2051.00	Financial Analysts	Energy Efficiency; Governmental and Regulatory Administration; Green Construction; Research, Design, and Consulting Services
Green Enhanced Skills	13-2052.00	Personal Financial Advisors	Research, Design, and Consulting Services
Green New & Emerging	13-2099.01	Financial Quantitative Analysts	Research, Design, and Consulting Services
Green New & Emerging	13-2099.02	Risk Management Specialists	Research, Design, and Consulting Services
Green New & Emerging	13-2099.03	Investment Underwriters	Energy Trading; Research, Design, and Consulting Services
Green Increased Demand	15-1032.00	Computer Software Engineers, Systems Software	Research, Design, and Consulting Services
Green New & Emerging	15-1099.06	Geospatial Information Scientists and Technologists	Research, Design, and Consulting Services
Green New & Emerging	15-1099.07	Geographic Information Systems Technicians	Research, Design, and Consulting Services
Green Enhanced Skills	17-1011.00	Architects, Except Landscape and Naval	Green Construction; Research, Design, and Consulting Services
Green Enhanced Skills	17-1012.00	Landscape Architects	Agriculture and Forestry; Environment Protection; Green Construction
Green Enhanced Skills	17-2011.00	Aerospace Engineers	Research, Design, and Consulting Services; Transportation
Green Increased Demand	17-2041.00	Chemical Engineers	Research, Design, and Consulting Services
Green Enhanced Skills	17-2051.00	Civil Engineers	Green Construction; Renewable Energy Generation; Research, Design, and Consulting Services
Green New & Emerging	17-2051.01	Transportation Engineers	Research, Design, and Consulting Services; Transportation
Green New & Emerging	17-2051.02	Water/Wastewater Engineers	Environment Protection
Green Enhanced Skills	17-2071.00	Electrical Engineers	Energy Efficiency; Green Construction; Renewable Energy Generation; Research, Design, and Consulting Services
Green Enhanced Skills	17-2072.00	Electronics Engineers, Except Computer	Research, Design, and Consulting Services; Transportation
Green Enhanced Skills	17-2081.00	Environmental Engineers	Environment Protection; Governmental and Regulatory Administration
Green Increased Demand	17-2111.01	Industrial Safety and Health Engineers	Manufacturing; Research, Design, and Consulting Services

Browse by Green Economy Sector

All Green Economy Sectors

Category	Code	Occupation	Sectors
Green Increased Demand	17-2112.00	Industrial Engineers	Research, Design, and Consulting Services
Green Enhanced Skills	17-2141.00	Mechanical Engineers	Energy Efficiency; Green Construction; Renewable Energy Generation; Research, Design, and Consulting Services; Transportation
Green New & Emerging	17-2141.01	Fuel Cell Engineers	Research, Design, and Consulting Services; Transportation
Green New & Emerging	17-2141.02	Automotive Engineers	Research, Design, and Consulting Services; Transportation
Green Enhanced Skills	17-2161.00	Nuclear Engineers	Governmental and Regulatory Administration; Research, Design, and Consulting Services
Green New & Emerging	17-2199.01	Biochemical Engineers	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-2199.02	Validation Engineers	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-2199.03	Energy Engineers	Energy Efficiency; Green Construction; Research, Design, and Consulting Services
Green New & Emerging	17-2199.04	Manufacturing Engineers	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-2199.05	Mechatronics Engineers	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-2199.06	Microsystems Engineers	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-2199.07	Photonics Engineers	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-2199.08	Robotics Engineers	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-2199.09	Nanosystems Engineers	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-2199.10	Wind Energy Engineers	Renewable Energy Generation
Green New & Emerging	17-2199.11	Solar Energy Systems Engineers	Renewable Energy Generation
Green Increased Demand	17-3011.01	Architectural Drafters	Green Construction
Green Increased Demand	17-3023.01	Electronics Engineering Technicians	Manufacturing
Green Enhanced Skills	17-3023.03	Electrical Engineering Technicians	Manufacturing
Green Enhanced Skills	17-3024.00	Electro-Mechanical Technicians	Manufacturing
Green New & Emerging	17-3024.01	Robotics Technicians	Manufacturing; Research, Design, and Consulting Services
Green Enhanced Skills	17-3025.00	Environmental Engineering Technicians	Environment Protection
Green Enhanced Skills	17-3026.00	Industrial Engineering Technicians	Manufacturing
Green New & Emerging	17-3027.01	Automotive Engineering Technicians	Transportation
Green New & Emerging	17-3029.02	Electrical Engineering Technologists	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-3029.03	Electromechanical Engineering Technologists	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-3029.04	Electronics Engineering Technologists	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-3029.05	Industrial Engineering Technologists	Manufacturing; Research, Design, and Consulting Services

Browse by Green Economy Sector

All Green Economy Sectors

Category	Code	Occupation	Sectors
Green New & Emerging	17-3029.06	Manufacturing Engineering Technologists	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-3029.07	Mechanical Engineering Technologists	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-3029.08	Photonics Technicians	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-3029.09	Manufacturing Production Technicians	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-3029.10	Fuel Cell Technicians	Transportation
Green New & Emerging	17-3029.11	Nanotechnology Engineering Technologists	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	17-3029.12	Nanotechnology Engineering Technicians	Manufacturing
Green Increased Demand	19-1023.00	Zoologists and Wildlife Biologists	Environment Protection
Green Enhanced Skills	19-1031.01	Soil and Water Conservationists	Environment Protection; Governmental and Regulatory Administration
Green Enhanced Skills	19-2021.00	Atmospheric and Space Scientists	Environment Protection; Research, Design, and Consulting Services
Green Increased Demand	19-2031.00	Chemists	Manufacturing; Research, Design, and Consulting Services
Green Increased Demand	19-2032.00	Materials Scientists	Manufacturing; Research, Design, and Consulting Services
Green Increased Demand	19-2041.00	Environmental Scientists and Specialists, Including Health	Environment Protection
Green New & Emerging	19-2041.01	Climate Change Analysts	Environment Protection
Green New & Emerging	19-2041.02	Environmental Restoration Planners	Environment Protection
Green New & Emerging	19-2041.03	Industrial Ecologists	Environment Protection
Green Enhanced Skills	19-2042.00	Geoscientists, Except Hydrologists and Geographers	Environment Protection; Research, Design, and Consulting Services
Green Increased Demand	19-2043.00	Hydrologists	Environment Protection; Research, Design, and Consulting Services
Green New & Emerging	19-2099.01	Remote Sensing Scientists and Technologists	Research, Design, and Consulting Services
Green New & Emerging	19-3011.01	Environmental Economists	Environment Protection
Green Enhanced Skills	19-3051.00	Urban and Regional Planners	Governmental and Regulatory Administration; Green Construction; Research, Design, and Consulting Services
Green New & Emerging	19-3099.01	Transportation Planners	Governmental and Regulatory Administration; Research, Design, and Consulting Services; Transportation
Green Enhanced Skills	19-4011.01	Agricultural Technicians	Agriculture and Forestry
Green Increased Demand	19-4031.00	Chemical Technicians	Manufacturing
Green Enhanced Skills	19-4041.01	Geophysical Data Technicians	Research, Design, and Consulting Services
Green Enhanced Skills	19-4041.02	Geological Sample Test Technicians	Renewable Energy Generation; Research, Design, and Consulting Services
Green Enhanced Skills	19-4051.01	Nuclear Equipment Operation Technicians	Renewable Energy Generation

Browse by Green Economy Sector

All Green Economy Sectors

Category	Code	Occupation	Sectors
Green Enhanced Skills	19-4091.00	Environmental Science and Protection Technicians, Including Health	Environment Protection
Green Increased Demand	19-4093.00	Forest and Conservation Technicians	Environment Protection
Green New & Emerging	19-4099.02	Precision Agriculture Technicians	Agriculture and Forestry; Research, Design, and Consulting Services
Green New & Emerging	19-4099.03	Remote Sensing Technicians	Research, Design, and Consulting Services
Green Enhanced Skills	23-1022.00	Arbitrators, Mediators, and Conciliators	Governmental and Regulatory Administration; Research, Design, and Consulting Services
Green Increased Demand	25-9021.00	Farm and Home Management Advisors	Environment Protection
Green Increased Demand	27-1021.00	Commercial and Industrial Designers	Manufacturing; Research, Design, and Consulting Services
Green Enhanced Skills	27-3022.00	Reporters and Correspondents	Environment Protection; Research, Design, and Consulting Services
Green Enhanced Skills	27-3031.00	Public Relations Specialists	Environment Protection; Research, Design, and Consulting Services
Green Increased Demand	29-9011.00	Occupational Health and Safety Specialists	Manufacturing; Research, Design, and Consulting Services
Green Enhanced Skills	29-9012.00	Occupational Health and Safety Technicians	Manufacturing
Green Increased Demand	33-3031.00	Fish and Game Wardens	Environment Protection
Green New & Emerging	41-3031.03	Securities and Commodities Traders	Energy Trading; Research, Design, and Consulting Services
Green New & Emerging	41-3099.01	Energy Brokers	Energy Trading
Green Enhanced Skills	41-4011.00	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Manufacturing; Research, Design, and Consulting Services
Green New & Emerging	41-4011.07	Solar Sales Representatives and Assessors	Renewable Energy Generation
Green Increased Demand	43-4051.00	Customer Service Representatives	Research, Design, and Consulting Services
Green New & Emerging	43-5011.01	Freight Forwarders	Transportation
Green Increased Demand	43-5032.00	Dispatchers, Except Police, Fire, and Ambulance	Transportation
Green Increased Demand	43-5061.00	Production, Planning, and Expediting Clerks	Manufacturing
Green Enhanced Skills	43-5071.00	Shipping, Receiving, and Traffic Clerks	Manufacturing; Research, Design, and Consulting Services; Transportation
Green Increased Demand	45-1011.05	First-Line Supervisors/Managers of Logging Workers	Environment Protection
Green Increased Demand	45-1011.07	First-Line Supervisors/Managers of Agricultural Crop and Horticultural Workers	Agriculture and Forestry
Green Increased Demand	45-2011.00	Agricultural Inspectors	Agriculture and Forestry; Governmental and Regulatory Administration
Green Increased Demand	45-4011.00	Forest and Conservation Workers	Environment Protection
Green New & Emerging	47-1011.03	Solar Energy Installation Managers	Renewable Energy Generation
Green Increased Demand	47-2011.00	Boilermakers	Energy Efficiency; Green Construction

Browse by Green Economy Sector

All Green Economy Sectors

Category	Code	Occupation	Sectors
Green Increased Demand	47-2031.01	Construction Carpenters	Green Construction
Green Increased Demand	47-2031.02	Rough Carpenters	Green Construction
Green Increased Demand	47-2051.00	Cement Masons and Concrete Finishers	Green Construction
Green Enhanced Skills	47-2061.00	Construction Laborers	Green Construction
Green Increased Demand	47-2073.00	Operating Engineers and Other Construction Equipment Operators	Green Construction
Green Increased Demand	47-2111.00	Electricians	Green Construction
Green Increased Demand	47-2131.00	Insulation Workers, Floor, Ceiling, and Wall	Energy Efficiency; Green Construction
Green Enhanced Skills	47-2152.01	Pipe Fitters and Steamfitters	Green Construction
Green Enhanced Skills	47-2152.02	Plumbers	Green Construction
Green Enhanced Skills	47-2181.00	Roofers	Green Construction
Green Enhanced Skills	47-2211.00	Sheet Metal Workers	Green Construction; Manufacturing; Renewable Energy Generation
Green Increased Demand	47-2221.00	Structural Iron and Steel Workers	Green Construction; Manufacturing
Green Increased Demand	47-3012.00	Helpers--Carpenters	Green Construction
Green Enhanced Skills	47-4011.00	Construction and Building Inspectors	Governmental and Regulatory Administration; Green Construction
Green Enhanced Skills	47-4041.00	Hazardous Materials Removal Workers	Environment Protection; Green Construction; Recycling and Waste Reduction
Green Increased Demand	47-4061.00	Rail-Track Laying and Maintenance Equipment Operators	Transportation
Green New & Emerging	47-4099.01	Solar Photovoltaic Installers	Renewable Energy Generation
Green New & Emerging	47-4099.02	Solar Thermal Installers and Technicians	Renewable Energy Generation
Green New & Emerging	47-4099.03	Weatherization Installers and Technicians	Energy Efficiency
Green Enhanced Skills	47-5013.00	Service Unit Operators, Oil, Gas, and Mining	Renewable Energy Generation
Green Enhanced Skills	47-5041.00	Continuous Mining Machine Operators	Renewable Energy Generation
Green Increased Demand	49-1011.00	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	Manufacturing
Green Increased Demand	49-2094.00	Electrical and Electronics Repairers, Commercial and Industrial Equipment	Manufacturing; Research, Design, and Consulting Services
Green Enhanced Skills	49-3023.02	Automotive Specialty Technicians	Transportation
Green Enhanced Skills	49-9021.01	Heating and Air Conditioning Mechanics and Installers	Energy Efficiency; Green Construction
Green Increased Demand	49-9021.02	Refrigeration Mechanics and Installers	Energy Efficiency; Green Construction
Green Increased Demand	49-9041.00	Industrial Machinery Mechanics	Manufacturing
Green Enhanced Skills	49-9042.00	Maintenance and Repair Workers, General	Energy Efficiency; Environment Protection; Green Construction; Manufacturing; Renewable Energy Generation
Green Increased Demand	49-9044.00	Millwrights	Manufacturing
Green Increased Demand	49-9051.00	Electrical Power-Line Installers and Repairers	Energy Efficiency
Green Increased Demand	49-9098.00	Helpers--Installation, Maintenance, and Repair Workers	Green Construction
Green New & Emerging	49-9099.01	Geothermal Technicians	Renewable Energy Generation
Green New & Emerging	49-9099.02	Wind Turbine Service Technicians	Renewable Energy Generation
Green Increased Demand	51-1011.00	First-Line Supervisors/Managers of Production and Operating Workers	Manufacturing

Browse by Green Economy Sector

All Green Economy Sectors

Category	Code	Occupation	Sectors
Green Enhanced Skills	51-2011.00	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	Manufacturing
Green Increased Demand	51-2022.00	Electrical and Electronic Equipment Assemblers	Manufacturing
Green Increased Demand	51-2031.00	Engine and Other Machine Assemblers	Manufacturing
Green Increased Demand	51-2041.00	Structural Metal Fabricators and Fitters	Green Construction; Manufacturing
Green Increased Demand	51-2092.00	Team Assemblers	Manufacturing
Green Increased Demand	51-4011.00	Computer-Controlled Machine Tool Operators, Metal and Plastic	Manufacturing
Green Increased Demand	51-4031.00	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	Manufacturing
Green Increased Demand	51-4032.00	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	Manufacturing
Green Enhanced Skills	51-4041.00	Machinists	Manufacturing; Renewable Energy Generation
Green Increased Demand	51-4121.06	Welders, Cutters, and Welder Fitters	Green Construction; Manufacturing
Green Increased Demand	51-4121.07	Solderers and Brazers	Green Construction; Manufacturing
Green Enhanced Skills	51-8011.00	Nuclear Power Reactor Operators	Renewable Energy Generation
Green Increased Demand	51-8012.00	Power Distributors and Dispatchers	Renewable Energy Generation
Green Enhanced Skills	51-8013.00	Power Plant Operators	Energy and Carbon Capture and Storage; Green Construction; Renewable Energy Generation
Green Increased Demand	51-8021.00	Stationary Engineers and Boiler Operators	Energy Efficiency
Green Increased Demand	51-8091.00	Chemical Plant and System Operators	Manufacturing
Green New & Emerging	51-8099.01	Biofuels Processing Technicians	Renewable Energy Generation
Green New & Emerging	51-8099.02	Methane/Landfill Gas Generation System Technicians	Renewable Energy Generation
Green New & Emerging	51-8099.03	Biomass Plant Technicians	Renewable Energy Generation
Green New & Emerging	51-8099.04	Hydroelectric Plant Technicians	Renewable Energy Generation
Green Increased Demand	51-9011.00	Chemical Equipment Operators and Tenders	Manufacturing
Green Enhanced Skills	51-9012.00	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	Manufacturing; Renewable Energy Generation
Green Increased Demand	51-9023.00	Mixing and Blending Machine Setters, Operators, and Tenders	Manufacturing
Green Enhanced Skills	51-9061.00	Inspectors, Testers, Sorters, Samplers, and Weighers	Governmental and Regulatory Administration; Manufacturing
Green New & Emerging	51-9199.01	Recycling and Reclamation Workers	Recycling and Waste Reduction
Green New & Emerging	53-1021.01	Recycling Coordinators	Recycling and Waste Reduction
Green Increased Demand	53-3021.00	Bus Drivers, Transit and Intercity	Transportation
Green Enhanced Skills	53-3032.00	Truck Drivers, Heavy and Tractor-Trailer	Transportation
Green Increased Demand	53-4011.00	Locomotive Engineers	Transportation
Green Increased Demand	53-4031.00	Railroad Conductors and Yardmasters	Transportation
Green Enhanced Skills	53-6051.07	Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation	Energy Efficiency; Governmental and Regulatory Administration; Transportation
Green Increased Demand	53-7051.00	Industrial Truck and Tractor Operators	Green Construction; Transportation

Browse by Green Economy Sector

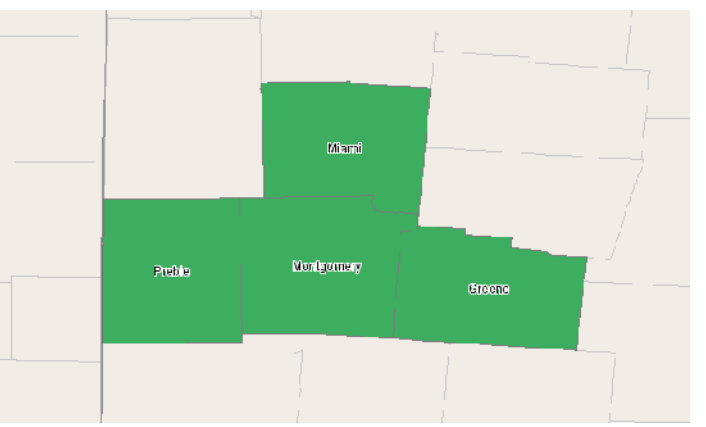
All Green Economy Sectors

Category	Code	Occupation	Sectors
Green Increased Demand	53-7062.00	Laborers and Freight, Stock, and Material Movers, Hand	Green Construction; Manufacturing
Green Enhanced Skills	53-7081.00	Refuse and Recyclable Material Collectors	Recycling and Waste Reduction

Great Oaks Career Campuses

3254 East Kemper Road
Cincinnati, Ohio 45241
513.771.8881

Occupation Report



Region Info

Region: Dayton MSA

MSA Areas: Dayton, OH (19380)

Selected Occupations

Occupation	Education Level
First-line supervisors/managers of non-retail sales workers (SOC 41-1012)	Work experience in a related field
Sales representatives, wholesale and manufacturing, technical and scientific products (SOC 41-4011)	Moderate-term on-the-job training
Sales representatives, wholesale and manufacturing, except technical and scientific products (SOC 41-4012)	Moderate-term on-the-job training
Demonstrators and product promoters (SOC 41-9011)	Moderate-term on-the-job training
Sales engineers (SOC 41-9031)	Bachelor's degree
Electric motor, power tool, and related repairers (SOC 49-2092)	Postsecondary vocational award
Electrical and electronics repairers, commercial and industrial equipment (SOC 49-2094)	Postsecondary vocational award
Electrical and electronics repairers, powerhouse, substation, and relay (SOC 49-2095)	Postsecondary vocational award
Electronic equipment installers and repairers, motor vehicles (SOC 49-2096)	Postsecondary vocational award
Aircraft mechanics and service technicians (SOC 49-3011)	Postsecondary vocational award
Bus and truck mechanics and diesel engine specialists (SOC 49-3031)	Postsecondary vocational award
Rail car repairers (SOC 49-3043)	Long-term on-the-job training
Maintenance workers, machinery (SOC 49-9043)	Short-term on-the-job training
Electrical power-line installers and repairers (SOC 49-9051)	Long-term on-the-job training
Helpers--Installation, maintenance, and repair workers (SOC 49-9098)	Short-term on-the-job training
First-line supervisors/managers of production and operating workers (SOC 51-1011)	Work experience in a related field
Aircraft structure, surfaces, rigging, and systems assemblers (SOC 51-2011)	Long-term on-the-job training
Coil winders, tapers, and finishers (SOC 51-2021)	Short-term on-the-job training
Electrical and electronic equipment assemblers (SOC 51-2022)	Short-term on-the-job training
Electromechanical equipment assemblers (SOC 51-2023)	Short-term on-the-job training
Engine and other machine assemblers (SOC 51-2031)	Short-term on-the-job training
Structural metal fabricators and fitters (SOC 51-2041)	Moderate-term on-the-job training
Fiberglass laminators and fabricators (SOC 51-2091)	Moderate-term on-the-job training
Team assemblers (SOC 51-2092)	Moderate-term on-the-job training
Computer-controlled machine tool operators, metal and plastic (SOC 51-4011)	Moderate-term on-the-job training
Extruding and drawing machine setters, operators, and tenders, metal and plastic (SOC 51-4021)	Moderate-term on-the-job training
Forging machine setters, operators, and tenders, metal and plastic (SOC 51-4022)	Moderate-term on-the-job training
Rolling machine setters, operators, and tenders, metal and plastic (SOC 51-4023)	Moderate-term on-the-job training
Cutting, punching, and press machine setters, operators, and tenders, metal and plastic (SOC 51-4031)	Moderate-term on-the-job training
Drilling and boring machine tool setters, operators, and tenders, metal and plastic (SOC 51-4032)	Moderate-term on-the-job training
Grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders, metal and plastic (SOC 51-4033)	Moderate-term on-the-job training
Lathe and turning machine tool setters, operators, and tenders, metal and plastic (SOC 51-4034)	Moderate-term on-the-job training
Milling and planing machine setters, operators, and tenders, metal and plastic (SOC 51-4035)	Moderate-term on-the-job training

Machinists (SOC 51-4041)	Long-term on-the-job training
Metal-refining furnace operators and tenders (SOC 51-4051)	Moderate-term on-the-job training
Pourers and casters, metal (SOC 51-4052)	Moderate-term on-the-job training
Welders, cutters, solderers, and brazers (SOC 51-4121)	Long-term on-the-job training
Welding, soldering, and brazing machine setters, operators, and tenders (SOC 51-4122)	Moderate-term on-the-job training
Heat treating equipment setters, operators, and tenders, metal and plastic (SOC 51-4191)	Moderate-term on-the-job training
Nuclear power reactor operators (SOC 51-8011)	Long-term on-the-job training
Power distributors and dispatchers (SOC 51-8012)	Long-term on-the-job training
Power plant operators (SOC 51-8013)	Long-term on-the-job training
Stationary engineers and boiler operators (SOC 51-8021)	Long-term on-the-job training
Chemical plant and system operators (SOC 51-8091)	Long-term on-the-job training
Gas plant operators (SOC 51-8092)	Long-term on-the-job training
Petroleum pump system operators, refinery operators, and gaugers (SOC 51-8093)	Long-term on-the-job training
Chemical equipment operators and tenders (SOC 51-9011)	Moderate-term on-the-job training
Separating, filtering, clarifying, precipitating, and still machine setters, operators, and tenders (SOC 51-9012)	Moderate-term on-the-job training
Crushing, grinding, and polishing machine setters, operators, and tenders (SOC 51-9021)	Moderate-term on-the-job training
Extruding, forming, pressing, and compacting machine setters, operators, and tenders (SOC 51-9041)	Moderate-term on-the-job training
Furnace, kiln, oven, drier, and kettle operators and tenders (SOC 51-9051)	Moderate-term on-the-job training
Inspectors, testers, sorters, samplers, and weighers (SOC 51-9061)	Moderate-term on-the-job training
Semiconductor processors (SOC 51-9141)	Associate's degree
Tire builders (SOC 51-9197)	Moderate-term on-the-job training
Helpers--Production workers (SOC 51-9198)	Short-term on-the-job training
Locomotive engineers and operators (SOC 53-4019)	Moderate-term on-the-job training
Railroad brake, signal, and switch operators (SOC 53-4021)	Moderate-term on-the-job training
Railroad conductors and yardmasters (SOC 53-4031)	Moderate-term on-the-job training
Subway and streetcar operators (SOC 53-4041)	Moderate-term on-the-job training
Rail transportation workers, all other (SOC 53-4099)	Moderate-term on-the-job training
Crane and tower operators (SOC 53-7021)	Long-term on-the-job training
Dredge operators (SOC 53-7031)	Moderate-term on-the-job training
Refuse and recyclable material collectors (SOC 53-7081)	Short-term on-the-job training

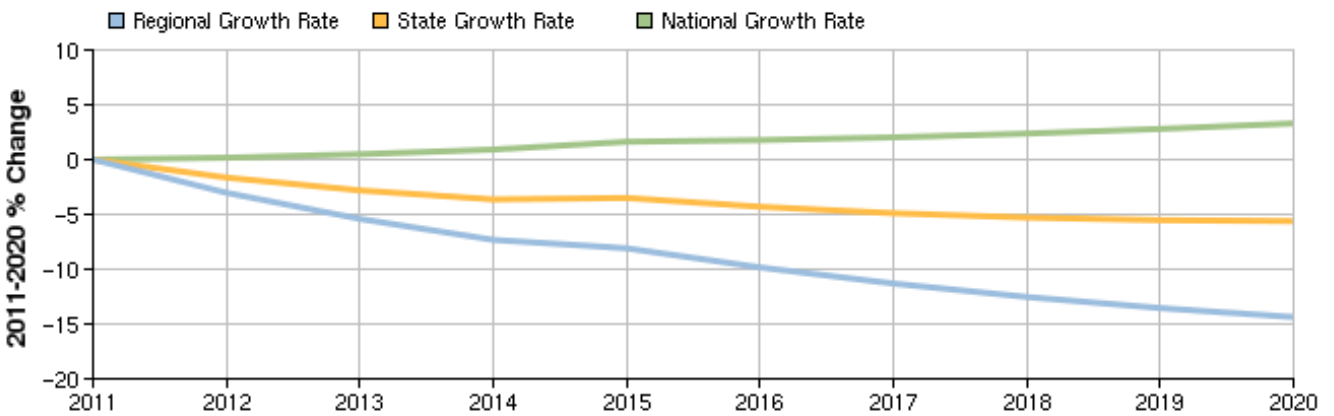
Executive Summary

Basic Information	
2011 Occupational Jobs	28,044
2020 Occupational Jobs	24,014
Total Change	-4,030
Total % Change	-14.37%
Openings	5,959
Avg Hourly Earnings	$19.87

Economic Indicators	
2011 Location Quotient	1.15
2020 Location Quotient	1.01

Source: EMSI Complete Employment - 2nd Quarter 2010

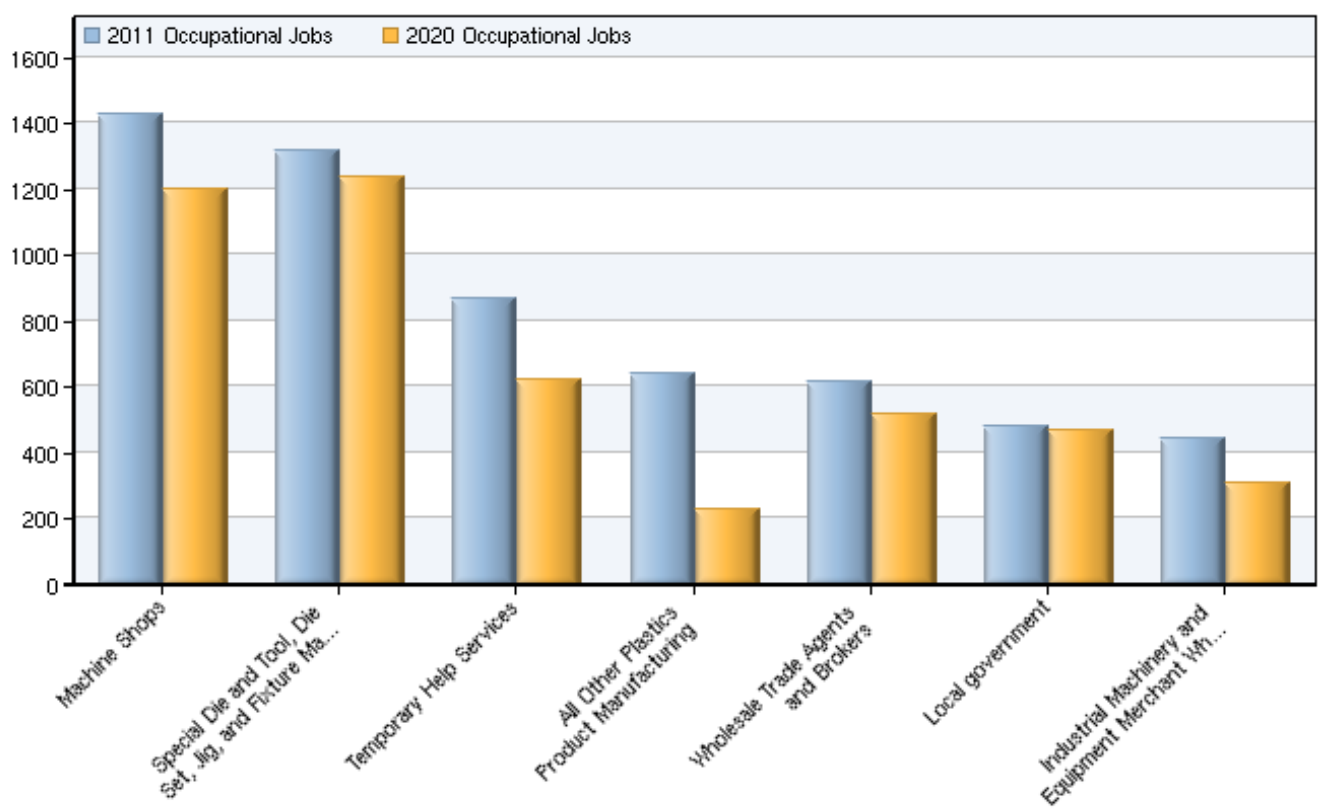
Occupational Change Summary



Region	2011 Jobs	2020 Jobs	Change	% Change	Openings	Avg Hourly Earnings
Regional Total	28,044	24,014	-4,030	-14%	5,959	$19.87
State Total	443,999	419,081	-24,918	-6%	102,747	$20.76
National Total	9,270,993	9,576,821	305,828	3%	2,506,285	$22.57

Source: EMSI Complete Employment - 2nd Quarter 2010

Top Industries for Selected Occupations

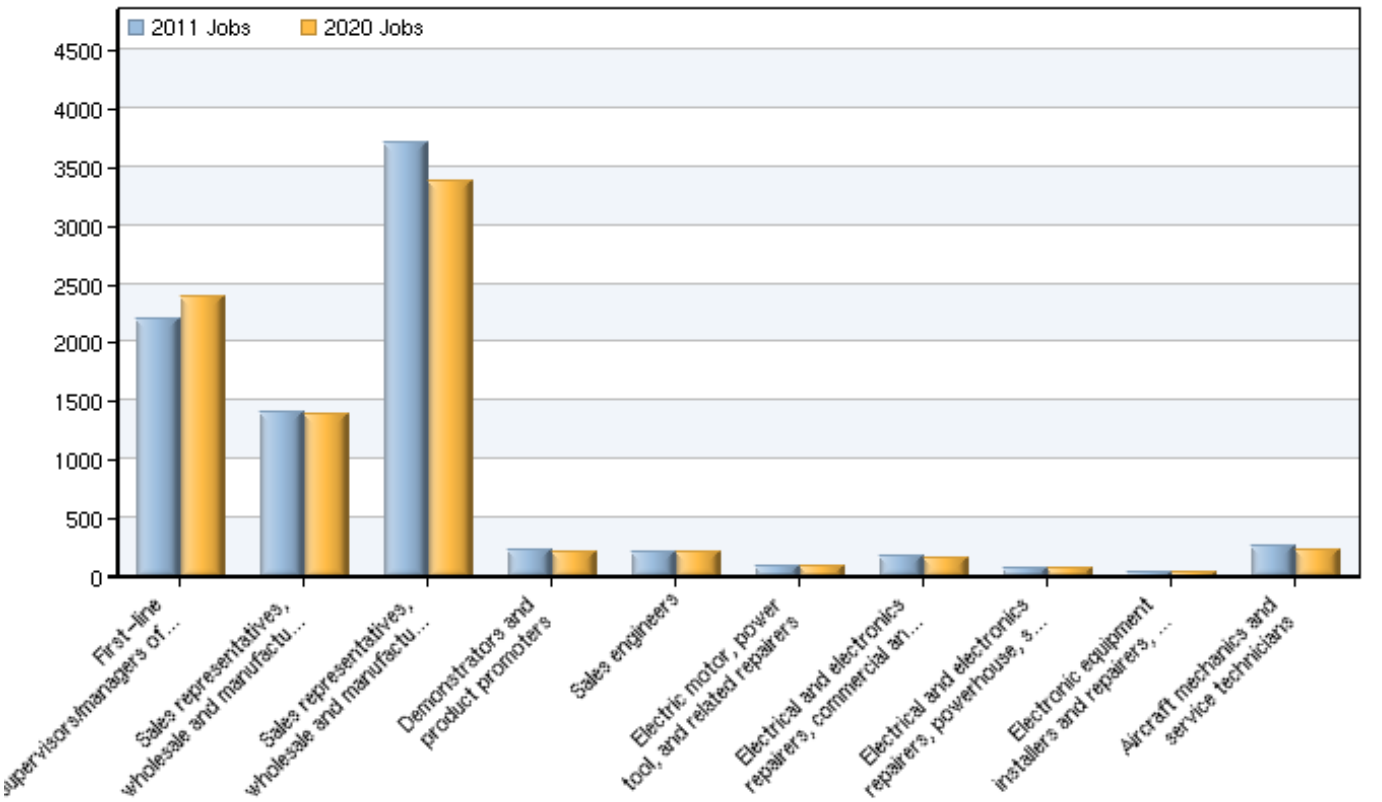


NAICS Code	Name	2011 Jobs	2020 Jobs	Change	% Change
332710	Machine Shops	1,430	1,198	-232	-16%
333514	Special Die and Tool, Die Set, Jig, and Fixture Manufacturing	1,319	1,237	-82	-6%
561320	Temporary Help Services	869	619	-250	-29%
326199	All Other Plastics Product Manufacturing	639	227	-412	-64%

425120	Wholesale Trade Agents and Brokers	616	516	-100	-16%
930000	Local government	479	468	-11	-2%
423830	Industrial Machinery and Equipment Merchant Wholesalers	442	306	-136	-31%

Source: EMSI Complete Employment - 2nd Quarter 2010

Occupational Breakdown



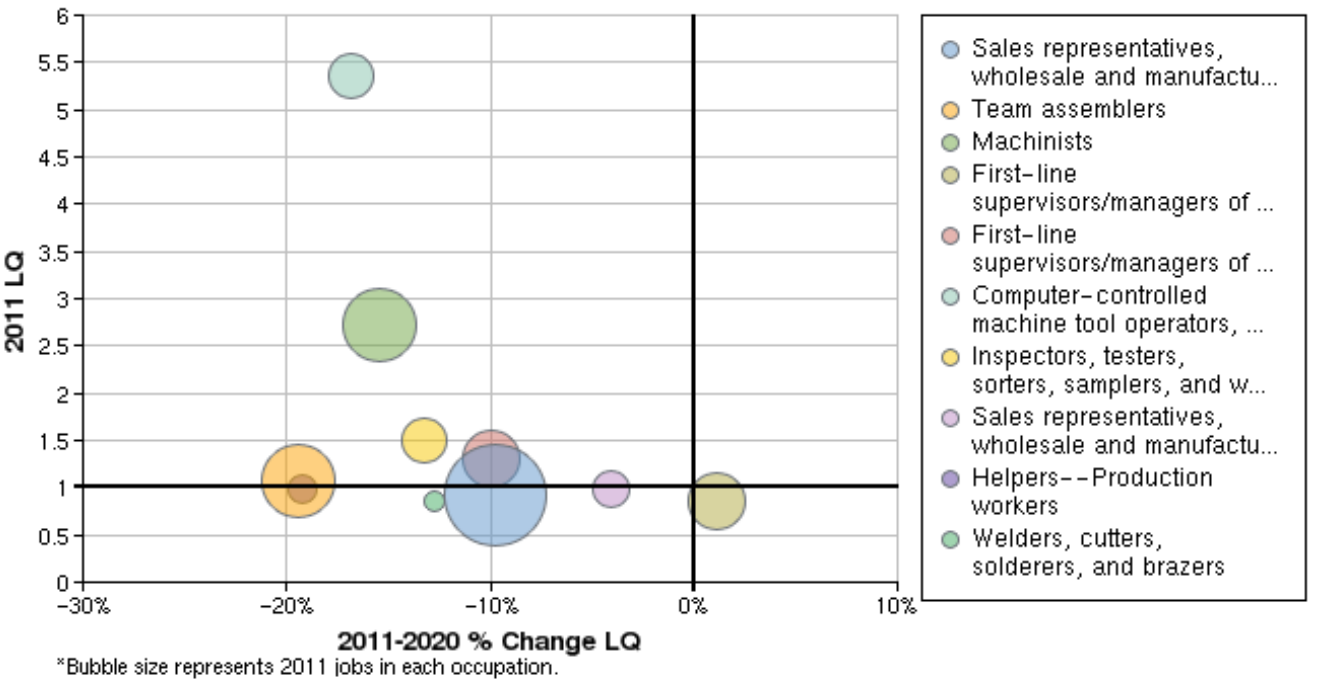
SOC Code	Description	2011 Jobs	2020 Jobs	Openings	Avg Hourly Earnings
41-1012	First-line supervisors/managers of non-retail sales workers	2,206	2,386	584	$23.54
41-4011	Sales representatives, wholesale and manufacturing, technical and scientific products	1,401	1,380	360	$31.57
41-4012	Sales representatives, wholesale and manufacturing, except technical and scientific products	3,709	3,374	877	$25.99
41-9011	Demonstrators and product promoters	217	208	60	$9.32
41-9031	Sales engineers	214	206	84	$42.67
49-2092	Electric motor, power tool, and related repairers	86	78	29	$24.37
49-2094	Electrical and electronics repairers, commercial and industrial equipment	169	155	27	$26.13
49-2095	Electrical and electronics repairers, powerhouse, substation, and relay	73	78	18	$26.25
49-2096	Electronic equipment installers and repairers, motor vehicles	29	26	5	$16.50
49-3011	Aircraft mechanics and service technicians	265	225	49	$23.47
49-3031	Bus and truck mechanics and diesel engine specialists	574	531	126	$18.85
49-3043	Rail car repairers	58	61	13	$19.22
49-9043	Maintenance workers, machinery	98	85	16	$17.59
49-9051	Electrical power-line installers and repairers	157	169	63	$23.49
49-9098	Helpers--Installation, maintenance, and repair workers	212	210	98	$12.82

51-1011	First-line supervisors/managers of production and operating workers	2,136	1,779	279	$26.14
51-2011	Aircraft structure, surfaces, rigging, and systems assemblers	213	201	54	$16.76
51-2021	Coil winders, tapers, and finishers	63	32	10	$14.06
51-2022	Electrical and electronic equipment assemblers	432	300	67	$12.77
51-2023	Electromechanical equipment assemblers	281	205	42	$13.44
51-2031	Engine and other machine assemblers	143	88	30	$18.73
51-2041	Structural metal fabricators and fitters	210	180	45	$16.98
51-2091	Fiberglass laminators and fabricators	48	45	12	$15.92
51-2092	Team assemblers	2,784	2,185	632	$13.11
51-4011	Computer-controlled machine tool operators, metal and plastic	1,779	1,500	332	$18.96
51-4021	Extruding and drawing machine setters, operators, and tenders, metal and plastic	77	53	15	$14.84
51-4022	Forging machine setters, operators, and tenders, metal and plastic	62	34	12	$17.99
51-4023	Rolling machine setters, operators, and tenders, metal and plastic	59	37	11	$16.79
51-4031	Cutting, punching, and press machine setters, operators, and tenders, metal and plastic	601	397	117	$13.64
51-4032	Drilling and boring machine tool setters, operators, and tenders, metal and plastic	182	103	15	$16.20
51-4033	Grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders, metal and plastic	554	371	79	$16.47
51-4034	Lathe and turning machine tool setters, operators, and tenders, metal and plastic	304	175	49	$17.26
51-4035	Milling and planing machine setters, operators, and tenders, metal and plastic	142	100	27	$17.05
51-4041	Machinists	2,716	2,103	340	$17.43
51-4051	Metal-refining furnace operators and tenders	38	27	7	$19.64
51-4052	Pourers and casters, metal	40	27	8	$14.22
51-4121	Welders, cutters, solderers, and brazers	841	706	245	$17.38
51-4122	Welding, soldering, and brazing machine setters, operators, and tenders	376	285	114	$17.30
51-4191	Heat treating equipment setters, operators, and tenders, metal and plastic	78	51	34	$16.22
51-8011	Nuclear power reactor operators	12	14	5	$31.23
51-8012	Power distributors and dispatchers	22	21	8	$27.08
51-8013	Power plant operators	82	78	27	$28.03
51-8021	Stationary engineers and boiler operators	70	71	13	$23.66
51-8091	Chemical plant and system operators	36	33	8	$24.33
51-8092	Gas plant operators	17	17	4	$26.63
51-8093	Petroleum pump system operators, refinery operators, and gaugers	29	21	6	$27.01
51-9011	Chemical equipment operators and tenders	59	55	5	$20.41
51-9012	Separating, filtering, clarifying, precipitating, and still machine setters, operators, and tenders	44	38	5	$15.70
51-9021	Crushing, grinding, and polishing machine setters, operators, and tenders	36	30	6	$15.73
51-9041	Extruding, forming, pressing, and compacting machine setters, operators, and tenders	388	385	100	$13.59
51-9051	Furnace, kiln, oven, drier, and kettle operators and tenders	22	21	2	$18.86

51-9061	Inspectors, testers, sorters, samplers, and weighers	1,713	1,399	289	$16.80
51-9141	Semiconductor processors	100	64	21	$17.10
51-9197	Tire builders	25	15	8	$19.92
51-9198	Helpers--Production workers	1,112	868	193	$12.21
53-4019	Locomotive engineers and operators	62	53	18	$20.84
53-4021	Railroad brake, signal, and switch operators	<10	<10	–	--
53-4031	Railroad conductors and yardmasters	10	<10	–	--
53-4041	Subway and streetcar operators	<10	<10	–	--
53-4099	Rail transportation workers, all other	34	32	10	$22.06
53-7021	Crane and tower operators	83	72	18	$19.72
53-7031	Dredge operators	22	23	7	$17.93
53-7081	Refuse and recyclable material collectors	421	524	211	$18.33
	Total	**28,044**	**24,014**	**5,959**	**$19.87**

Source: EMSI Complete Employment - 2nd Quarter 2010

Location Quotient Breakdown



*Bubble size represents 2011 jobs in each occupation.

SOC Code	Description	2011 Jobs	2011 LQ	2020 LQ
41-4012	Sales representatives, wholesale and manufacturing, except technical and scientific products	3,709	0.92	0.83
51-2092	Team assemblers	2,784	1.08	0.87
51-4041	Machinists	2,716	2.72	2.30
41-1012	First-line supervisors/managers of non-retail sales workers	2,206	0.86	0.87
51-1011	First-line supervisors/managers of production and operating workers	2,136	1.31	1.18
51-4011	Computer-controlled machine tool operators, metal and plastic	1,779	5.35	4.45
51-9061	Inspectors, testers, sorters, samplers, and weighers	1,713	1.51	1.31
41-4011	Sales representatives, wholesale and manufacturing, technical and scientific products	1,401	0.98	0.94
51-9198	Helpers--Production workers	1,112	0.99	0.80
51-4121	Welders, cutters, solderers, and brazers	841	0.86	0.75
51-4031	Cutting, punching, and press machine setters, operators, and tenders, metal and plastic	601	1.17	0.91
49-3031	Bus and truck mechanics and diesel engine specialists	574	0.82	0.76

51-4033	Grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders, metal and plastic	554	2.76	2.23
51-2022	Electrical and electronic equipment assemblers	432	0.91	0.75
53-7081	Refuse and recyclable material collectors	421	1.02	1.19
51-9041	Extruding, forming, pressing, and compacting machine setters, operators, and tenders	388	2.05	1.86
51-4122	Welding, soldering, and brazing machine setters, operators, and tenders	376	2.29	1.85
51-4034	Lathe and turning machine tool setters, operators, and tenders, metal and plastic	304	2.49	1.99
51-2023	Electromechanical equipment assemblers	281	2.00	1.65
49-3011	Aircraft mechanics and service technicians	265	0.83	0.70
41-9011	Demonstrators and product promoters	217	0.69	0.64
41-9031	Sales engineers	214	1.16	1.09
51-2011	Aircraft structure, surfaces, rigging, and systems assemblers	213	2.05	1.87
49-9098	Helpers--Installation, maintenance, and repair workers	212	0.59	0.57
51-2041	Structural metal fabricators and fitters	210	0.85	0.75
51-4032	Drilling and boring machine tool setters, operators, and tenders, metal and plastic	182	2.72	2.14
49-2094	Electrical and electronics repairers, commercial and industrial equipment	169	0.90	0.84
49-9051	Electrical power-line installers and repairers	157	0.53	0.58
51-2031	Engine and other machine assemblers	143	1.69	1.18
51-4035	Milling and planing machine setters, operators, and tenders, metal and plastic	142	2.37	2.03
51-9141	Semiconductor processors	100	1.28	1.04
49-9043	Maintenance workers, machinery	98	0.56	0.50
49-2092	Electric motor, power tool, and related repairers	86	1.35	1.23
53-7021	Crane and tower operators	83	0.77	0.74
51-8013	Power plant operators	82	0.82	0.83
51-4191	Heat treating equipment setters, operators, and tenders, metal and plastic	78	1.53	1.16
51-4021	Extruding and drawing machine setters, operators, and tenders, metal and plastic	77	0.37	0.28
49-2095	Electrical and electronics repairers, powerhouse, substation, and relay	73	1.18	1.22
51-8021	Stationary engineers and boiler operators	70	0.70	0.72
51-2021	Coil winders, tapers, and finishers	63	1.36	0.93
53-4019	Locomotive engineers and operators	62	0.48	0.39
51-4022	Forging machine setters, operators, and tenders, metal and plastic	62	1.03	0.70
51-4023	Rolling machine setters, operators, and tenders, metal and plastic	59	0.73	0.55
51-9011	Chemical equipment operators and tenders	59	0.49	0.54
49-3043	Rail car repairers	58	0.84	0.87
51-2091	Fiberglass laminators and fabricators	48	0.58	0.57
51-9012	Separating, filtering, clarifying, precipitating, and still machine setters, operators, and tenders	44	0.43	0.36
51-4052	Pourers and casters, metal	40	1.23	0.94
51-4051	Metal-refining furnace operators and tenders	38	0.91	0.70
51-8091	Chemical plant and system operators	36	0.33	0.38
51-9021	Crushing, grinding, and polishing machine setters, operators, and tenders	36	0.36	0.31
53-4099	Rail transportation workers, all other	34	3.12	3.09
49-2096	Electronic equipment installers and repairers, motor vehicles	29	0.61	0.58
51-8093	Petroleum pump system operators, refinery operators, and gaugers	29	0.24	0.22
51-9197	Tire builders	25	0.58	0.43
51-8012	Power distributors and dispatchers	22	0.77	0.75
51-9051	Furnace, kiln, oven, drier, and kettle operators and tenders	22	0.45	0.46
53-7031	Dredge operators	22	0.88	0.88
51-8092	Gas plant operators	17	0.46	0.52
51-8011	Nuclear power reactor operators	12	0.76	0.77
53-4031	Railroad conductors and yardmasters	10	0.09	0.08
53-4021	Railroad brake, signal, and switch operators	<10	--	--
53-4041	Subway and streetcar operators	<10	--	--
	Total	**28,044**	**1.15**	**1.01**

Data Sources and Calculations

Industry Data

In order to capture a complete picture of industry employment, EMSI basically combines covered employment data from Quarterly Census of Employment and Wages (QCEW) produced by the Department of Labor with total employment data in Regional Economic Information System (REIS) published by the Bureau of Economic Analysis (BEA), augmented with County Business Patterns (CBP) and Nonemployer Statistics (NES) published by the U.S. Census Bureau. Projections are based on the latest available EMSI industry data, 15-year past local trends in each industry, growth rates in statewide and (where available) sub-state area industry projections published by individual state agencies, and (in part) growth rates in national projections from the Bureau of Labor Statistics.

Occupation Data

Organizing regional employment information by occupation provides a workforce-oriented view of the regional economy. EMSI's occupation data are based on EMSI's industry data and regional staffing patterns taken from the Occupational Employment Statistics program (U.S. Bureau of Labor Statistics). Wage information is partially derived from the American Community Survey. The occupation-to-program (SOC-to-CIP) crosswalk is based on one from the U.S. Department of Education, with customizations by EMSI.

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

State Data Sources

This report uses state data from the following agencies: Ohio Department of Job and Family Services, Labor Market Information Division.

Appendix D:
Policy Matrix

	Construction	Weatherization	Energy Efficiency	Renewable Energy Installation	**Manufacturing**	Wind Energy	Solar Energy	Bio-Fuels	Green Building Products - Insulation	Batteries / Fuel Cells	*Controls / Sensor Technology*	*Advanced Material Manufacturing*	Green-"er" Process or Product	**Rail Transit**	*Logistics/Shipping*	Commuter/Public Transit
Ohio Department of Development																
Ohio Aerospace Hub Designation																
Research/Outreach											•	•				
Grant											•	•				
Technical Assistance											•	•				
Ohio Third Frontier																
Grant						•	•	•	•	•	•	•				
Edison Centers - Edison Materials Technology Center (EMTEC)																
Technical Assistance																
Business/Commercialization Support																
University System of Ohio																
Ohio Green Pathways Catalog and Advisory Panel																
Training		•	•	•		•	•	•	•	•						
Ohio Energy Workforce Consortium (OEWC)																
"Get Into Energy" Career Pathways Model Pilot Program																
Training						•	•	•	•	•						
Montgomery County																
2009-2010 Strategic Initiatives																
Research/Outreach											•	•			•	
ED/GE Program (Economic Development/Government Equity)																
Grant																
City of Dayton																
Tech Town																
Technical Assistance											•	•				
Dayton Economic Attraction Program (DEAP)																
Grant											•	•				
Dayton Development Fund																
Grant/"Gap" Financing																
Enterprise Zone (EZ) Property Tax Abatement																
Property Improvement Tax Exemption																
CityWide Development Direct Loans/SBA 504 Loans																
Below-market Loan Financing																
Energy Efficiency Measures																
Grant or Low-interest Loan			•	•												
Dayton Business Resource Center																
Business Assistance																
City of Moraine																
Project LEAP																
Research/Outreach			•			•	•	•		•	•	•			•	
Clinton County / City of Wilmington																
Green Enterprise Zone																
Research/Outreach		•	•	•		•	•	•	•	•	•	•	•			
Permit Fee Reductions		•	•	•												
Grant		•	•	•		•	•	•	•	•	•	•	•			

	Construction	Weatherization	Energy Efficiency	Renewable Energy Installation	**Manufacturing**	Wind Energy	Solar Energy	Bio-Fuels	Green Building Products - Insulation	Batteries / Fuel Cells	*Controls / Sensor Technology*	*Advanced Material Manufacturing*	Green-"er" Process or Product	**Rail Transit**	*Logistics/Shipping*	Commuter/Public Transit
Downtown Dayton Partnership																
The Greater Downtown Dayton Plan																
Research/Outreach		•	•	•		•	•						•			•
Dayton - Montgomery Co. Port Auth.																
Independent Lending																
Loans/Financing Assistance																
Dayton Development Coalition																
Dayton Region Strategy for Industry Growth																
Research/Outreach			•	•		•	•	•	•	•	•	•	•			
Miami Valley Regional Planning																
Going Places: An Integrated Land Use Vision																
Research/Outreach																•
Miamisburg Mound CDC																
Mound Advanced Technology Center																
Research/Outreach			•	•		•	•	•	•	•	•	•				
Sinclair Community College																
Workforce Training and Sustainability Training																
Sustainability Training/Certificate Programs		•	•	•		•	•	•	•	•	•	•	•			
Advanced Integrated Manufacturing Center																
Technical Assistance													•			
University of Dayton Research Institute																
Center for Competitive Change																
Technical Assistance / Business Training													•			
Center of Excellence for Strategic Energy & Environmental Informatics																
Research and Outreach						•	•	•		•	•	•				
Industrial Assessment Center																
Technical Assistance													•			
Wright State University																
Center of Workforce Development & Labor Management Initiatives																
Technical Assistance / Business Training																
Center for Innovation Management																
Technical Assistance / Business Training																
Central State University / DDC																
NET Incubator																
Technical Assistance - Business Plan Asst						•	•	•			•	•				
Financing - Capital Investment Loans						•	•	•			•	•				
Dayton Power & Light																
Commercial and Residential Programs																
Outreach/Education		•	•	•												
Financial Rebates		•	•	•												
Technical Assistance (Energy Audit)		•	•													
Vectren Corporation																
Commercial and Residential Programs																
Outreach/Education		•	•	•												
Financial Rebates		•	•	•												
Technical Assistance (Energy Audit)		•	•													

Appendix E:
Case Study Database

Canada

Sustainable Development Technology Canada (http://www.sdtc.ca/en/index.htm) – a non-profit foundation created in 2001 by the Canadian government to finance and support development of clean technology. They have two main funds:

- SD Tech fund ($550 M)– is meant to support "late-state development and pre-commercial demonstration of clean technology solutions: products and processes that contribute to clean air, clean water and clean land, that address climate change and improve the productivity and the global competitiveness of the Canadian industry". This fund does not have to be repaid.
- NextGen Biofuels Fund ($500 M) – meant to support "commercial scale demonstration facilities for the production of next-generation renewable fuels and co-products" to help Canada meet its Renewable Fuel standards. Grants from this fund have to be repaid once the new tech is profitable.

United States

- Texas – Number of cities are focusing on bringing clean energy tech to their locals, for jobs creation, etc. (http://www.wacotrib.com/news/content/news/stories/2008/08/31/08312008wacgreenjobs.html) This article states that Texas is an early leader in wind power in the US, and that they're trying to build more. A number of cities are working on ways to attract more green businesses (Waco, Austin, as examples) and the universities and colleges are upping their offering for green tech and jobs training.
- Illinois – Rockford Region offers a number of incentive programs for new entrepreneurs, existing or new businesses, and manufacturers in an effort to encourage green industry to come to the region (http://www.rockfordil.com/incentives)

Japan

- Announced it would expand green business and create up to 1 million new jobs in the 'green business' market, including offering zero interest loans for green companies (http://www.reuters.com/article/vcCandidateFeed2/idUST327766)
- Investing $30 B in environment and energy sectors over the next 5 years (http://www.meti.go.jp/english/policy/GreenITInitiativeInJapan.pdf)

South Korea

- $38 B to be invested over 4 years to create 960,000 new green jobs, including creation of green transport networks, 2 million green homes, and clean-up of four main rivers in the country. (http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=556&ArticleID=6035&l=en)

China

http://www.businessweek.com/magazine/content/09_21/b4132040805185.htm?chan=magazine+channel_in+depth

- China is largest producer of PV panels in the world
- 2nd largest market for wind turbines
- Goal to boost % of energy from renewable to 23% by 2020
- Recent economic stimulus package includes $ earmarked for clean tech
- Finance Ministry has financial incentives, including subsidy of $3/watt solar capacity installed in 2009

- Himin Solar Energy Group – world's largest producer of rooftop piping systems for solar water heating.
- Insists on collaboration with major companies (GE, Wal-Mart, DuPont, 3M, Siemens)
- Government is heavily subsidizing green industries (such as electric cars, PVs, etc.)
- Solar subsidies (http://www.reuters.com/article/GCA-GreenBusiness/idUSTRE56K3W720090721)

France

- (http://www.dw-world.de/dw/article/0,,4676121,00.html) France intends to unveil a 16 month rebate program on electric / hybrid cars, and will also offer 400 M Euros over 4 years for green car development

Germany

- (http://www.businessgreen.com/business-green/news/2248348/germany-approves-500-million) Government is investing 500 M Euros into electric car development by 2011.

United Kingdom

- Low Carbon Industrial Strategy: Grants available (out of 10 M Euros) for 20 best low carbon communities (http://decc.gov.uk/en/content/cms/news/pn109/pn109.aspx)
- Automotive Assistance Program (http://www.berr.gov.uk/whatwedo/sectors/automotive/aap/page50296.html) – primary goal is to support continued development / research into low-carbon emitting vehicles.
- 250 M Euros in incentives for purchasing electric vehicles through 2011 (http://www.goauto.com.au/mellor/mellor.nsf/story2/7A46E378A0F5AD6DCA25759E00274743); this also includes 20 M Euros for upgrades / additions to infrastructure for charging stations, etc.
- Low Carbon Buildings Programme (http://www.lowcarbonbuildings.org.uk/about/) – grants for installing PVs, wind turbines, small scale hydro, solar hot water, ground source heat pumps, air source heat pumps, biomass.
- Low Carbon Building Programme Phase 2, headed by British Gas (http://www.britishgas.co.uk/energy-efficiency/products/energy-innovation/low-carbon.html) – 50 M Euros in grants available for "installation of microgeneration technologies for local housing authorities, housing associations, schools and other public sector buildings and charitable bodies.."
- Low Energy House – Green Grants (http://www.lowenergyhouse.com)
- Energy Savings Trust (http://www.energysavingtrust.org.uk/What-can-I-do-today/Energy-saving-grants-and-offers/Search-for-grants-and-offers) – Grants and offers for energy saving measures for buildings

India

- New Ventures: Venture capital for green projects / businesses - http://www.newventuresindia.org/nvi/newdesign/index.jsp

Successful workforce training programs

United Kingdom

- UK Green Building Council has launched a Sustainability Training & Education Programme (STEP) task group to set up the STEP program (http://www.ukgbc.org/site/info-centre/display-category?id=79)

Germany

- Siemens just built a new wind power training center in Bremen, which will provide training for wind energy technicians in the country and from around the world.

US - National:

- Walmart Foundation Green Jobs Initiative (http://walmartstores.com/CommunityGiving/8975.aspx) – Grants totaling $6.1 M to groups to help create jobs in emerging green industries, and to develop green job training sites in WA, CO, NM, and LA.
- Veterans Green Jobs (http://veteransgreenjobs.org/) – provides education and career development opportunities on green jobs for US military veterans. Also runs Veterans Green Corps, in collaboration with Southwest Conservation Corp
- US Dept of Labor:
  - ARRA Energy Training Partnership Grants ($100 M) to 20-30 projects that provide training and placement services in energy efficiency and renewable energy industries
  - ARRA Pathways out of Poverty Grants ($150 M) for projects to provide training / placement services into employment in energy efficiency / renewable energy industries.
  - ARRA State Energy Sector Partnership & Training Grants ($190 M) for state workforce investment boards for workforce sector strategies that target energy efficiency and renewable energy
  - ARRA Green Capacity Building Grants ($4 M) to fund projects that build the capacity of DOL-funded training programs to ensure targeted groups are prepared to meet the country's expanding green industries.

US - State-specific

- California – (Sept 09) $75 M green jobs training program (http://www.energy.ca.gov/greenjobs/) – the largest green jobs training program in the US. Intends to train over 20,000 workers for renewable energy jobs (manufacturing, installing, etc.)
- Florida (Aug 09) – City of Miami got $500,000 in grants from EPA to train people for jobs assessing / cleaning brownfield sites. (http://www.environmental-expert.com/resultEachPressRelease.aspx?cid=7698&codi=59692)
- Ohio (Aug 09) - $100,000 for weatherization training in Cleveland
- Massachusetts (http://boston.bizjournals.com/boston/stories/2009/08/31/daily14.html) – MA Green Jobs Act of 2008: $4 million in grants available through the Massachusetts Clean Energy Center to job training institutions to "develop vocational programs in the cleantech sector".
- Michigan – Detroiters working for Environmental Justice Green Jobs Training Program (http://www.dwej.org/Green_Jobs.htm) -
- Minnesota:
  - (http://www.mngreenjobs.com/) – Action plan has suggestions for how legislation can increase # of green jobs in the state (including specific focus on renewable energy)

    - Green Jobs Act (http://www.greenforall.org/resources/summary-of-minnesota-green-jobs-act-2007) – passed in 2007; signed into law in 2008. This act seeks to advance green economic development while creating living wage jobs. Act includes loans for improvement to building energy use, and created a green jobs task force.
- New Jersey – Green Job Training programs (http://www.state.nj.us/dca/hmfa/gho/news/2009/pdf/20090717news_GreenJob.pdf) – training programs for both adults and youth. Adults – Isles' Center for Energy and Environmental Training (done with NJ Dept of Labor and Workforce Development). Training for 'youths = New Jersey Youth Corps program which offers green jobs training for ages 16 – 25.
- New Mexico - (http://www.rdcnm.org/LinkClick.aspx?fileticket=xBmCUzPV64A%3D&tabid=1726) – New Mexico Green Collaborative – got $500 M from ARRA for green jobs training in the state.
- New York:
    - Sustainable South Bronx (http://www.ssbx.org/index.php) – offers training for green jobs, among other benefits.
    - Green Jobs / Green NY Act of 2009 (http://www.gouverneurtimes.com/index.php?option=com_content&view=article&id=6327:senate-passes-green-jobs-act&catid=60:st-lawrence-news&Itemid=175) - $112 M, to be used to create 14,000 green jobs; primary focus is on building retrofitting. Act also includes loans for retrofitting and for energy audits.
- North Carolina – North Carolina State Board of Community Colleges – established a green training initiative called 'Code Green", which entails major expansion of green-collar workforce training programs on all their campuses. (http://www.chathamjournal.com/weekly/news/chathamschools/cccc-in-forefront-of-training-green-collar-workforce-90411.shtml)
- Rhode Island - $17.2 M for workforce training grants (from ARRA) for job training. While this is not all reserved for green jobs only, green industries are given preference.
- Tennessee (http://tn.gov/wap/) – Weatherization assistance program, as well as program to train people to do energy audits and to become weatherization contractors.
- Washington – Senate Bill 5649 designates $14.5 M (funding comes from ARRA) to be used for green job training programs, and for weatherizing homes and businesses, and to provide grants for neighborhood energy-efficiency projects around the state. (http://www.greenforall.org/resources/washington-senate-bill-5649)

Canada

- **BlueGreen Jobs** (http://www.bluegreencanada.ca/index.php) **–** Green jobs training programs (specifically for steelworkers) throughout Canada
- **Clean Energy Classrooms** (http://www.cleanenergyclassrooms.ca/government-initiatives/) – a list of local government initiatives for clean energy in Canada

United States

- Energy Efficiency Opportunity Fund (http://dealbook.blogs.nytimes.com/2009/09/25/aiming-to-create-green-jobs-and-profits/) – new social investment fund that will finance projects like building retrofits. Fund is sponsored by Living Cities and Green For All.
- Energy Efficiency & Conservation Block Grant Program (http://www.eecbg.energy.gov/) - $2.7 B in available funds for grants to states, local governments and tribes to "develop and implement projects to improve energy efficiency and reduce energy use and fossil fuel emissions in their communities." The link provided also shows a list of all applicants which have received money so far.

- Green for All Capital Access Program (http://www.greenforall.org/what-we-do/capital-access-program) – designed to assist investors, non profits, and businesses to get involved in the clean energy economy; offers assistance in securing stimulus and other funds to create green jobs, etc.

Appendix F:
Organization Information

Blue Green Alliance

The Blue Green Alliance is a national partnership of labor unions and environmental organizations dedicated to expanding the number and quality of jobs in the green economy. With partners USW, Sierra Club, CWA, NRDC, LIUNA, SEIU, AFT and UWUA, the Blue Green Alliance is uniting eight million people in pursuit of good jobs, a clean environment and a green economy.
www.bluegreenalliance.org

emersion DESIGN

emersion DESIGN is a full service architecture, planning, engineering, design, and sustainability consulting firm. emersion DESIGN is a collaborative practice driven by a passion for exceptional design and planning that advance clients & society. We have been recognized for our research in sustainability and social responsibility, and have published and spoken extensively on sustainability topics ranging from planning, design, and construction to government policy and green jobs.
www.emersiondesign.com

International Union of Electronic, Electrical, Salaried, Machine and Furniture Workers – Communication Workers of America (IUE-CWA) Local 755

The Local 755 has been in existence since November 1949, and is the founding Local of the IUE. In 2000, the IUE merged with the Communications Workers of America (CWA) and became the IUE-CWA, and now represents over 750,000 members.
www.iue-cwa.org

Bibliography

1. American Council for an Energy-Efficient Economy. *Shaping Ohio's Energy Future: Energy Efficiency Works.* ACEEE Report Number E092, March 2009.
2. Anunike, Dr. Manny. *Solar Industry and Supply Chain Opportunities and Resources in Ohio.* http://www.development.ohio.gov/cms/uploadedfiles/Development.ohio.gov/Divisional_Content/Strategic_Business_Investment/Energy/Solar-Anunike.pdf
3. Apollo Alliance. *Make it in America; The Apollo Green Manufacturing Action Plan*. http://apolloalliance.org/wp-content/uploads/2009/03/greenmap_proposal031109.pdf
4. Apollo Alliance. *Green Jobs Guidebook; Employment Opportunities in the New Clean Economy.* http://www.edf.org/documents/8489_Green%20Jobs%20Guidebook%20FINAL%20with%20cover.pdf
5. Apollo Alliance. *Green-Collar Jobs in America's Cities; Building Pathways out of Poverty and Careers in the Clean Energy Economy*. http://apolloalliance.org/downloads/greencollarjobs.pdf
6. Apollo Alliance and Policy Matters Ohio. *Mapping Green Career Pathways: Job Training Infrastructure and Opportunities in Ohio.* http://www.policymattersohio.org/pdf/MappingGreenCareerPathways2010.pdf
7. Blue Green Alliance. *Job Opportunities in a Green Economy: Ohio Can Gain from Fighting Global Warming.* http://www.bluegreenalliance.org/assets/pdf/LWGreenJobsOH_0508_04.pdf
8. Dierdorff, Erich C., Jennifer J. Norton, Donald W. Drewes, and Christina M. Kroustalis, North Carolina State University, and David Rivkin and Phil Lewis, National Center for O*NET Development. *Greening of the World of Work: Implications for O*NET®-SOC and New and Emerging Occupations*. http://www.onetcenter.org/dl_files/Green.pdf
9. Downtown Dayton Partnership. *The Greater Downtown Dayton Plan.* http://www.downtown-dayton.com/plan/
10. Economic Modeling Specialists, Inc. *Occupational Report prepared by Great Oaks Career Campuses*, 2nd Quarter 2009.
11. Economic Modeling Specialists, Inc. *Data Spotlight, Green Jobs, Parts 1 – 5.* http://www.economicmodeling.com/resources/whitepapers/
12. Foote, Deane, Foote Consulting Group. *Location Trends of Today's Thriving Industries.* http://doc.ci.redmond.or.us/Community_Development/Economic_Development/Presentations/Location_Trends.pdf
13. Green Capital Alliance. *Helping workforce training and education programs support green job growth in the Sacramento Region 2009.* http://www.cwib.ca.gov/doc_files/Green%20Jobs%20Training%20Report%20for%20SETA%20and%20Golden%20Sierra%206%2030%2009%20(3).pdf
14. Green For All. Green Pathways out of Poverty: Workforce Development Initiatives. http://www.greenforall.org/what-we-do/building-a-movement/community-of-practice/green-pathways-out-of-poverty-workforce-development-initiatives
15. Hume, Greg. *Connecting to the Wind Turbine Supply Chain*. http://r5wc.com/docs/ConnectingWindTurbineSupplyChainGregHume.pdf
16. Jones, Van. *The Green Collar Economy: How One Solution Can Fix Our Two Biggest Problems*. New York: HarperCollins, 2008.

17. Luria, Daniel, and Joel Rogers. *Manufacturing, Regional Prosperity, and Public Policy*. *Retooling for Growth: Building a 21st Century Economy in America's Older Industrial Areas*. Washington, D.C.: Brookings Institution Press, 2008.

18. Makower, Joel. *Strategies for the Green Economy: Opportunities and Challenges in the New World of Business*. New York: McGraw Hill, 2009.

19. McCabe, Loch. *Positioning for Alternative Energy Manufacturing Success.* http://r5wc.com/docs/PositioningLochMcCabe.pdf

20. McGahey, Richard M., and Jennifer S. Vey, Editors. *Retooling for Growth: Building a 21st Century Economy in America's Older Industrial Areas*. Washington, D.C.: Brookings Institution Press, 2008.

21. Mejia, Robert. South Bay Workforce Investment Board. *The California Green Collar Jobs Council.* http://www.cwib.ca.gov/doc_files/Green%20Collar%20Jobs%20Council.pdf

22. Miami Valley Regional Planning Commission. *Going Places: Regional Land Use Planning* Initiative. http://www.mvrpc.org/rlu/

23. Mims, Natalie, and Heidi Hauenstein. Feebates – A Legislative Option to Encourage Continuous Improvement to Automobile Efficiency. Rocky Mountain Institute. February 2008. http://www.rmi.org/images/PDFs/Transportation/Feebate_final.pdf

24. Ohio Department of Development. *Advanced Energy; Leading the world to energy independence*. http://www.ohiomeansbusiness.com/docs/Advanced-Energy-brochure-Ohio.pdf

25. Ohio Department of Development. *Wind Power in Ohio.* http://www.development.ohio.gov/cms/uploadedfiles/Development.ohio.gov/Divisional_Content/Strategic_Business_Investment/Energy/Wind(3).pdf

26. Ohio Department of Job and Family Services. *Ohio Job Outlook to 2016.* http://ohiolmi.com/proj/OhioJobOutlook.htm

27. Ohio Department of Job and Family Services. *2009 Economic Analysis; Responding to Recession, Preparing for Recovery*. http://ohiolmi.com/research/2009OhioEconomicAnalysis.pdf

28. Pollin, Robert; Jeannette Wicks-Lim. *Political Economy Research Institute. Job Opportunities for the Green Economy: A State-By-State Picture of Occupations that Gain from Green Investments*. http://www.bluegreenalliance.org/admin/publications/files/0005.4.pdf

29. Sterzinger, George; Matt Svrcek, Renewable Energy Policy Project. *Component Manufacturing: Ohio's Future in the Renewable Energy Industry.* http://www.repp.org/articles/static/1/binaries/Ohio_Report_Long_Appndx_ABC.pdf

30. Sterzinger, George; Matt Svrcek, Renewable Energy Policy Project. *Solar PV Development: Location of Economic Activity.* http://www.repp.org/articles/static/1/binaries/SolarLocator.pdf

31. World Watch Institute. *Green Jobs: Towards decent work in a sustainable, low-carbon world*: *Policy messages and main findings for decision makers*. www.unep.org/civil_society/Publications/index.asp

32. World Watch Institute. *Green Jobs: Towards decent work in a sustainable, low-carbon world.* http://www.unep.org/labour_environment/PDFs/Greenjobs/UNEP-Green-Jobs-Report.pdf

33. The Pew Charitable Trusts. *The Clean Energy Economy; Repowering Jobs, Businesses and Investments Across America.* http://www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf

34. United States Conference of Mayors. U.S. Metro Economies; Green Jobs in U.S. Metro Areas. http://www.usmayors.org/pressreleases/uploads/GreenJobsReport.pdf