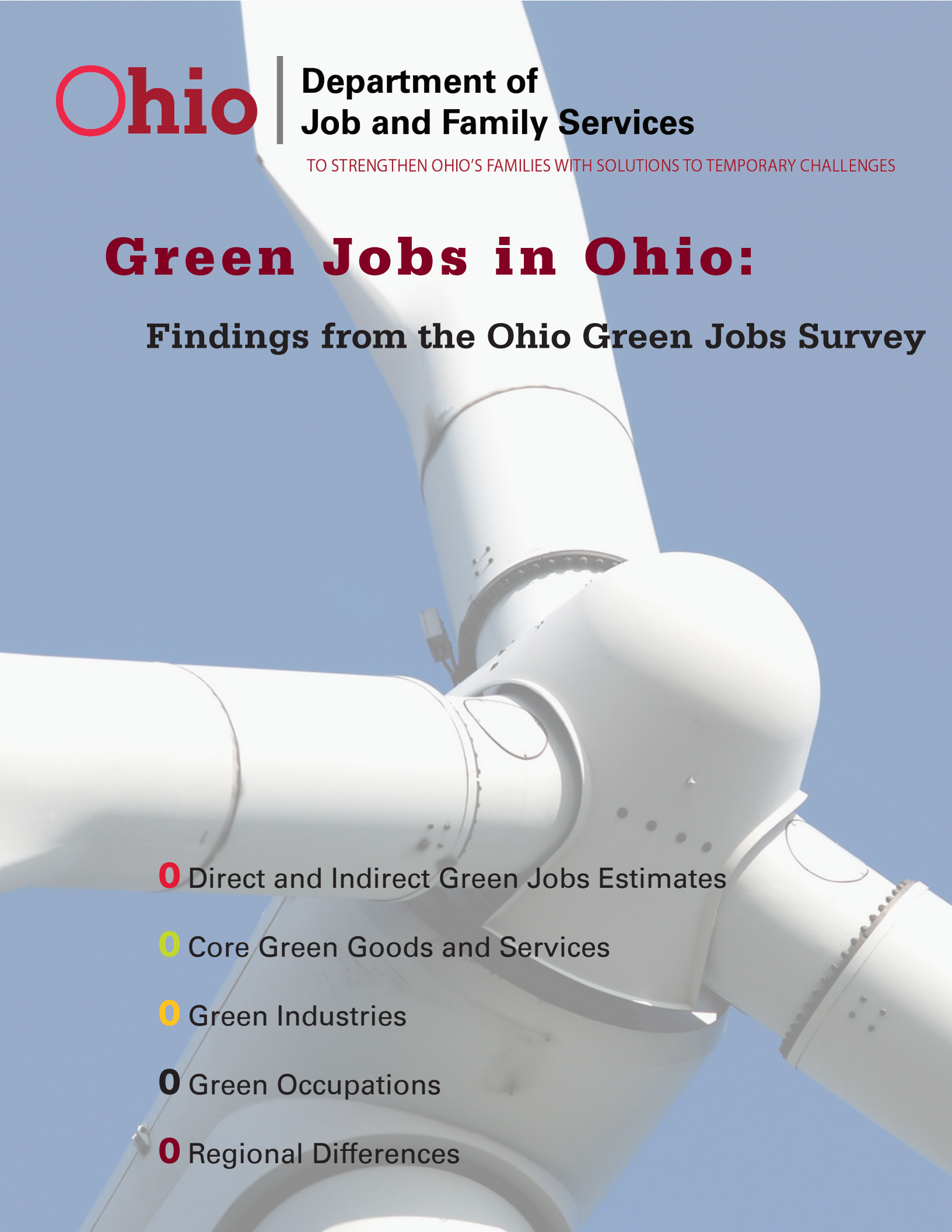
Ohio | Department of Job and Family Services

TO STRENGTHEN OHIO'S FAMILIES WITH SOLUTIONS TO TEMPORARY CHALLENGES

Green Jobs in Ohio:

Findings from the Ohio Green Jobs Survey



- 0 Direct and Indirect Green Jobs Estimates
- 0 Core Green Goods and Services
- 0 Green Industries
- 0 Green Occupations
- 0 Regional Differences

Table of Contents

Table of Figures

Executive Summary

Much attention has been given in recent years to green jobs and their potential to decrease pollution, decrease dependence on foreign oil and create jobs. Green jobs could present challenges for economic and workforce development efforts. What kinds of green jobs will there be? What skills are needed for green jobs? Do enough workers have those skills? Which industries will have green jobs? Where will the jobs be located? The ability to answer these questions starts with an understanding of the current green jobs situation.

Unfortunately, the systems used to define and measure industries and occupations have no mechanisms to measure green jobs. To deal with this shortcoming, several states developed their own green jobs definitions and conducted employer surveys to assess their green jobs situations. The data in this report came from a survey of Ohio employers in 47 industries thought to be likely to have green jobs. The survey was conducted during April and May 2011.

Direct and indirect green jobs were a small slice of the total jobs pie.

- During the survey period, Ohio had an estimated 56,785 direct and 31,589 indirect green jobs.
- Direct green jobs accounted for about 1.3 percent of all private non-agricultural jobs; indirect green jobs accounted for another 0.7 percent of those jobs.

Direct green jobs were unevenly distributed among core green goods and service areas:

- 42.5 percent of jobs were in increasing energy efficiency,
- 24.9 percent were in pollution prevention and environmental cleanup,
- 12.4 percent were in agriculture and natural resource conservation,
- 7.0 percent were in clean transportation and fuels, and
- 5.9 percent were in producing renewable energy.

Direct green jobs were concentrated in a few industry sectors:

- manufacturing — 28.4 percent of direct green jobs,
- construction — 19.3 percent,
- professional and technical services — 14.1 percent,
- administrative and waste services — 12.8 percent,
- wholesale trade — 6.0 percent,
- other services except public administration — 5.9 percent,
- transportation and warehousing — 5.3 percent, and
- agriculture — 4.8 percent.

More than 75 percent of direct green jobs were in occupational groups in which the usual training and education requirements are often on-the-job training:

- production occupations group — 22.0 percent of coded green occupations
- construction and extraction occupations — 15.8 percent,
- transportation and material moving — 13.2 percent,
- installation, maintenance and repair occupations — 11.1 percent,
- building and grounds cleaning and maintenance green occupations — 7.9 percent,
- sales and related occupations — 4.2 percent, and
- farming, fishing, and forestry occupations — 3.2 percent.

More than 15 percent of direct green jobs were in occupational groups in which the usual training and education requirements are often a bachelor's degree:

- architecture and engineering occupations — 7.7 percent,
- life, physical and social science occupations — 4.8 percent,
- management occupations — 3.6 percent, and
- business and financial operations — 2.5 percent.

About 70 percent of direct green jobs were concentrated in five of the former economic development regions:

- Northern Ohio (EDR-8) — 16.1 percent (9,121 direct green jobs),
- Northwest Ohio (EDR-2) — 15.7 percent,
- Central Ohio (EDR-1) — 14.0 percent, and
- Southwest Ohio (EDR-5) — 11.6 percent.

Four regions had percentages of direct green jobs that were significantly higher than their percentages of all jobs in Ohio:

- the Northwest region (EDR 2) accounted for 15.7 percent of direct green jobs, but only 8.2 percent of all jobs in Ohio,
- the East Central region (EDR 10) accounted for 7.2 percent of direct green jobs, but only 3.7 percent of all jobs in Ohio,
- the West Central region (EDR 3) accounted for 6.4 percent of green jobs, but only 3.1 percent of all jobs in Ohio, and
- the North Central region (EDR 6) accounted for 4.8 percent of green jobs, but only 3.5 percent of all jobs in Ohio.

The challenge for economic and workforce efforts will be to capitalize on local resources to develop green industries and jobs and to work with local educators and training providers to produce a workforce with the skills necessary for employment in green jobs.

Introduction

Two of the main goals of the green jobs movement are protecting the environment and increasing energy sustainability. Achieving these goals will require a wide range of changes in the business world, including the production of "green" products and services intended to help meet environmental goals. As a result of trying to reach environmental goals, the green movement has the potential to create new jobs and to modify some existing jobs. These green jobs could present challenges for economic and workforce development efforts. What kinds of green jobs will there be? Are enough skilled workers available for new green jobs? What skills will be needed? Which industries will have green jobs? Where will the jobs be located? The ability to answer these questions starts with an understanding of the current green jobs situation.

Although green jobs have received more attention in recent years, many green jobs are not new because efforts to reduce pollution and increase energy efficiency are not new. For example, auto industry fuel mileage standards have been in place since 1978, and there are green jobs associated with those efforts. Unfortunately, developing reliable information about the current green jobs situation has been difficult. For example, two studies in 2008 estimated that the number of green jobs in Ohio ranged from 17,000 to 500,000.[1] The number of green jobs varied widely because those studies defined green jobs differently. There has been no standard definition of green jobs, and the systems used to classify and count industry and occupational employment have no mechanisms for identifying green jobs. Consequently, many states, including Ohio, developed their own green jobs definitions and collected data about green jobs. This report presents data from the green jobs survey of Ohio employers.

The Ohio Green Jobs Survey

In 2009, Ohio, Indiana and Michigan received a grant from the U.S. Department of Labor Employment and Training Administration to conduct a joint project aimed at dealing with changes in automotive industry employment.[2] As part of the project, Indiana and Ohio proposed to conduct green jobs surveys modeled after a green jobs survey previously conducted by Michigan.

This report highlights the estimated number of direct green jobs—those involved in the production of green products or the delivery of green services—at the state level, for five core green areas, for Ohio's 12 economic development regions, and for 14 industry sectors. Information from employers was used to classify the green jobs into occupational groups.

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[1] Please see: a) Bezdek, Roger. *Renewable Energy and Energy Efficiency: Economic Drivers for the 21st Century.* American Solar Energy Society, 2007 and b) Global Insight. *U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy* [Report to the United States Conference of Mayors]. Lexington, MA: Global Insight, August 2008.

[2] For more information, please visit the website Driving Change: Greening the Automotive Workforce at http://www.drivingworkforcechange.org/.

Survey Methodology and Data Limitations

The Ohio green jobs survey was modeled after the Michigan green jobs survey conducted in 2009. The Ohio questionnaire was adapted from the Michigan questionnaire with minor edits. A copy of the questionnaire and letter materials is in the appendix. The U.S. Bureau of Labor Statistics drew a sample of 14,995 Ohio business establishments that was stratified by industry and region. Stratification is a sampling method that ensures that subunits within a population are adequately represented in the sample. Michigan limited its survey to industries that were more likely than others to produce green products or services, and the Ohio survey was limited to the same industries. Figure 1 on the next page lists the 47 industries included in the survey. The sample was also stratified on the 12 former Economic Development Regions to ensure that the sample adequately covered all areas of the state. Without stratification, the sample would have favored the larger industries and the heavily populated areas of the state.

The original survey plan was to mail copies of the questionnaire to establishments in the sample, and then follow-up by mail and telephone with non-responding establishments. Because of delays in fielding the survey, the vendor, Market Decisions, LLC, suggested an alternate plan to complete the survey in less time. When phone numbers were available, establishments were first contacted by phone to conduct brief screening interviews to determine whether the establishments had any green jobs. Establishments with green jobs were mailed questionnaires. Establishments for which there were no phone numbers or that could not be reached by phone were mailed a questionnaire. There were 336 establishments for which neither phone numbers nor addresses could be obtained, effectively reducing the sample size to 14,659 establishments. Establishments could respond by phone, mail, fax, and the Internet, making this a multimode survey. Data collection began on April 14, 2011 and was completed on May 26, 2011. Figure A2 in the appendix shows the final sample disposition. The response rate was 52 percent, calculated using the standard American Association for Public Opinion response rate formula (AAPOR 1). This represents the most conservative measure of survey response and is based on the formula:

$$\frac{\text{Complete Surveys (Without Green Jobs, With Green Jobs)}}{\text{Completed Surveys + Known Eligible Cases + Unresolved Cases}}$$

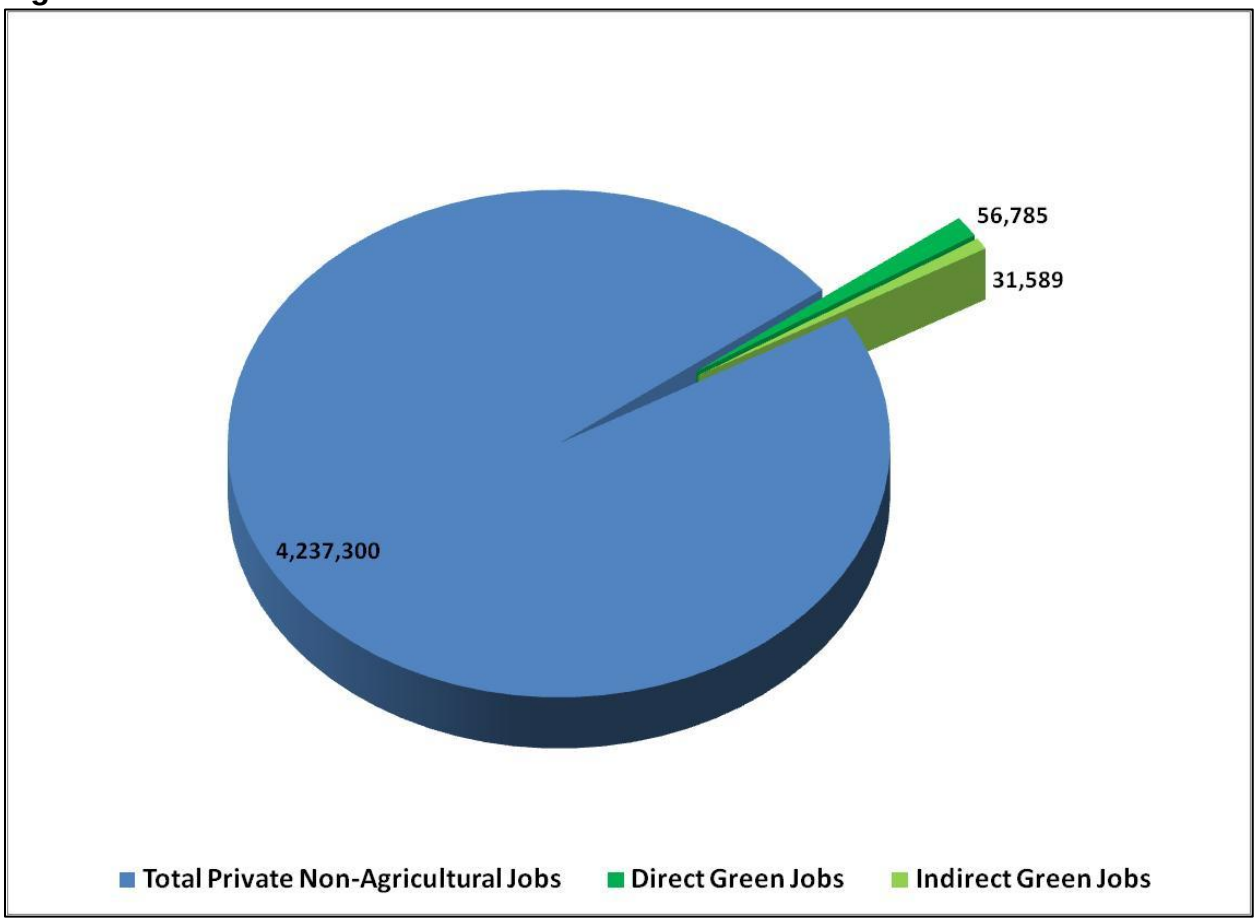
Figure 1. Industries Surveyed for Green Jobs

Code	Industry title	Code	Industry title
NAICS 111	Crop production	NAICS 337	Furniture and related product manufacturing
NAICS 112	Animal production and aquaculture	NAICS 339	Miscellaneous manufacturing
NAICS 113	Forestry and logging	NAICS 423	Merchant wholesalers, durable goods
NAICS 115	Agriculture and forestry support activities	NAICS 425	Electronic markets and agents and brokers
NAICS 221	Utilities	NAICS 482	Rail transportation
NAICS 236	Construction of buildings	NAICS 485	Transit and ground passenger transportation
NAICS 237	Heavy and civil engineering construction	NAICS 486	Pipeline transportation
NAICS 238	Specialty trade contractors	NAICS 493	Warehousing and storage
NAICS 311	Food manufacturing	NAICS 511	Publishing industries, except Internet
NAICS 313	Textile mills	NAICS 517	Telecommunications
NAICS 314	Textile product mills	NAICS 518	Data processing, hosting and related services
NAICS 315	Apparel manufacturing	NAICS 519	Other information services
NAICS 321	Wood product manufacturing	NAICS 522	Credit intermediation and related activities
NAICS 322	Paper manufacturing	NAICS 523	Securities, commodity contracts, investments
NAICS 323	Printing and related support activities	NAICS 533	Lessors of nonfinancial intangible assets
NAICS 325	Chemical manufacturing	NAICS 541	Professional and technical services
NAICS 326	Plastics and rubber products manufacturing	NAICS 551	Management of companies and enterprises
NAICS 327	Nonmetallic mineral product manufacturing	NAICS 561	Administrative and support services
NAICS 331	Primary metal manufacturing	NAICS 562	Waste management and remediation services
NAICS 332	Fabricated metal product manufacturing	NAICS 712	Museums, historical sites, zoos, and parks
NAICS 333	Machinery manufacturing	NAICS 811	Repair and maintenance
NAICS 334	Computer and electronic product manufacturing	NAICS 813	Membership associations and organizations
NAICS 335	Electrical equipment and appliance mfg.	NAICS 999	Unclassified
NAICS 336	Transportation equipment manufacturing		

Originally, data from this survey were to be combined with and compared to data from the Michigan and Indiana green jobs surveys. Unfortunately, delays in hiring a vendor to conduct the survey pushed the field period back. The Ohio survey was conducted two years after the Michigan survey and one year after the Indiana survey. Because of the recession of 2007-2009, the employment picture was very different during each of the field periods, making data comparisons across the states problematic. For this reason, comparisons to the Michigan and Indiana data have been omitted from this report.

Estimated Green Employment

Figure 2. The Green Slice of the Jobs Pie

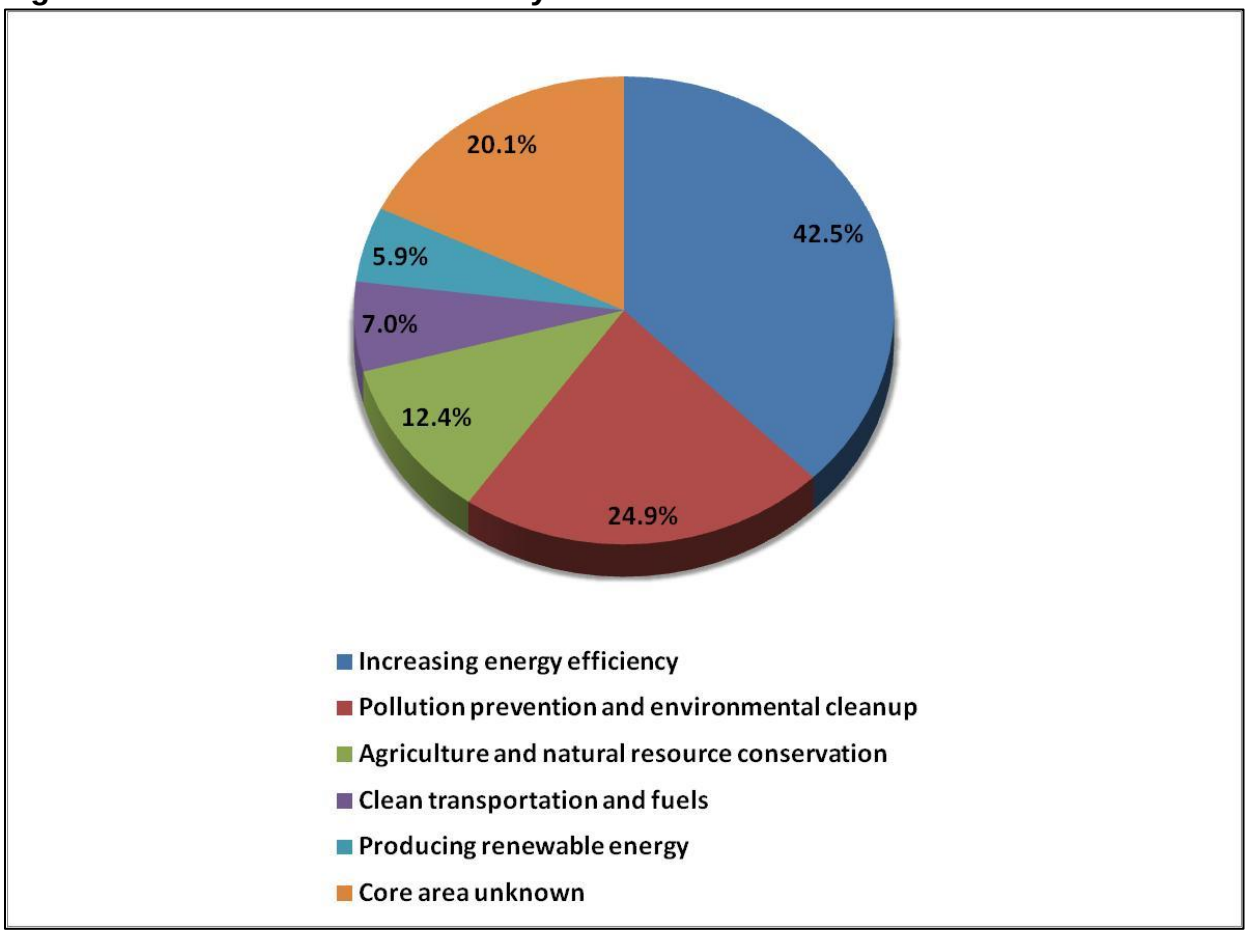


Based on the survey, green jobs—direct and indirect—are a small slice of the total jobs pie. There were an estimated 56,785 direct and 31,589 indirect green jobs in Ohio during the survey period. In March 2011 there were 4,237,300 private non-agricultural jobs in Ohio (seasonally unadjusted). Therefore, direct green jobs accounted for about 1.3 percent of all private non-agricultural jobs; indirect green jobs accounted for another 0.7 percent of those jobs.

Excluding the industries assumed to have very few or no green jobs, green jobs were still a relatively small slice of the jobs pie. Direct green jobs accounted for 3.0 percent of employment among the industries surveyed, and indirect green jobs accounted for 1.7 percent of employment.

Green Employment by Core Areas

Figure 3. Ohio Direct Green Jobs by Core Area



A wide range of green goods and services are being produced and provided. To make the analysis easier, employers were asked to categorize their green goods and services into five core areas:

- increasing energy efficiency,
- pollution prevention and environmental cleanup,
- agriculture and natural resource conservation,
- clean transportation and fuels, and
- producing renewable energy.

The core area with the largest number of direct green jobs was increasing energy efficiency. This core area had 24,120 direct green jobs in Ohio, 42.5 percent of all direct green jobs.

The core area with the second largest number of green jobs was pollution prevention and environmental cleanup. It had 14,168 direct green jobs, and it accounted for 24.9 percent of green employment in Ohio.

The third largest core area in terms of direct green jobs was agriculture and natural resources conservation. This core area had 7,061 direct green jobs, which was about 12.4 percent of the direct green jobs.

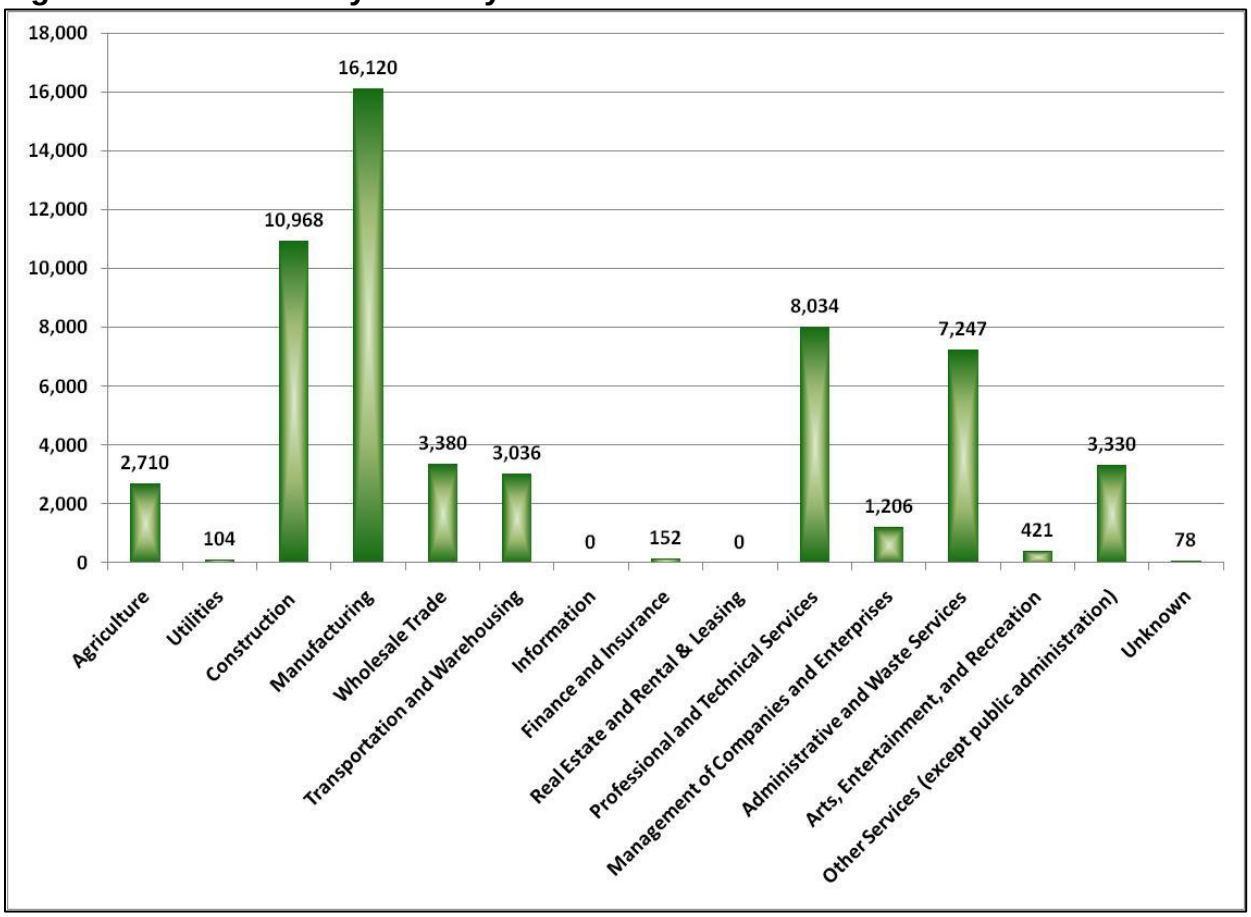
The fourth largest core area was clean transportation and fuels. The main focus of the grant that funded the green jobs survey was the automotive manufacturing workforce because Ohio, Indiana and Michigan have high concentrations of employment in motor vehicle manufacturing, motor vehicle body and trailer manufacturing and motor vehicle parts manufacturing. The auto industries have been engaged in efforts to reduce fuel consumption, and so the green jobs survey specifically included clean transportation and fuels as a core area. In Ohio, this core area had 3,966 jobs, which accounted for 7.0 percent of the direct green jobs in the state.

Although the production of renewable energy—particularly using solar or wind power—has received considerable attention, this core area accounted for the smallest percentage of green employment in Ohio. This core area's 3,324 jobs accounted for only 5.9 percent of direct green jobs.

Not all employers who responded to the survey indicated in which core areas their green jobs belonged. About 7.3 percent of Ohio direct green jobs were not assigned a core area. It is possible that if the core areas of these jobs were known, the distribution of direct green jobs may have been somewhat different.

Green Employment by Industry Sector

Figure 4. Green Jobs by Industry Sector



The industry classification system (the North American Industry Classification System or NAICS) does not have any means for identifying green industries. However, employers' industry classifications were included in the sample data, which made it possible to estimate the distribution of direct green jobs across the industries surveyed.

Figure 4 shows the estimated number of direct green jobs by industry sector. There were four industry sectors with more than 7,000 green jobs, five sectors that had between 1,200 and 3,400 green jobs, three sectors with fewer than 500 jobs, and two sectors that reported no direct green jobs.

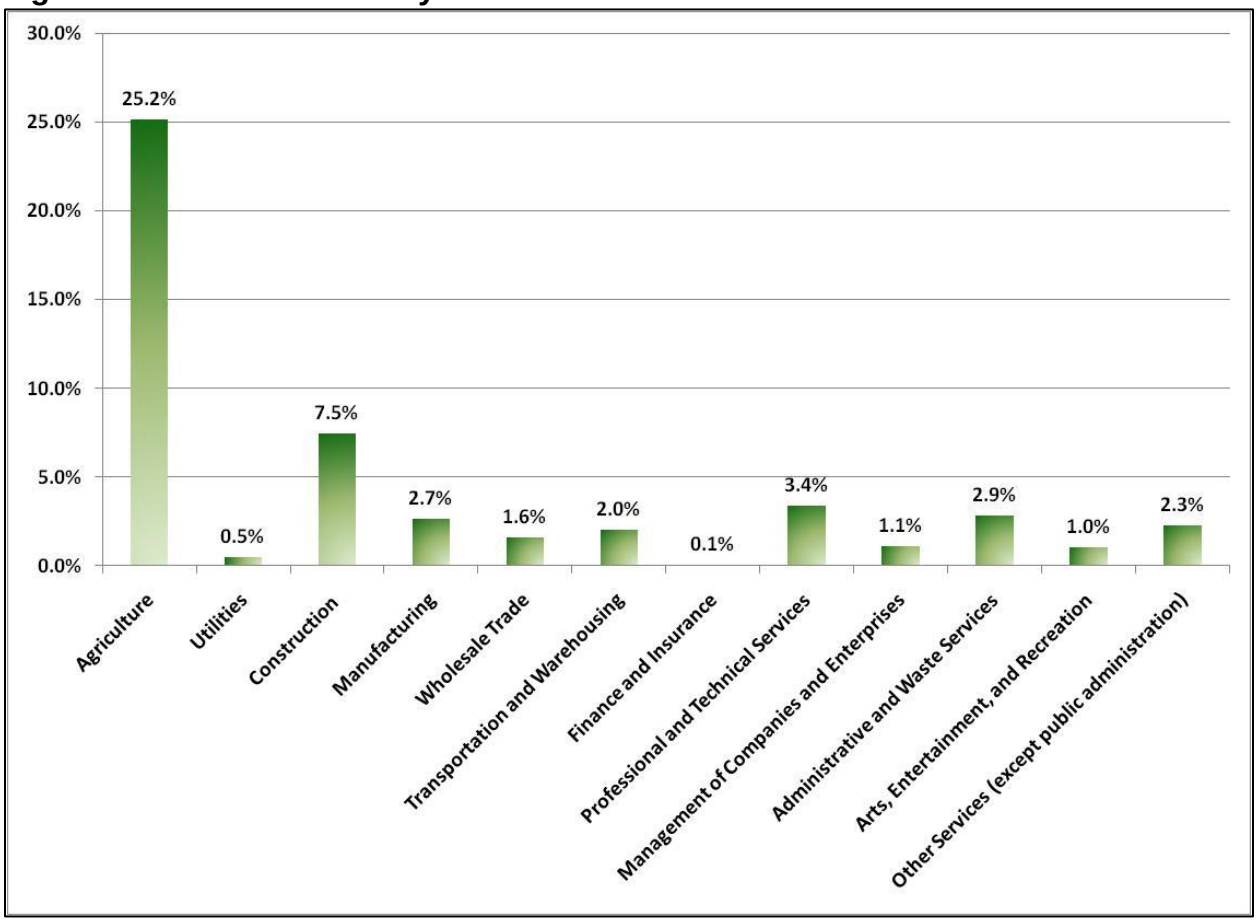
The manufacturing and construction sectors accounted for close to half of the direct green jobs identified by the survey, and the top four sectors accounted for almost 75 percent of the green jobs. This is the percentage distribution of direct green jobs among the sectors:

- manufacturing — 28.4 percent of direct green jobs,
- construction — 19.3 percent,

- professional and technical services — 14.1 percent,
- administrative and waste services — 12.8 percent,
- wholesale trade — 6.0 percent,
- other services except public administration — 5.9 percent,
- transportation and warehousing — 5.3 percent,
- agriculture — 4.8 percent,
- management of companies and enterprises — 2.1 percent,
- arts, entertainment, and recreation — 0.7 percent,
- finance and insurance — 0.3 percent,
- utilities — 0.2 percent,
- information — 0.0 percent, and
- real estate and rental and leasing — 0.0 percent.

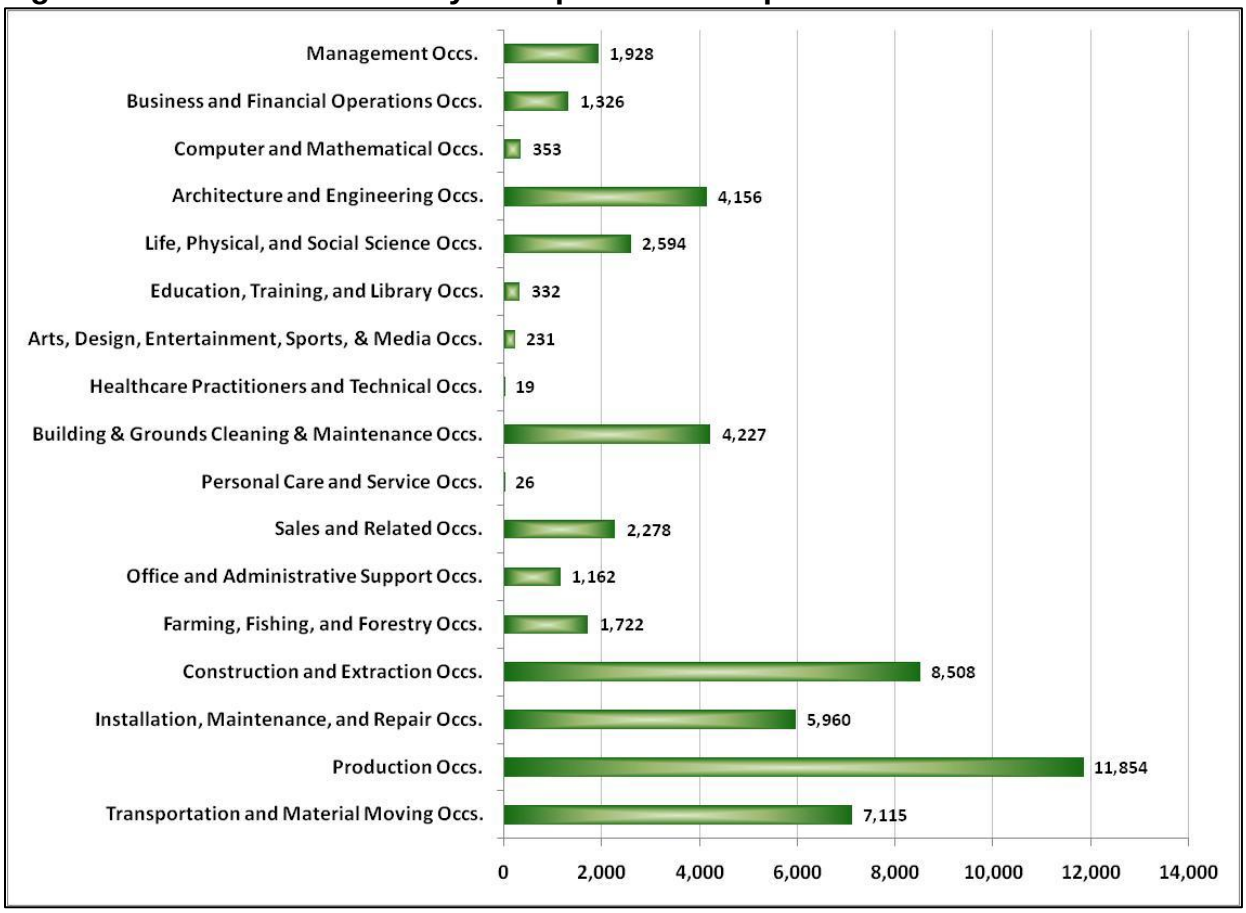
The concentration of green jobs within sectors may vary. Figure 5 shows the percentage of direct green jobs within each sector. The agriculture sector had the highest concentration of green jobs; they accounted for 25.2 percent of jobs in the sector. Construction had the next highest concentration, with green jobs accounting for 7.5 percent sector employment. The remaining sectors showed much lower concentrations of green jobs.

Figure 5. Percent of Industry Sector Jobs that are Green



Green Employment by Occupational Group

Figure 6. Direct Green Jobs by Occupational Group



The Standard Occupational Classification (SOC) system suffers from the same limitation as the industry classification system when it comes to green jobs: it has no means for identifying green jobs. Unlike the industries, however, there is no occupational data that is part of the sample. Instead, employers were asked to report the job titles of their green jobs. Experienced coders used industry information and the job titles to assign occupational codes to the green jobs. Because of insufficient information, not all green jobs could be coded into occupations.

Figure 6 shows the number of direct green jobs for each major occupational group. These are the occupational groups with more than five percent of the direct green jobs:

- production occupations group — 22.0 percent of coded green occupations
- construction and extraction occupations — 15.8 percent,
- transportation and material moving — 13.2 percent,
- installation, maintenance, and repair occupations — 11.1 percent,
- building and grounds cleaning and maintenance green occupations — 7.9 percent, and

- architecture and engineering occupations — 7.7 percent.

The two occupational groups with the most direct green jobs are closely linked to the two industry sectors with the most direct green jobs. Productions occupations are closely linked to the manufacturing sector, and construction and extraction occupations are, of course, linked with the construction sector.

Figure 7. Percentage of Green Jobs within Occupational Groups

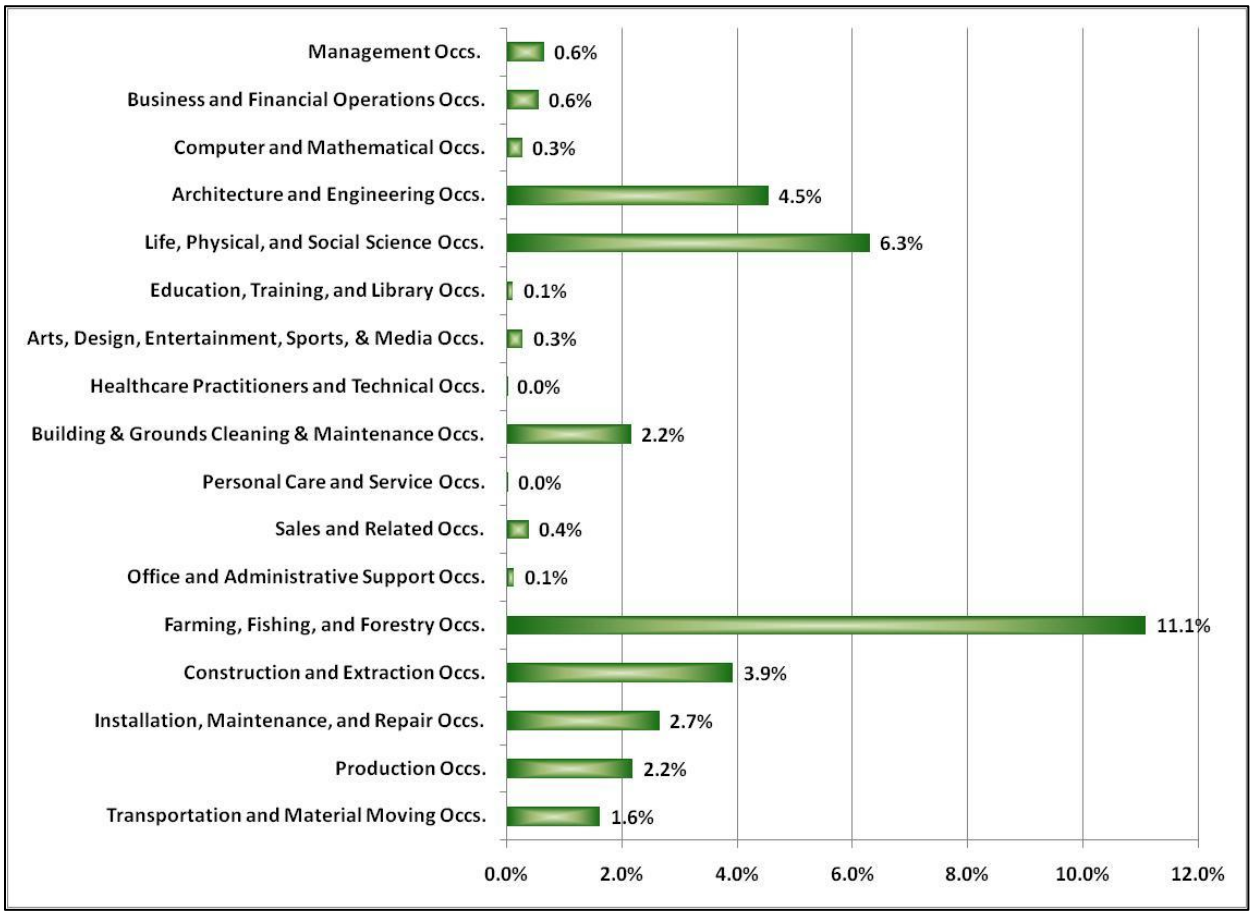


Figure 7 shows the percentage of the coded green jobs within each occupational group.[3] These occupational groups had an internal concentration of green jobs that was more than four percent:

- farming, fishing, and forestry occupations group — 11.1 percent green jobs,
- life, physical, and social science occupations — 6.3 percent,
- architecture and engineering occupations — 4.5 percent, and
- construction and extraction occupations — 3.9 percent.

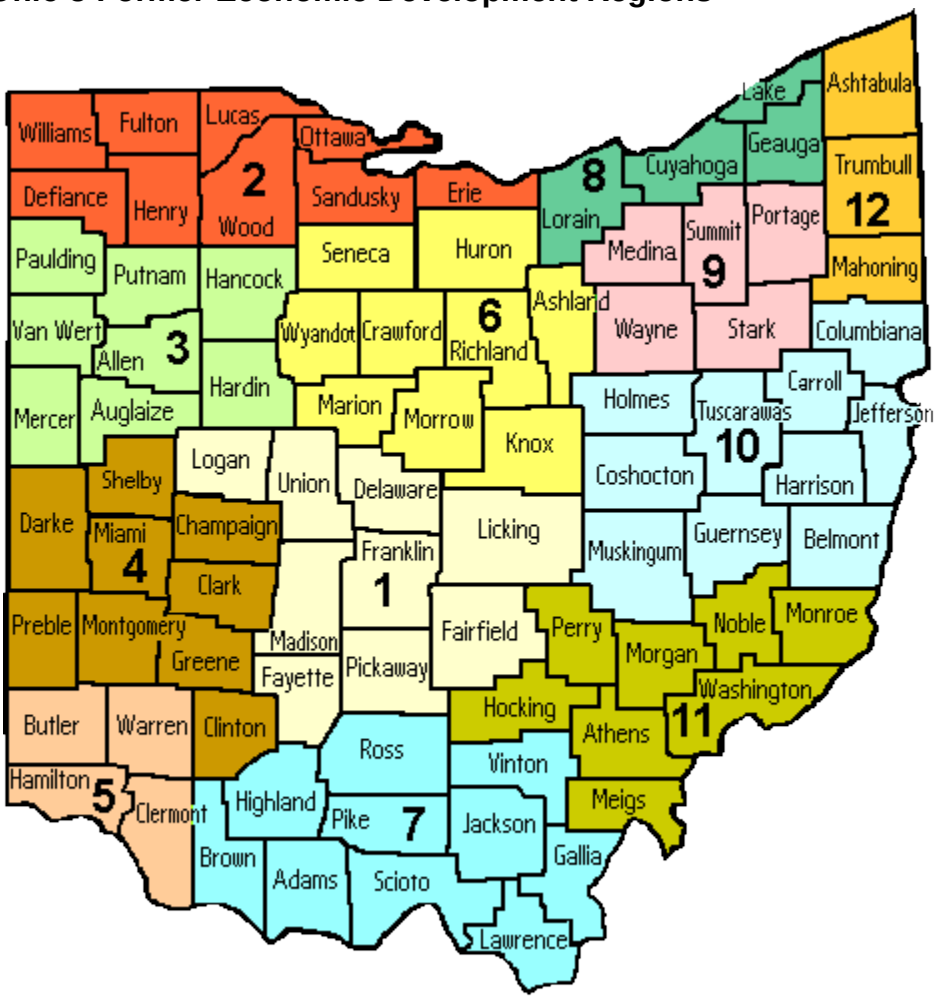
[3] The denominators for these estimates came from the 2008 occupational estimates in the 2008-2018 statewide occupational projections produced by the Ohio Bureau of Labor Market Information.

The relative size of an occupational group affected the percentage of green jobs within it. For example, although there were 11,854 green jobs in the production occupations group, the group is so large (almost 540,000 jobs in 2008) that the relative percentage of green jobs is small. On the other hand, there were 2,494 green jobs in the life, physical and social science occupations group, but with 'only' 41,150 jobs in the group, its proportion of green jobs was higher at 6.3 percent.

Green Employment by Region

At the time of the survey, Ohio was divided into 12 Economic Development Regions (EDRs). Figure 8 shows the regions. Because each region has a unique economic profile, it is reasonable to expect regional differences with respect to green industries and jobs.

Figure 8. Ohio's Former Economic Development Regions



EDR 1, Central Ohio	**EDR 2, Northwest Ohio**	**EDR 3, West Central Ohio**
EDR 4, Southwest Central Ohio	**EDR 5, Southwest Ohio**	**EDR 6. North Central Ohio**
EDR 7, Southern Ohio	**EDR 8, Northern Ohio**	**EDR 9, Northeast Central Ohio**
EDR 10, East Central Ohio	**EDR 11, Southeast Ohio**	**EDR 12, Northeast Ohio**

Figure 9 shows the number of direct and indirect green jobs for each EDR. Five regions accounted for more than 70 percent of the direct green jobs in Ohio. EDR 8, the Northern region, had the most direct green jobs, followed by the Northwest region (EDR 2), the Central region (EDR 1), the Southwest region (EDR 5), and the Northeast Central region (EDR 9). These regions cover some of the most populous areas of the state, and so would be expected to have large numbers of jobs.

Figure 9. Green Jobs by Economic Development Region

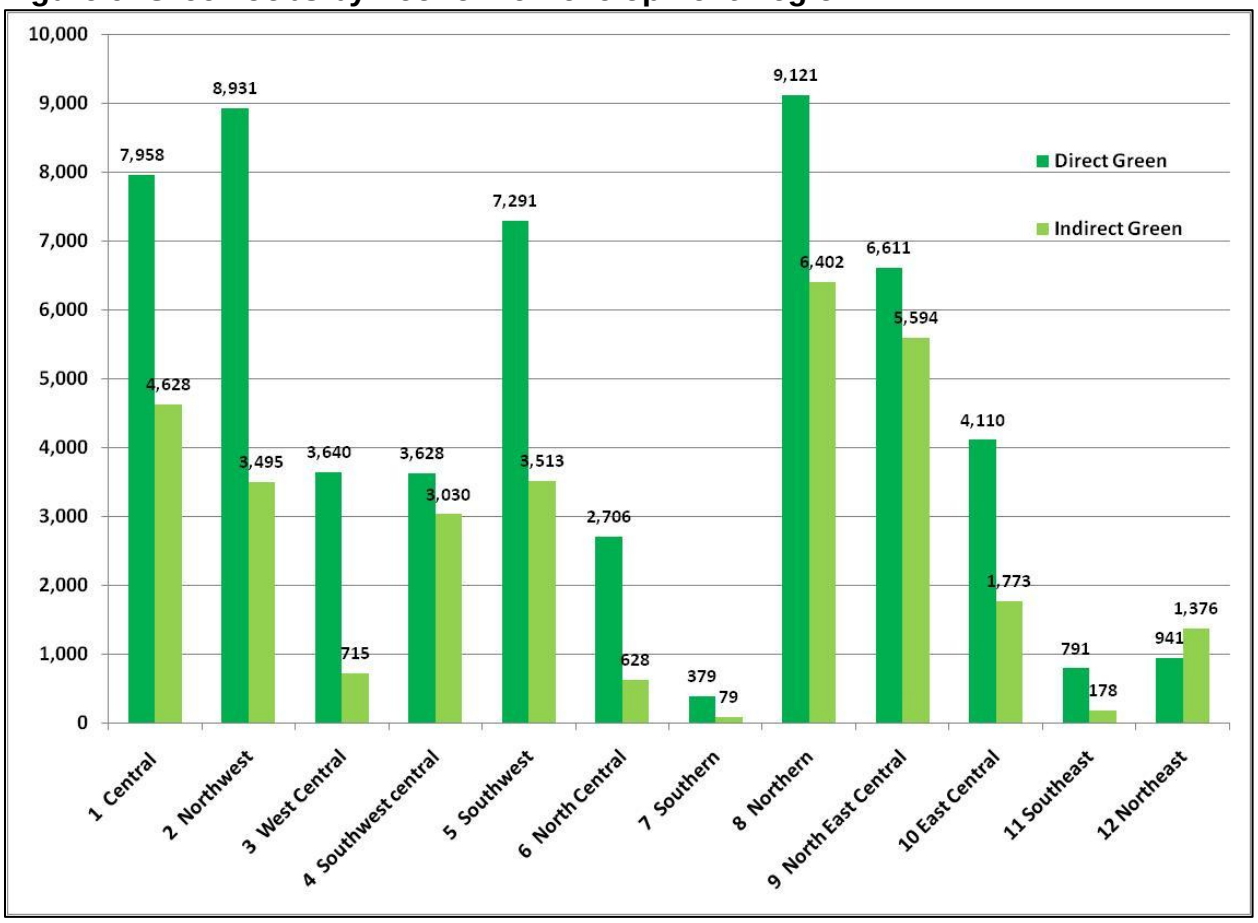


Figure 10. Distribution of All Jobs and Direct Green Jobs among the EDRs

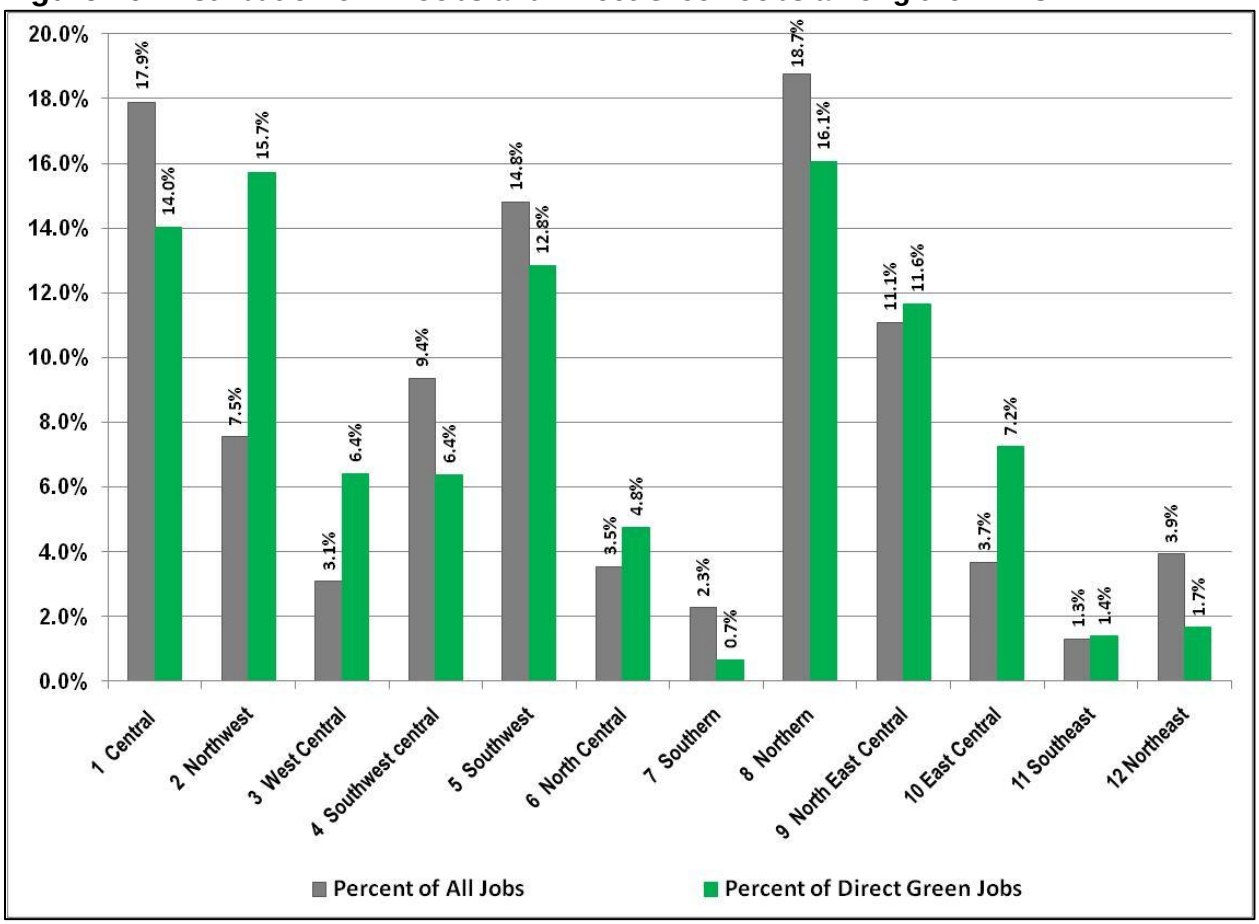


Figure 10 shows the relative distribution of all jobs (gray columns) and direct green jobs (green columns) among the Economic Development Regions. Four regions had proportions of direct green jobs that were significantly higher than their proportions of all jobs:

- the Northwest region (EDR 2) accounted for 15.7 percent of direct green jobs, but only 7.5 percent of all jobs,
- the East Central region (EDR 10) accounted for 7.2 percent of direct green jobs, but only 3.7 percent of all jobs,
- the West Central region (EDR 3) accounted for 6.4 percent of green jobs, but only 3.1 percent of all jobs, and
- the North Central region (EDR 6) accounted for 4.8 percent of green jobs, but only 3.5 percent of all jobs.

The Northwest region has a growing solar cell manufacturing industry,[4] which could have helped boost its percentage of green jobs relative to its overall job status.

[4] "Toledo reinvents itself as a solar-power innovator" USA Today, June 15, 2010. http://www.usatoday.com/money/industries/energy/2010-06-15-toledo15_CV_N.htm

Figure 11. Percentage of Green Jobs by EDR

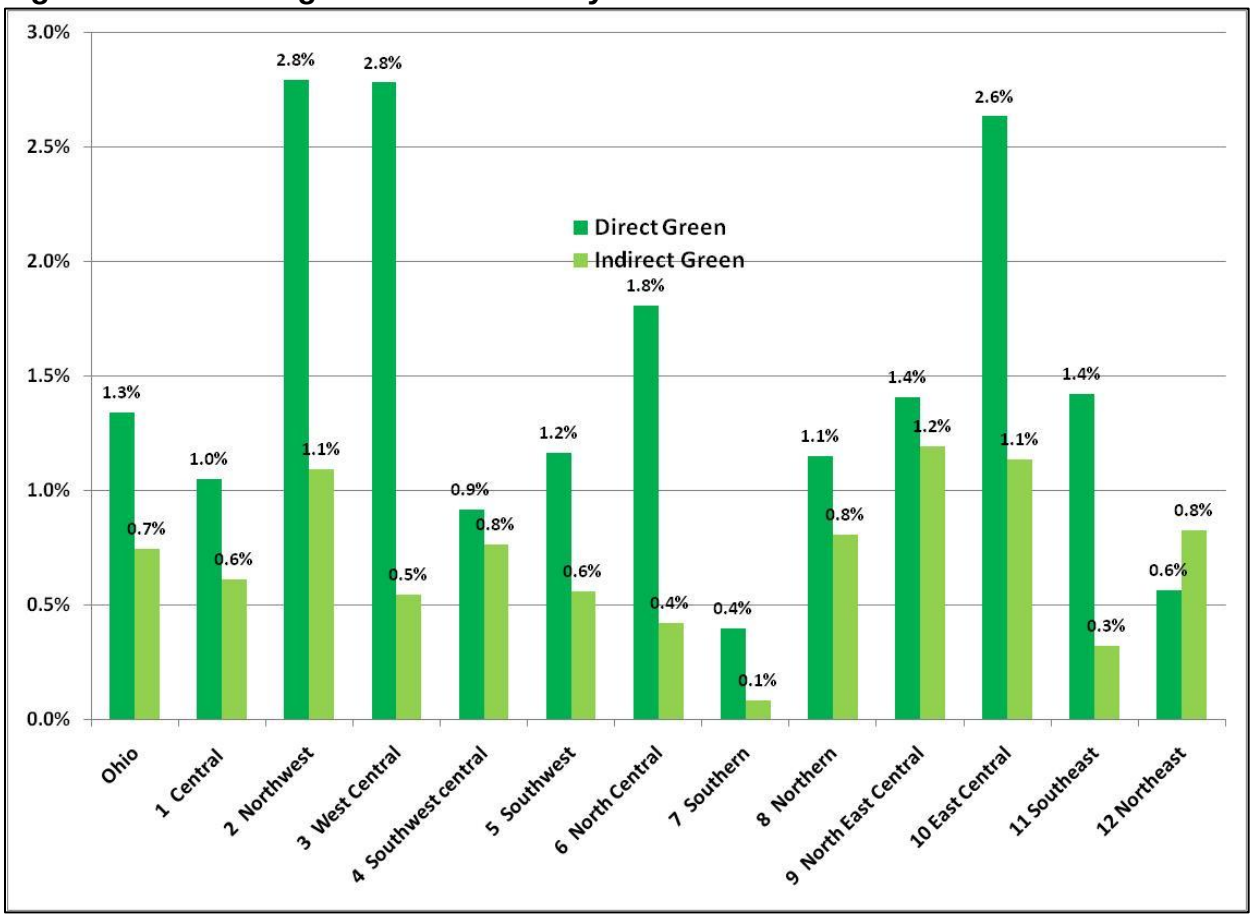


Figure 11 shows the percentage of all jobs that are direct green jobs for each EDR. Direct green jobs accounted for 1.3 percent of all Ohio jobs in March 2011. Three EDRs had a concentration of direct green jobs at least twice as high as the state level and a fourth EDR had a concentration of green jobs significantly higher than the state average. Green jobs accounted for 2.8 percent of jobs in the Northwest and West Central EDRs, 2.6 percent of jobs in the East Central EDR, and 1.8 percent of jobs in the North Central EDR.

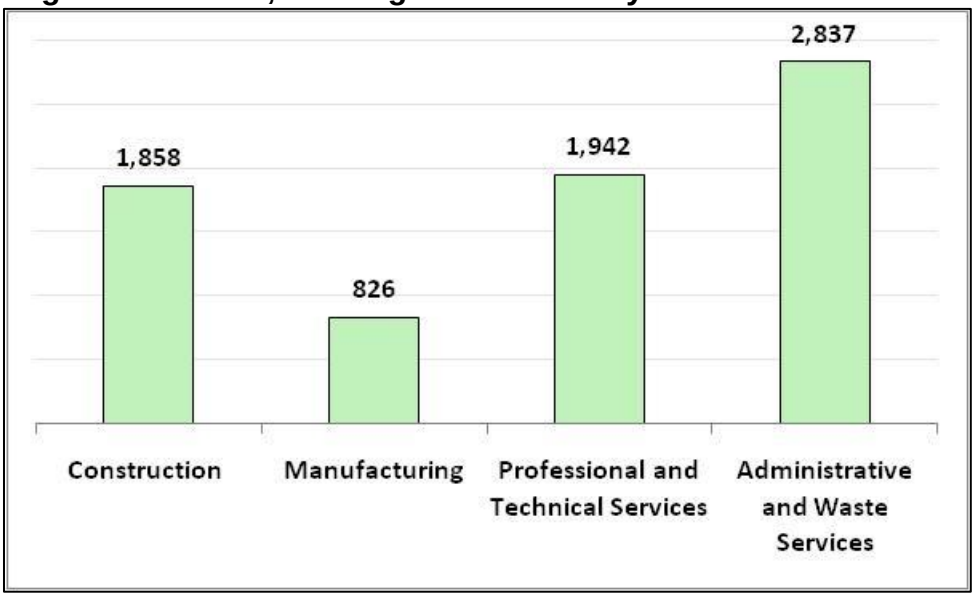
Two regions had concentrations of direct green jobs well below the state level. In the Northeast EDR, direct green jobs accounted for 0.6 percent jobs, and in the Southern EDR, direct green jobs accounted for only 0.4 percent of jobs.

Regional Profiles of Green Employment

This section examines the leading green industry sectors and occupational groups in each Economic Development Region. Leading industry sectors or occupational groups were defined as those having more than a 5 percent share of the direct green jobs in the region.

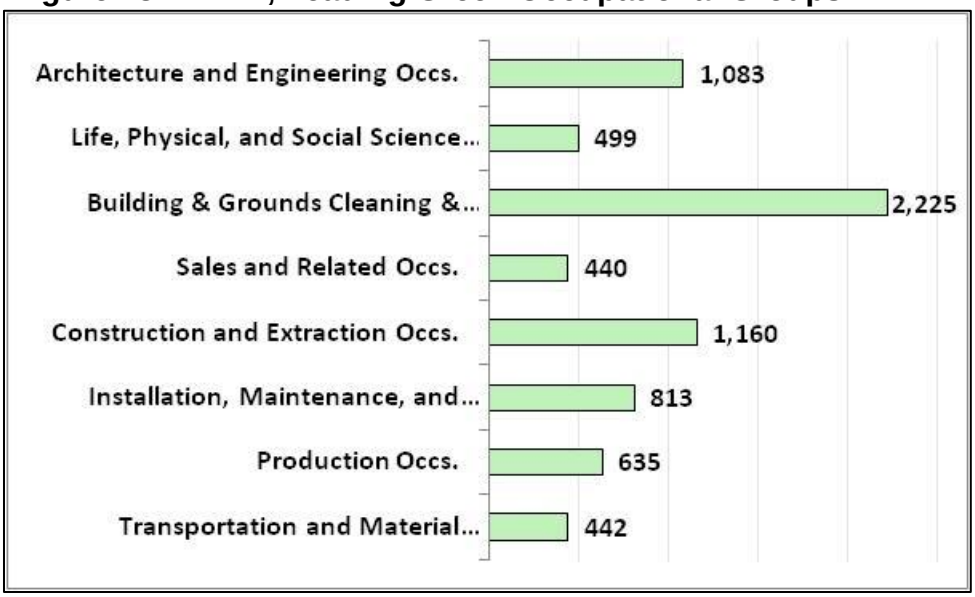
EDR 1, Central Ohio

Figure 12. EDR 1, Leading Green Industry Sectors



EDR 1, the Central Ohio region, consists of nine counties. It includes the entire Columbus Metropolitan Statistical Area plus one adjoining county. The EDR had an estimated 7,958 green jobs. More than a third (35.6%) of green jobs were in the administrative and waste services sector. Please see Figure 12. Two other sectors each had close to one quarter of the green jobs. Professional and technical services sector had about 24.4 percent of the total; construction had about 23.3 percent of green jobs. Manufacturing was weaker in the Central region, with only 10.4 percent of green jobs in the region.

Figure 13. EDR 1, Leading Green Occupational Groups

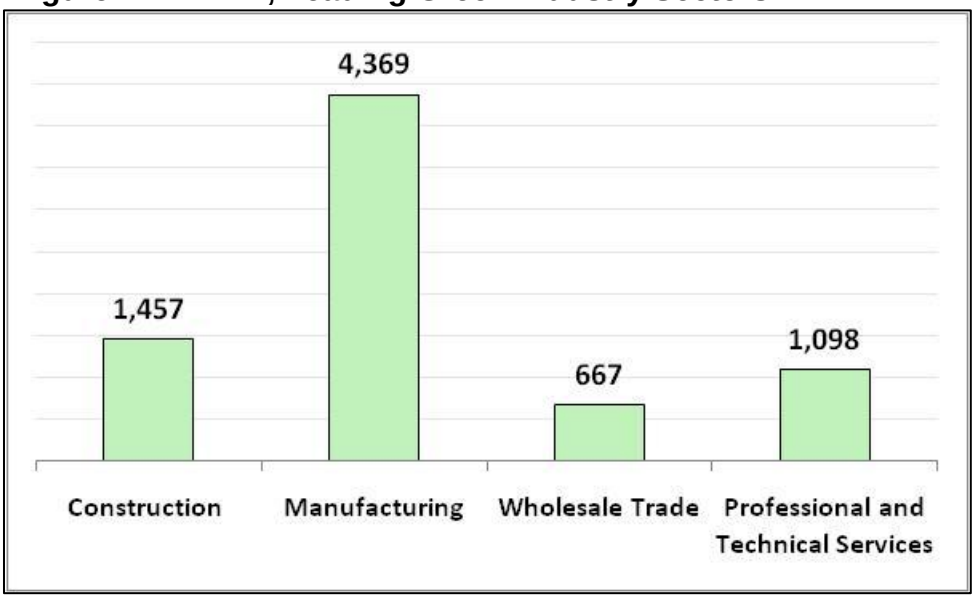


Green jobs in Central Ohio were distributed among several occupational groups instead of being concentrated in only a few groups. Figure 13 shows the number of green jobs for each occupational group. This is the percentage distribution of green jobs among the groups:

- building and grounds cleaning and maintenance group – 28.3 percent,
- construction and extraction group – 14.7 percent,
- architecture and engineering group – 13.8 percent,
- installation, maintenance, and repair – 10.3 percent,
- production occupations – 8.1 percent,
- life, physical and social science occupations – 6.3 percent,
- transportation and material moving occupations – 5.6 percent, and
- sales and related occupations – 5.6 percent.

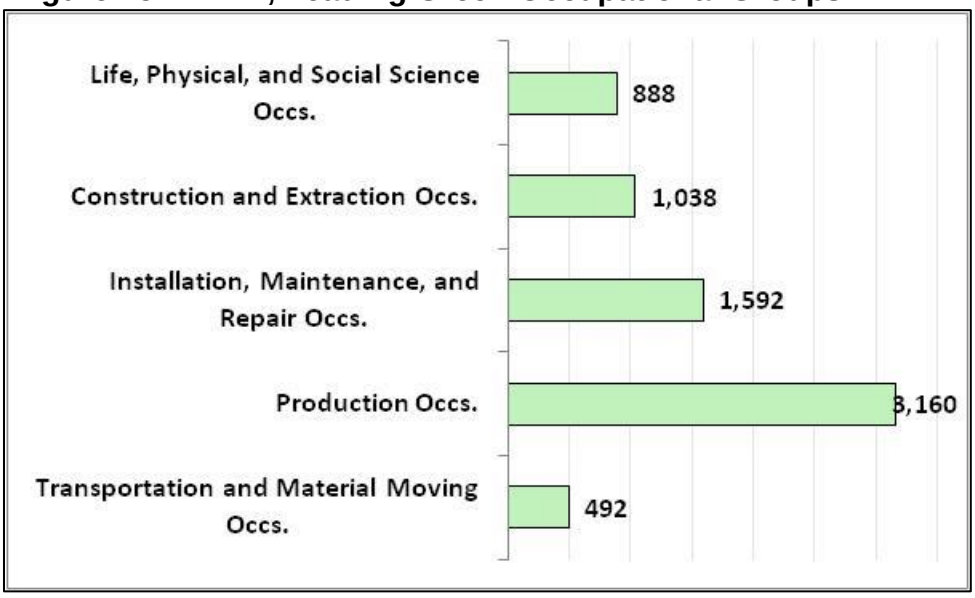
EDR 2, Northwest Ohio

Figure 14. EDR 2, Leading Green Industry Sectors



Northwest Ohio region, EDR 2, comprises nine counties. It includes the four counties in the Toledo, the Sandusky MSA (one county), and four adjoining counties. The region had 8,931 direct green jobs, and about 85 percent of those jobs were concentrated in four industry sectors. Please see Figure 14. The manufacturing sector had almost half of all green jobs (48.9%) in the region. The construction sector was a distant second with about 16.3 percent of green jobs. It was followed by professional and technical services (12.3%) and wholesale trade (7.5%).

Figure 15. EDR 2, Leading Green Occupational Groups



The Northwest Ohio region had five leading occupational groups. Please see Figure 15 on the previous page. With 3,160 jobs, production occupations accounted for about 36.1 percent of green jobs in the region. This reflects the strength of the manufacturing sector in the region. Next came installation, maintenance and repair occupations (18.2%), followed by construction and extraction occupations (11.9%), life, physical and social science occupations (10.2%), and transportation and material moving occupations (5.6%).

EDR 3, West Central Ohio

EDR 3, West Central Ohio region, consists of eight counties, one of which is the Lima MSA. The region had 3,640 direct green jobs. The transportation and warehousing sector dominates the region, with 73.3 percent of green jobs in the region. Please see Figure 16. There were three other leading industry sectors. The administrative and waste services sector accounted for 7.2 percent of green jobs, followed by construction (6.7%) and manufacturing (5.6%).

Figure 16. EDR 3, Leading Green Industry Sectors

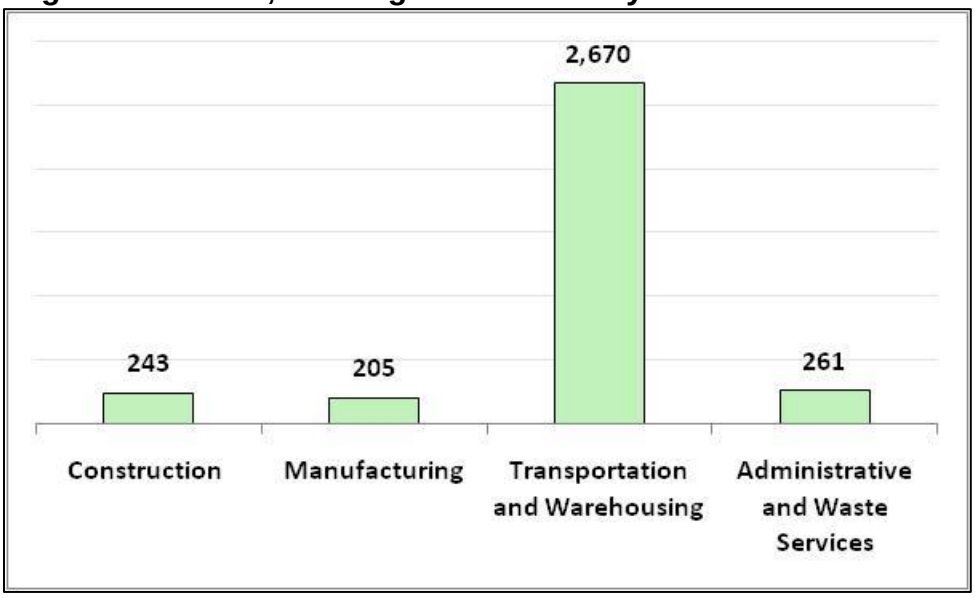
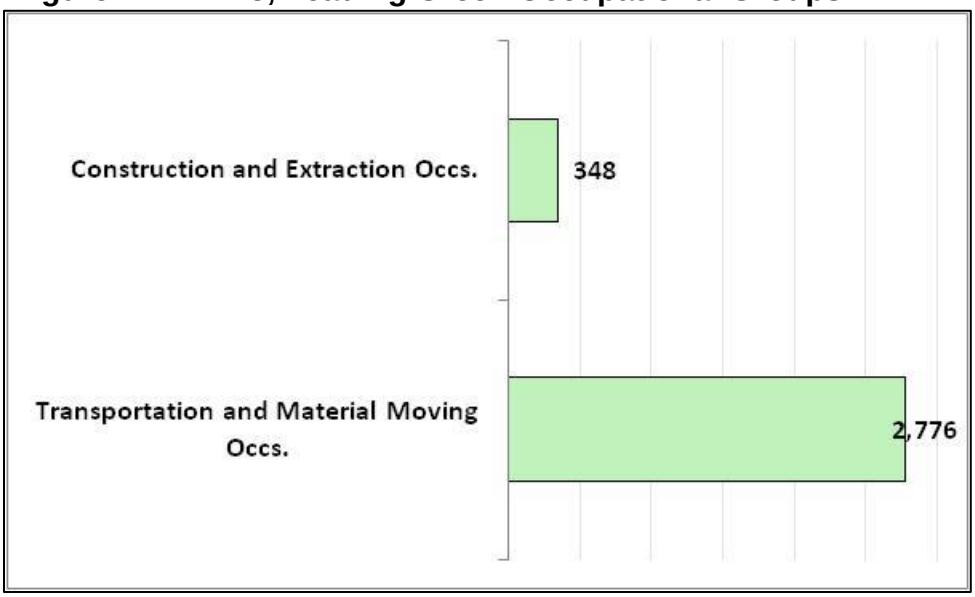


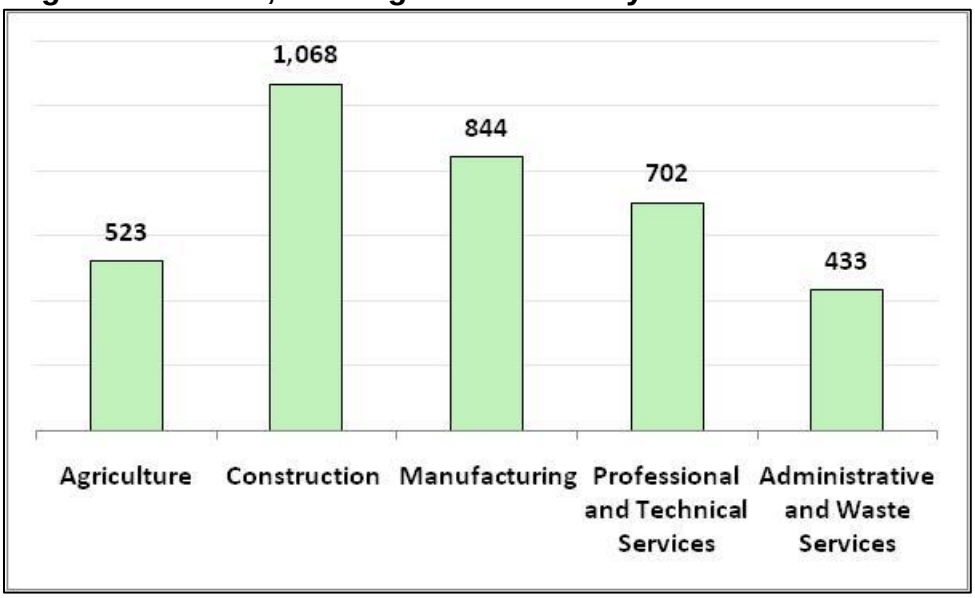
Figure 17. EDR 3, Leading Green Occupational Groups



Not surprisingly, green jobs in the West Central region were concentrated in the transportation and material moving occupations group (73.4%). Please see Figure 17. A distance second was the construction and extraction occupations group (9.2%).

EDR 4, Southwest Central Ohio

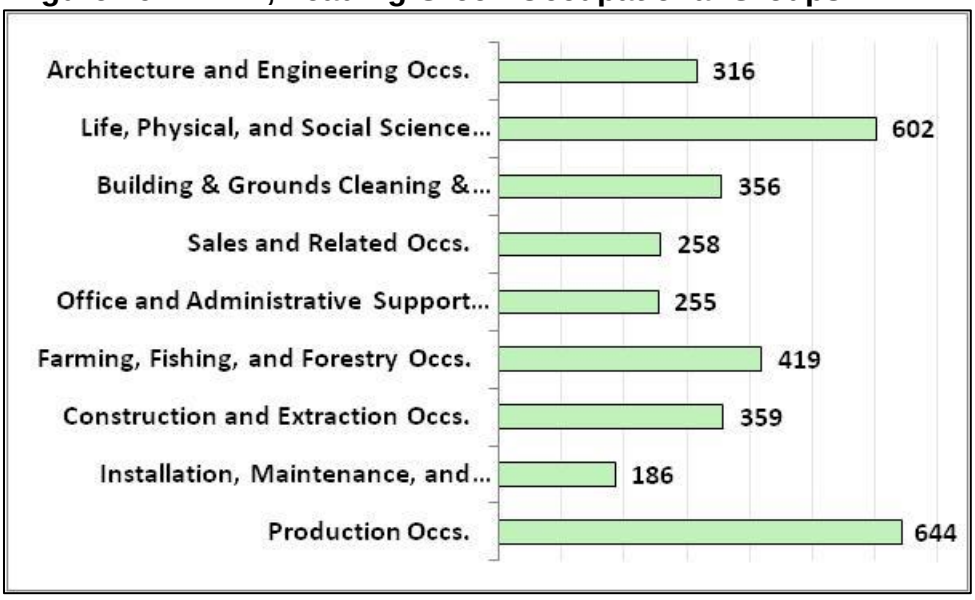
Figure 18. EDR 4, Leading Green Industry Sectors



EDR 4, the Southwest Central Ohio region, contains the four counties of the Dayton MSA, the Springfield MSA (one county), and four adjoining counties. More than 98

percent of the region's 3,628 direct green jobs were in five industry sectors. Please see Figure 18 on the previous page. The top leading industry sector was construction, with about 29.4 percent of all green jobs in the region. It was followed by manufacturing (23.3%), professional and technical services (19.35%), agriculture (14.4%), and administrative and waste services (11.9%).

Figure 19. EDR 4, Leading Green Occupational Groups

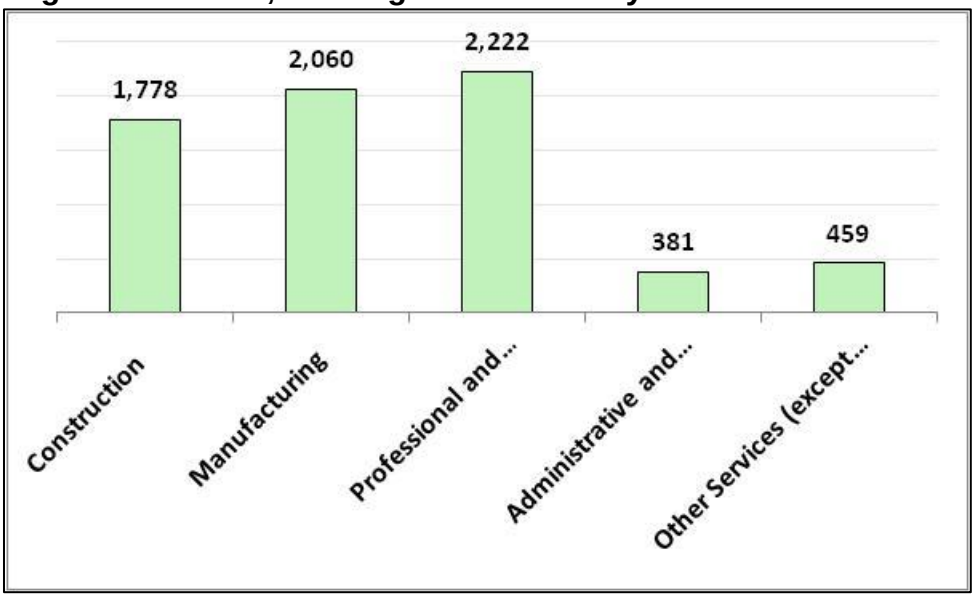


The Southwest Central region enjoys a diversity of green jobs. There were leading nine occupational groups that had more than five percent of green jobs in the EDR (please see Figure 19):

- production occupations – 17.7 percent of green jobs the total,
- life, physical and social science occupations group – 16.6 percent
- farming, fishing and forestry occupations – 11.5percent,
- construction and extraction occupations – 9.9 percent,
- building and grounds cleaning and maintenance occupations – 9.8 percent,
- architecture and engineering occupations – 8.7 percent,
- sales and related occupations – 7.1 percent,
- office and administrative support occupations – 7.0 percent, and
- installation, maintenance and repair occupations – 5.1 percent.

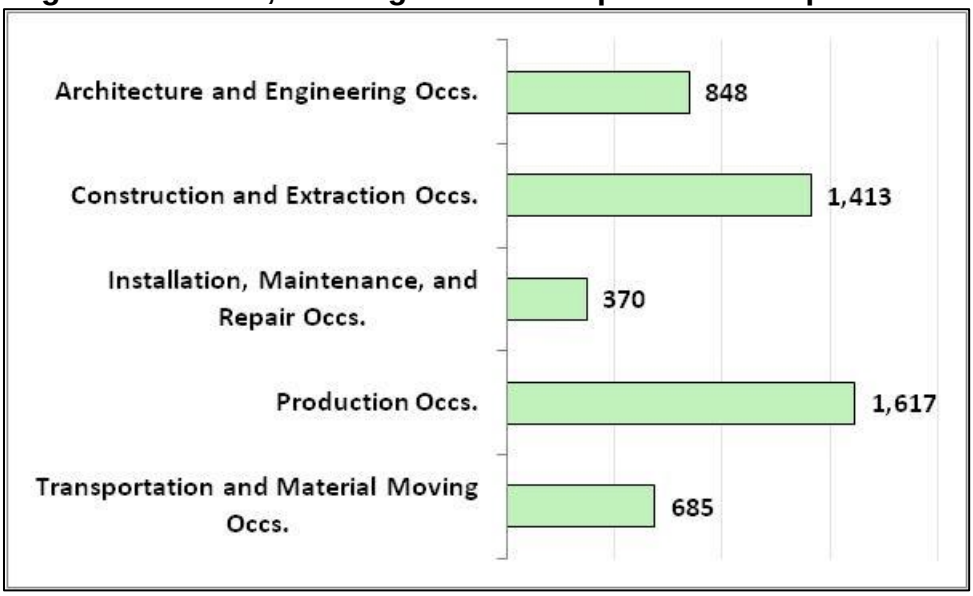
EDR 5, Southwest Ohio

Figure 20. EDR 5, Leading Green Industry Sectors



EDR 5, the Southwest Ohio region, consists of four counties that are part of the Cincinnati-Middletown MSA. One of the counties is part of Appalachia. Almost 95 percent of the 7,291 green jobs in the region were concentrated in five leading industry sectors. Please see Figure 20. The top leading industry sector was professional and technical services, with 30.5 percent of green jobs in the region. It was followed by manufacturing (28.3%) and construction (24.4%), the other services sector (6.3%), and administrative and waste services (5.2%).

Figure 21. EDR 5, Leading Green Occupational Groups



About 80 percent of green jobs in the Southwest region are in five leading occupational groups (please see Figure 21 on the previous page):

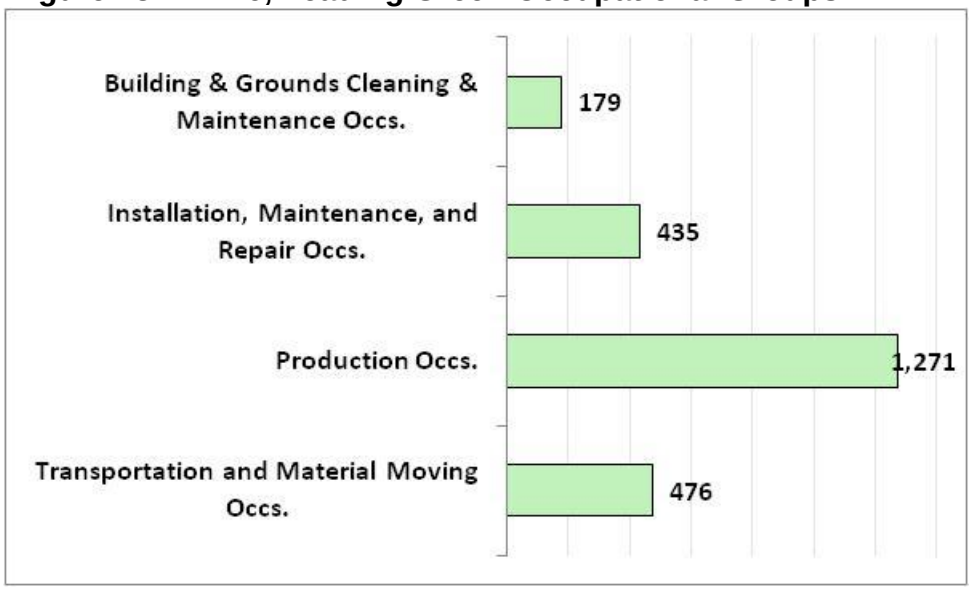
- production occupations – 26.3 percent,
- construction and extraction occupations – 23.0 percent,
- architecture and engineering occupations – 13.8 percent,
- transportation and material moving occupations – 11.1 percent, and
- installation, maintenance, and repair occupations – 6.0 percent.

EDR 6, North Central Ohio

Figure 22. EDR 6, Leading Green Industry Sectors

EDR 6, the North Central Ohio region, consists of nine counties. It includes the Mansfield MSA (one county), one county from the Columbus MSA, and seven adjoining counties. The region had 2,706 direct green jobs. Please see Figure 22. Most of its green jobs, 96.7 percent, were concentrated in two industry sectors. Manufacturing had 72.6 percent of direct green jobs in the region, and the wholesale trade sector accounted for another 24.1 percent.

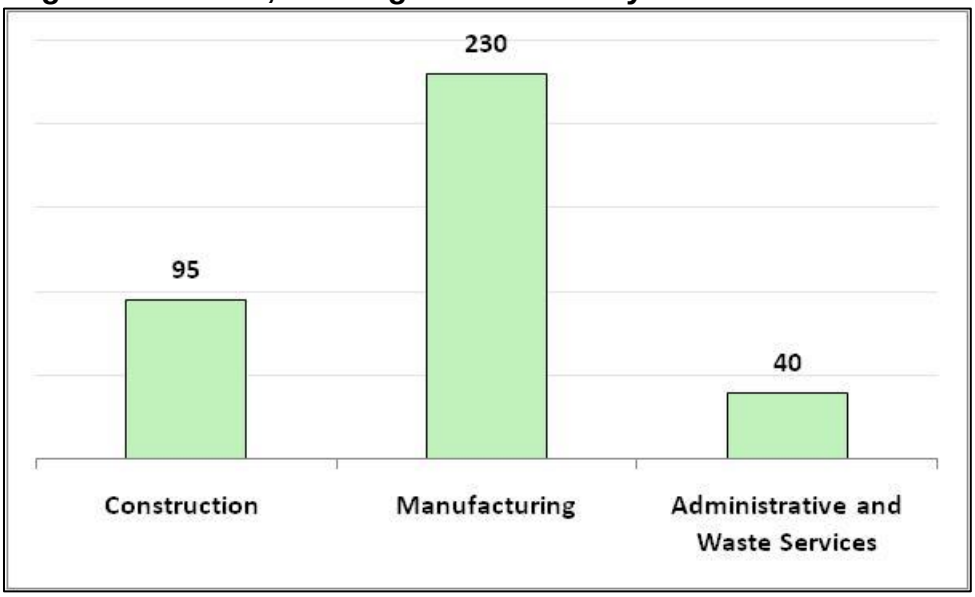
Figure 23. EDR 6, Leading Green Occupational Groups



There were four leading occupational groups in the North Central region. Please see Figure 23. Production occupations accounted for 49.5 percent of green jobs, followed by transportation and material moving occupations (18.6%), installation, maintenance and repair occupations (17.0%), and building and grounds cleaning and maintenance occupations (7.0%).

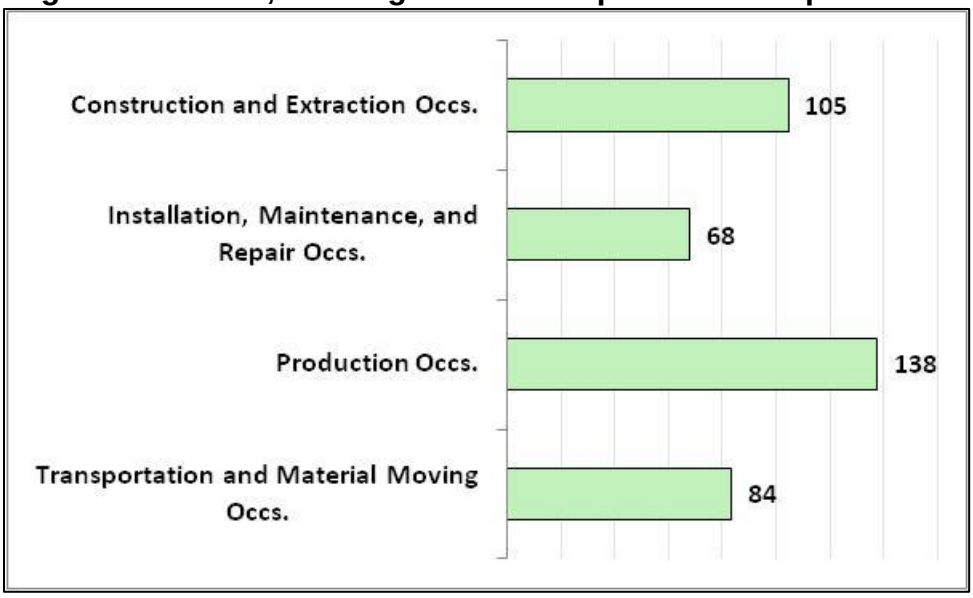
EDR 7, Southern Ohio

Figure 24. EDR 7, Leading Green Industry Sectors



The Southern Ohio region, EDR 7, comprises ten counties in southern-most area of Ohio. One county is part of the Cincinnati-Middletown MSA, and another is part of the Huntington-Ashland (WV) MSA. All of the counties are part of Appalachia. More than 96 percent of the 397 direct green jobs in the Southern region were in three industry sectors. Please see Figure 24 on the previous page. Manufacturing had 60.6 percent of green jobs in the region. The construction sector had 25.1 percent of green jobs, and administrative and waste services had 10.5 percent of green jobs.

Figure 25. EDR 7, Leading Green Occupational Groups



Green jobs in the Southern region are concentrated in four occupational groups. Please see Figure 25. The production occupations group accounted for 30.8 percent of green jobs. The construction and extraction group had 23.4 percent of green jobs. Transportation and material moving occupations had 18.7 percent, and installation, maintenance, and repair occupations had 15.1 percent.

EDR 8, Northern Ohio

EDR 8, the Northern Ohio region, consists of four counties that are part of the Cleveland-Elyria-Mentor MSA. This region had the most green jobs — 9,121 jobs. Please see Figure 28 on the next page. Green jobs were concentrated in six sectors:

- construction – 22.1 percent,
- professional and technical services – 18.0 percent,
- manufacturingv15.0 percent,
- agriculture – 12.9 percent,
- administrative and waste services – 12.2 percent, and
- the other services sector – 10.3 percent.

Figure 26. EDR 8, Leading Green Industry Sectors

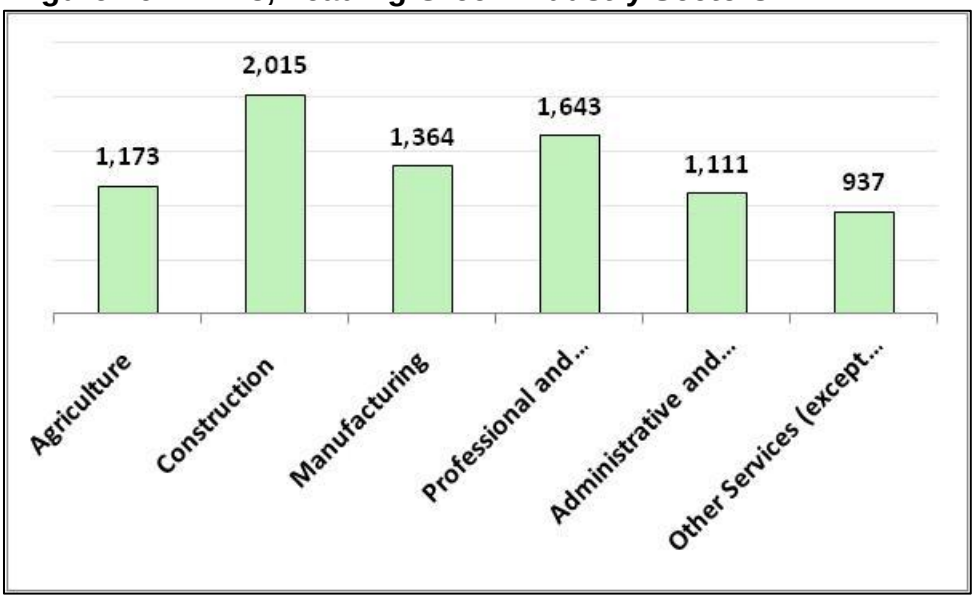
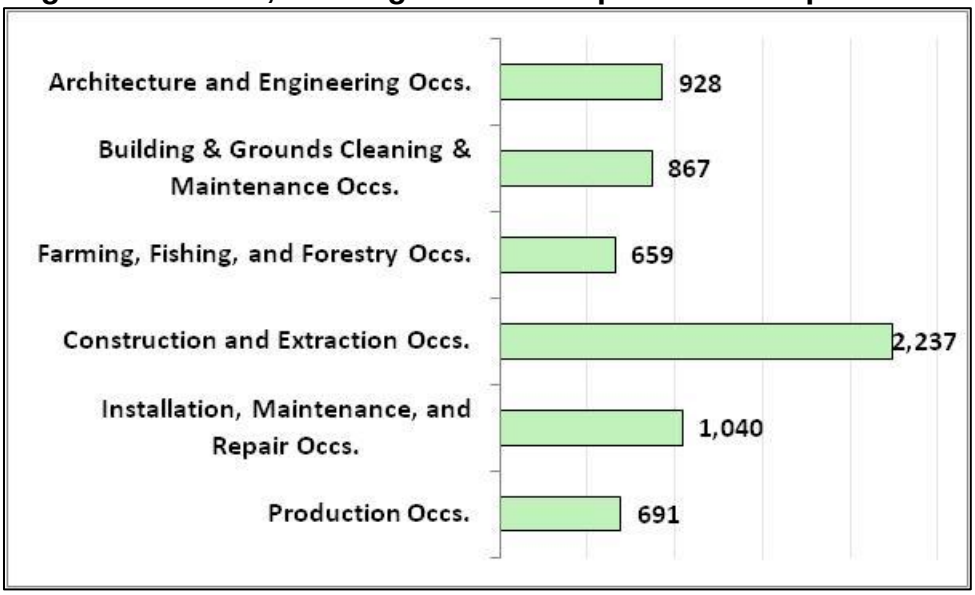


Figure 27. EDR 8, Leading Green Occupational Groups



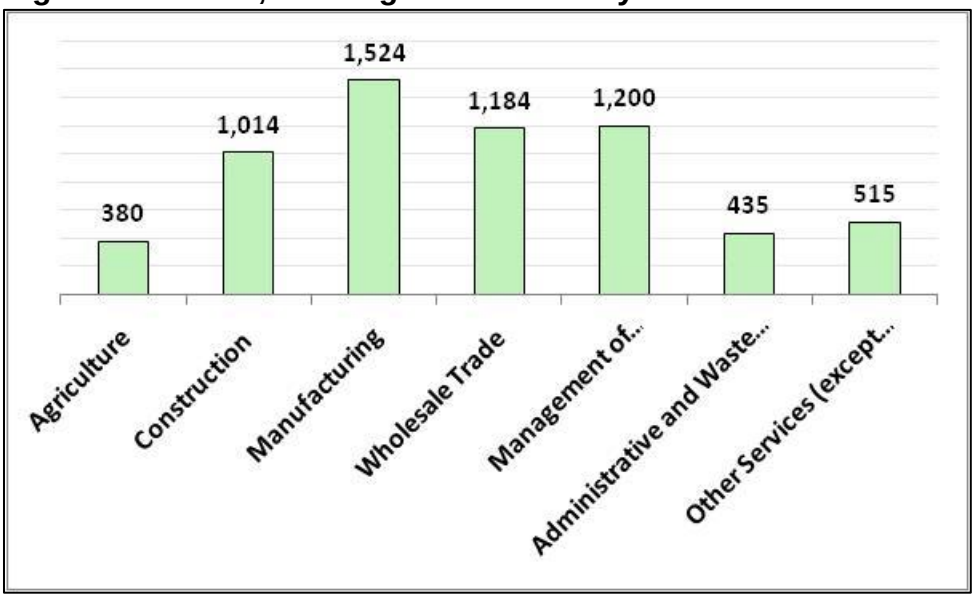
The Northern region had six leading occupational groups with more than five percent of green jobs, but groups accounted for only 73.2 percent of the green jobs. This indicates that green jobs are common in many occupational groups in the region. Please see Figure 27. This is the breakdown of the six leading occupational groups:

- construction and extraction occupations – 25.5 percent,
- installation, maintenance, and repair occupations – 11.9 percent,
- architecture and engineering occupations – 10.6 percent,
- building and grounds cleaning and maintenance occupations – 9.9 percent,

- production occupations – 7.9 percent, and
- farming, fishing, and forestry occupations – 7.5 percent.

EDR 9, Northeast Central Ohio

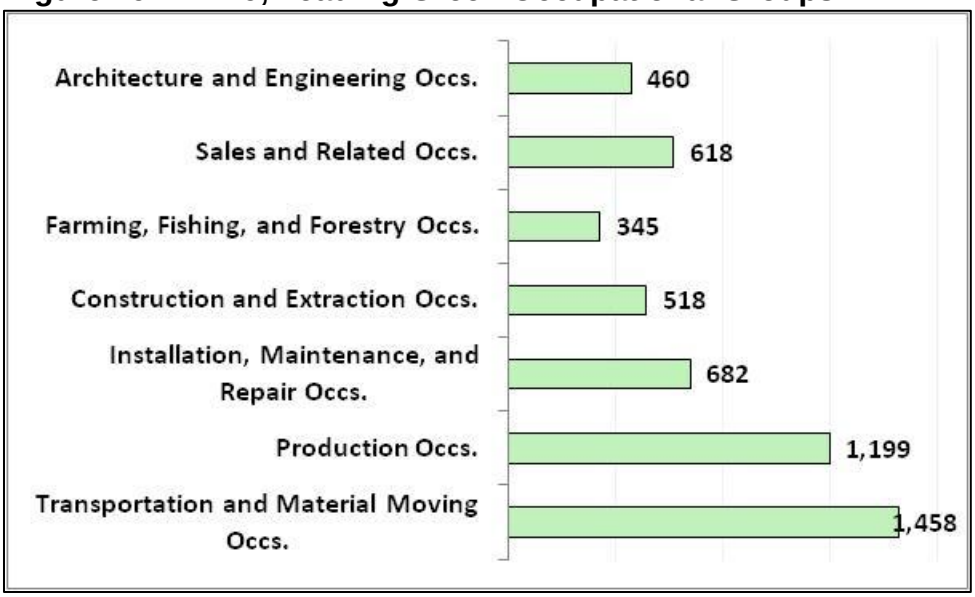
Figure 28. EDR 9, Leading Green Industry Sectors



EDR 9, Northeast Central Ohio region, consists of five counties. One county is part of the Cleveland-Elyria-Mentor MSA, two counties make up the Akron MSA, a fourth county is part of the Canton-Massillon MSA, and the fifth county is not part of any MSA. There were 5,611 direct green jobs in the region. Please see Figure 28. There were seven industries sectors each with more than 5 percent of green employment:

- manufacturing – 23.1 percent,
- management of companies and enterprises – 18.1 percent,
- wholesale trade – 17.9 percent,
- construction – 15.3 percent,
- other services – 7.8 percent,
- administrative and waste services – 6.8 percent, and
- agriculture – 5.8 percent.

Figure 29. EDR 9, Leading Green Occupational Groups



There were seven leading occupational groups in the Northeast Central region (please see Figure 29):

- transportation and material moving occupations – 24.7 percent,
- production occupations – 20.4 percent,
- installation, maintenance, and repair occupations – 11.6 percent,
- sales and related occupations – 10.5 percent,
- construction and extraction occupations – 8.8 percent,
- architecture and engineering occupationsv7.8 percent, and
- farming, fishing, and forestry occupations – 5.9 percent.

EDR 10, East Central Ohio

EDR 10, East Central Ohio, comprises 10 counties. One county is part of the Canton-Massillon MSA, another county is part of the Weirton (WV)-Steubenville (OH) MSA, and a third county is part of the Wheeling (WV) MSA. The other counties are not part of any MSA; all of the counties in the region are part of Appalachia. About 96 percent of the 4,110 direct green jobs in the East Central region were concentrated in four leading industry sectors (please see Figure 30 on the next page):

- manufacturing – 55.1 percent,
- administrative and waste services – 16.1 percent
- construction – 14.8 percent, and
- the other services sector – 9.7 percent.

Figure 30. EDR 10, Leading Green Industry Sectors

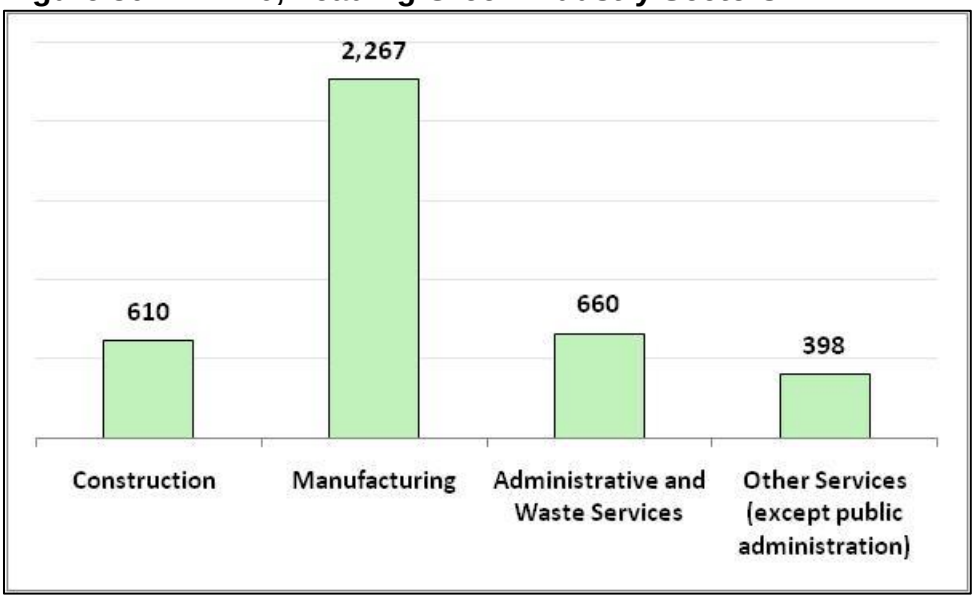
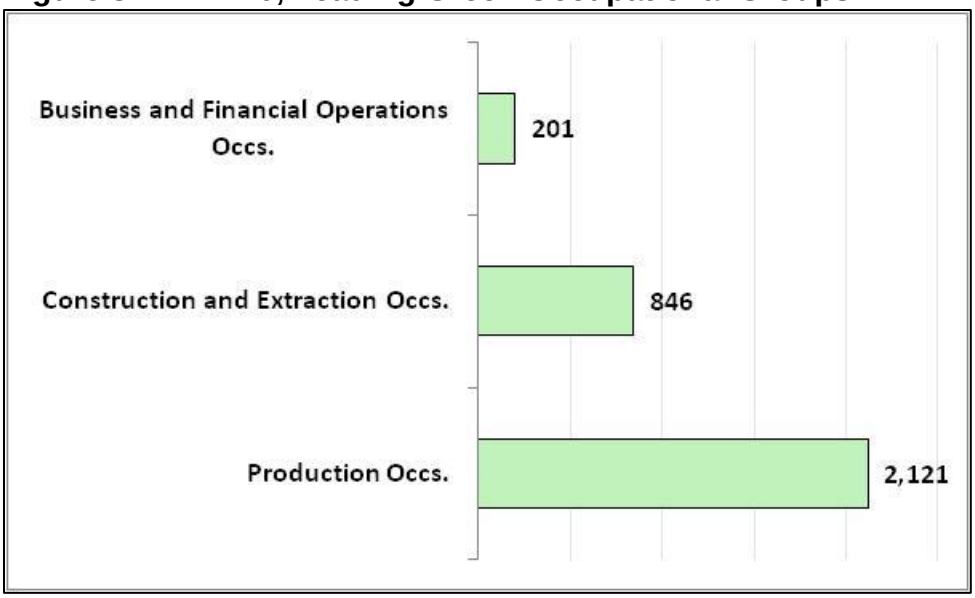


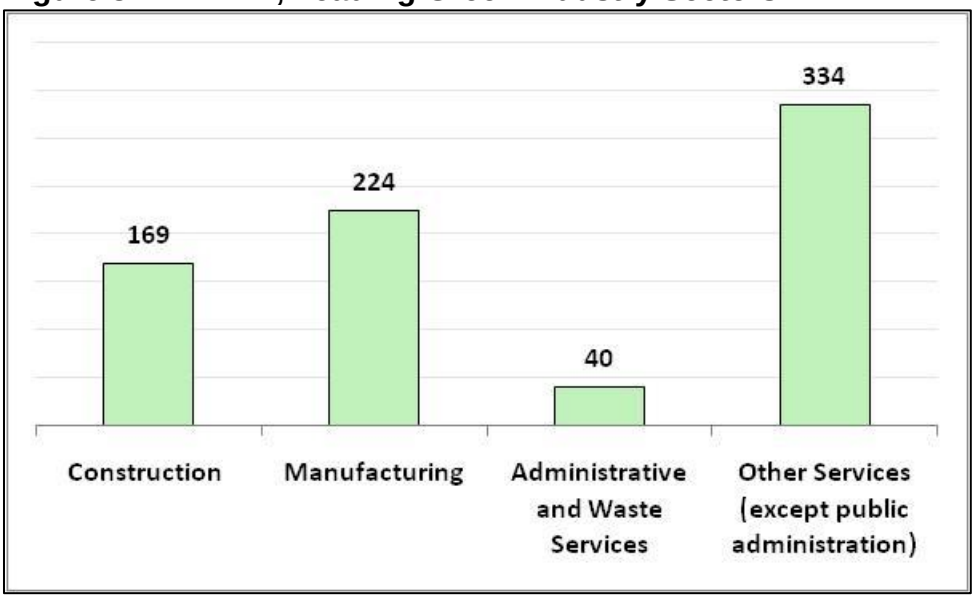
Figure 31. EDR 10, Leading Green Occupational Groups



Green jobs in the East Central region were concentrated in three leading occupational groups. Please see Figure 31. Production occupations accounted for 57.2 percent of the total. The construction and extraction occupations group accounted for another 22.8 percent. The business and financial operations occupations group accounted for about 5.4 percent of direct green jobs.

EDR 11, Southeast Ohio

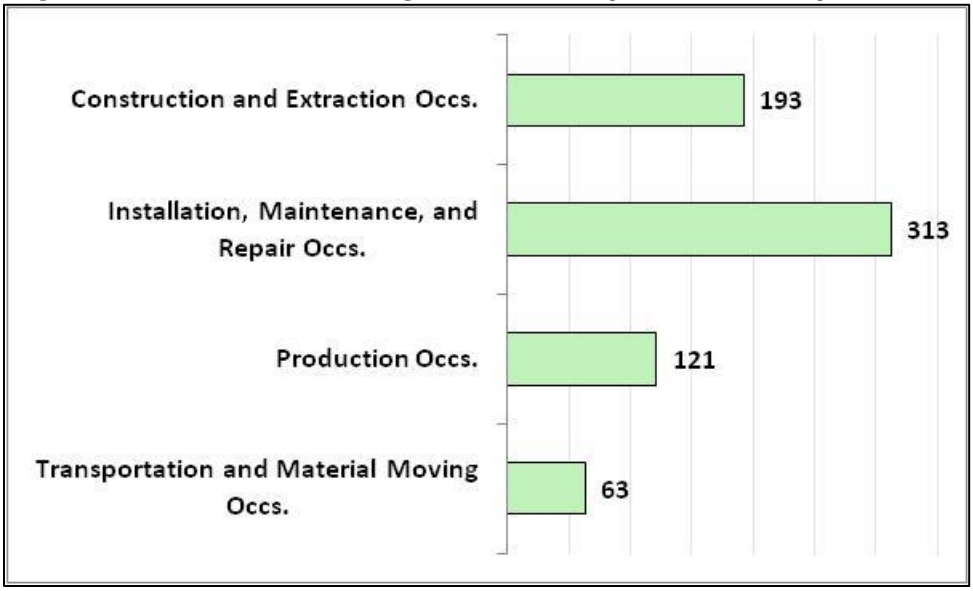
Figure 32. EDR 11, Leading Green Industry Sectors



EDR 11, the Southeast Ohio region, consists of eight counties. One county is part of the Parkersburg (WV)-Marietta-Vienna MSA, and all of the counties are part of Appalachia. About 97 percent of the 791 direct green jobs were in four leading industry sectors (please see Figure 32):

- the other services sector – 42.2 percent,
- manufacturing – 28.2 percent,
- construction – 21.4 percent, and
- administrative and waste services – 5.1 percent.

Figure 33. EDR 11, Leading Green Occupational Groups

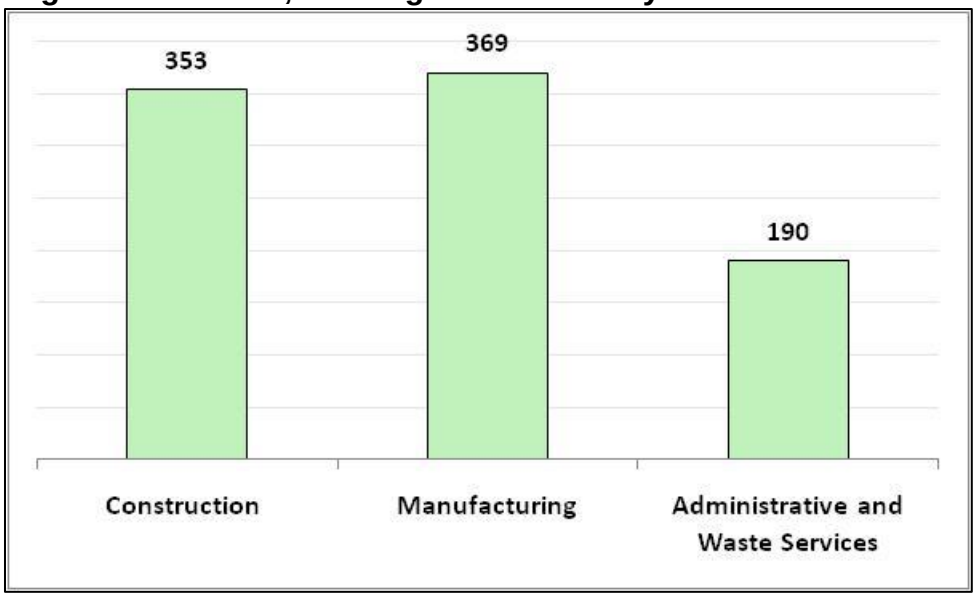


Green jobs in the Southeast region were concentrated in four leading occupational groups (please see Figure 33):

- installation, maintenance, and repair occupations – 42.2 percent,
- construction and extraction jobs – 26.0 percent,
- production occupations – 121 jobs -- 16.4 percent, and
- transportation and material moving occupations – 8.5 percent.

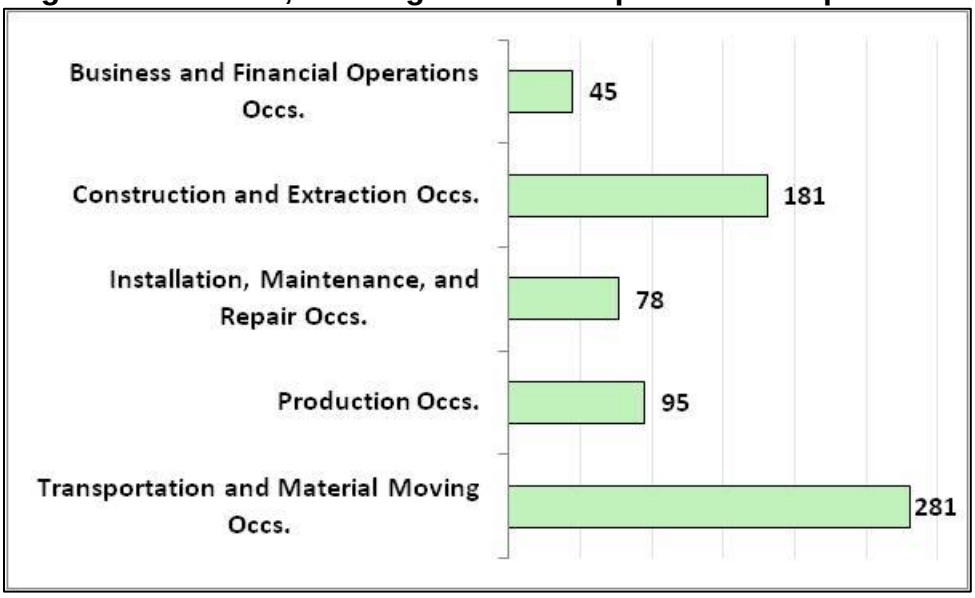
EDR 12, Northeast Ohio

Figure 34. EDR 12, Leading Green Industry Sectors



The Northeast Ohio region, EDR 12, consists of only three counties. Two counties are part of the Youngstown-Warren-Boardman MSA, and all three counties are part of Appalachia. Ninety-seven percent of the 941 direct green jobs were concentrated in three industry sectors. Please see Figure 34 on the previous page. The manufacturing sector had 39.3 percent of green jobs in the region. Following closely was the construction sector with about 37.6 percent. The administrative and waste services sector had 20.2 percent of the green jobs total.

Figure 35. EDR 12, Leading Green Occupational Groups



Green jobs in the Northeast region were concentrated in five leading occupational groups (please see Figure 35):

- transportation and material moving occupations – 36.9 percent,
- construction and extraction occupations – 23.7 percent,
- production occupations12.5 percent,
- installation, maintenance, and repair occupations10.2 percent, and
- business and financial operations occupations – 5.9 percent.

Green Job Growth

One of the most important aspects of the green movement is possibility of job growth. Employers were asked how many green workers they expected to employ in another two years. Predicting employment growth is difficult, and not all employers responded to this question. The following analyses pertain only to employers who provided growth estimates.

Figure 36. Expected Short-Term Green Job Growth by Industry Sector

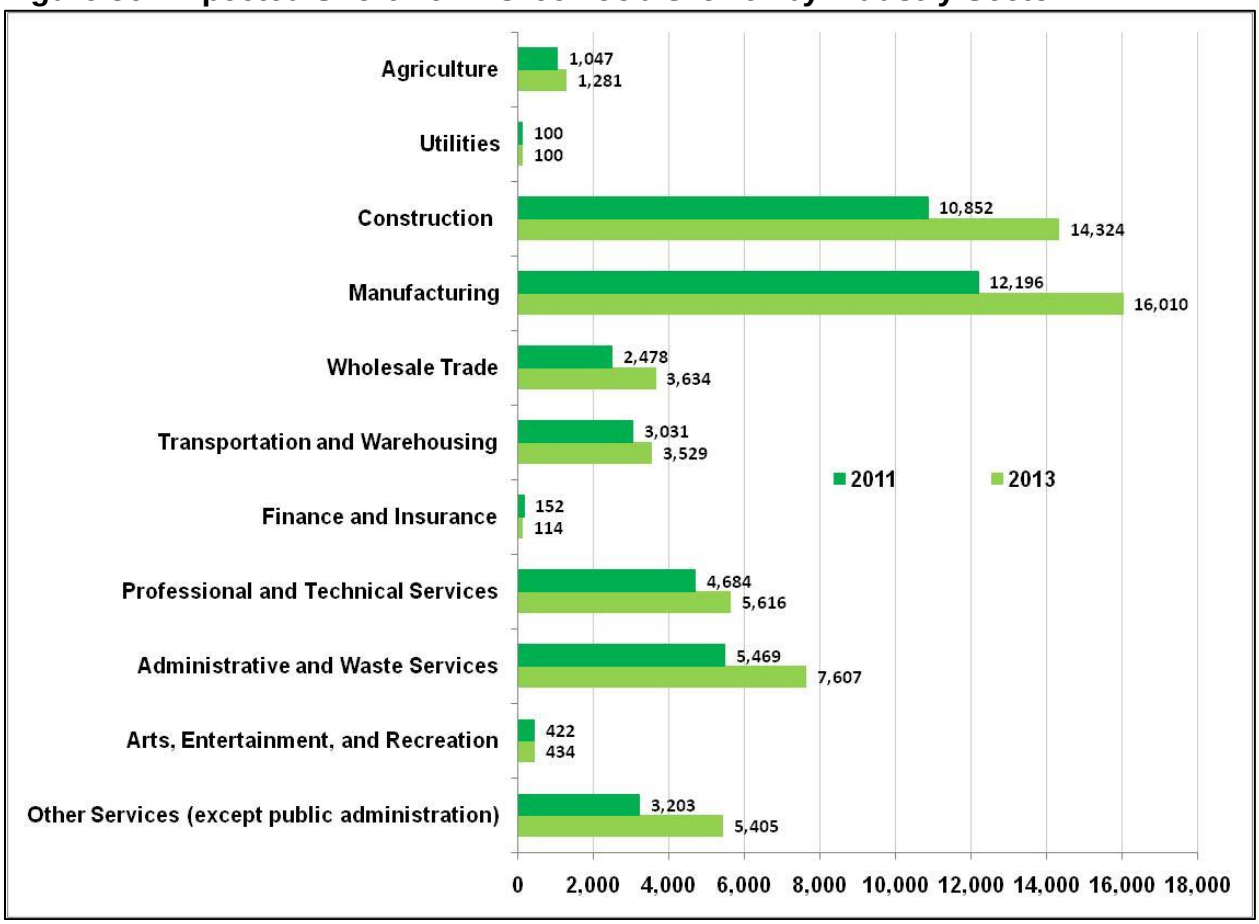


Figure 36 shows current job levels and employers' expected green job growth by industry sector for employers who responded to both sets of questions. Figure 37 on the next page shows the number of expected jobs and the percentage increase (or decline). Employers expected green job growth of about 33 percent in total. This growth is substantially higher than the 1.5 percent growth the Ohio Bureau of Labor Market Information projected for all industries for the period third quarter 2011 to third quarter 2013. Although this would be significant growth, it is unclear whether it would represent an expansion in employment or a return to pre-recession levels of employment.

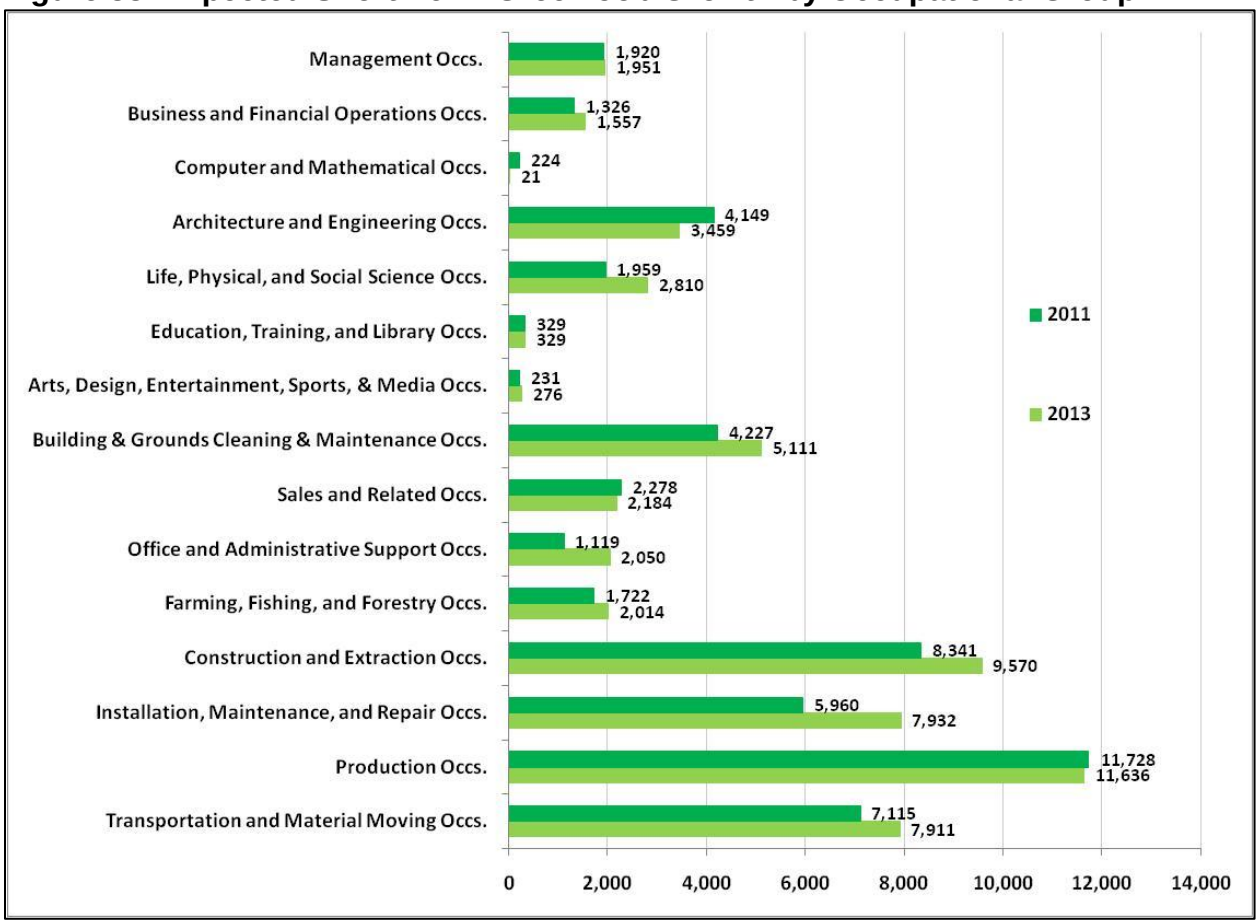
In absolute terms, employers in the manufacturing (+3,814 jobs) and construction (+3,472 jobs) sectors expect the largest increases. In terms of percent growth, employers in the other services (+68.8%) and wholesale trade (+46.6%) sectors expect the strongest growth.

Employers in utilities expected no growth in green jobs. Employers in the finance and insurance sector reported an expected decline in the number of green jobs in the sector. The sector had a small number of green jobs, and it is possible most of this decline comes from a small number of employers.

Figure 37. Absolute and Percent Expected Growth by Industry

Sector	Expected Growth	Percent Change
Manufacturing	3,814	31.3%
Construction	3,472	32.0%
Other Services	2,203	68.8%
Administrative and Waste Services	2,138	39.1%
Wholesale Trade	1,155	46.6%
Professional and Technical Services	932	19.9%
Transportation and Warehousing	498	16.4%
Agriculture	234	22.3%
Arts, Entertainment, and Recreation	12	2.8%
Utilities	0	0.0%
Finance and Insurance	-38	-25.0%

Figure 38. Expected Short-Term Green Job Growth by Occupational Group



Figures 38 (on the previous page) and 39 (below) show expected short-term growth by occupational group. The largest absolute increases are expected to be in the installation, maintenance, and repair (+1,972 jobs) and the construction and extraction (+1,229) groups. The largest percentage increases were in the office and administrative support (+83.2%) and the life, physical, and social science (+43.3%) groups.

Decreases were expected for the production (-92 jobs, -0.8%), sales and related occupations (-94 jobs, -4.1%), architecture and engineering (-690 jobs, -16.6%), and computer and mathematical (-203 jobs, -90.6%) groups.

Figure 39. Absolute and Percent Expected Growth by Occupational Group

Occupational Group	Expected Growth	Percent Change
Installation, Maintenance, and Repair	1,972	33.1%
Construction and Extraction	1,229	14.7%
Office and Administrative Support	931	83.2%
Building & Grounds Cleaning & Maintenance	884	20.9%
Life, Physical, and Social Science	851	43.4%
Transportation and Material Moving	796	11.2%
Farming, Fishing, and Forestry	292	17.0%
Business and Financial Operations	231	17.4%
Arts, Design, Entertainment, Sports, & Media	45	19.5%
Management	31	1.6%
Education, Training, and Library	0	0.0%
Production	-92	-0.8%
Sales and Related	-94	-4.1%
Computer and Mathematical	-203	-90.6%
Architecture and Engineering	-690	-16.6%

Figures 40 and 41 on the next page show that employers in each of the2 Economic Development Regions expect to see net increases in green jobs. The Southwest region (EDR 5) expects to see the largest absolute and percentage increase in green jobs: 4,143 jobs, a 91.8 percent increase. The Northern region (EDR 8) expects the second largest absolute increase (+2,430 jobs). The Southeast region (EDR 11) expects the second largest percentage increase (+84.1 percent).

Figure 40. Expected Short-Term Green Job Growth by EDR

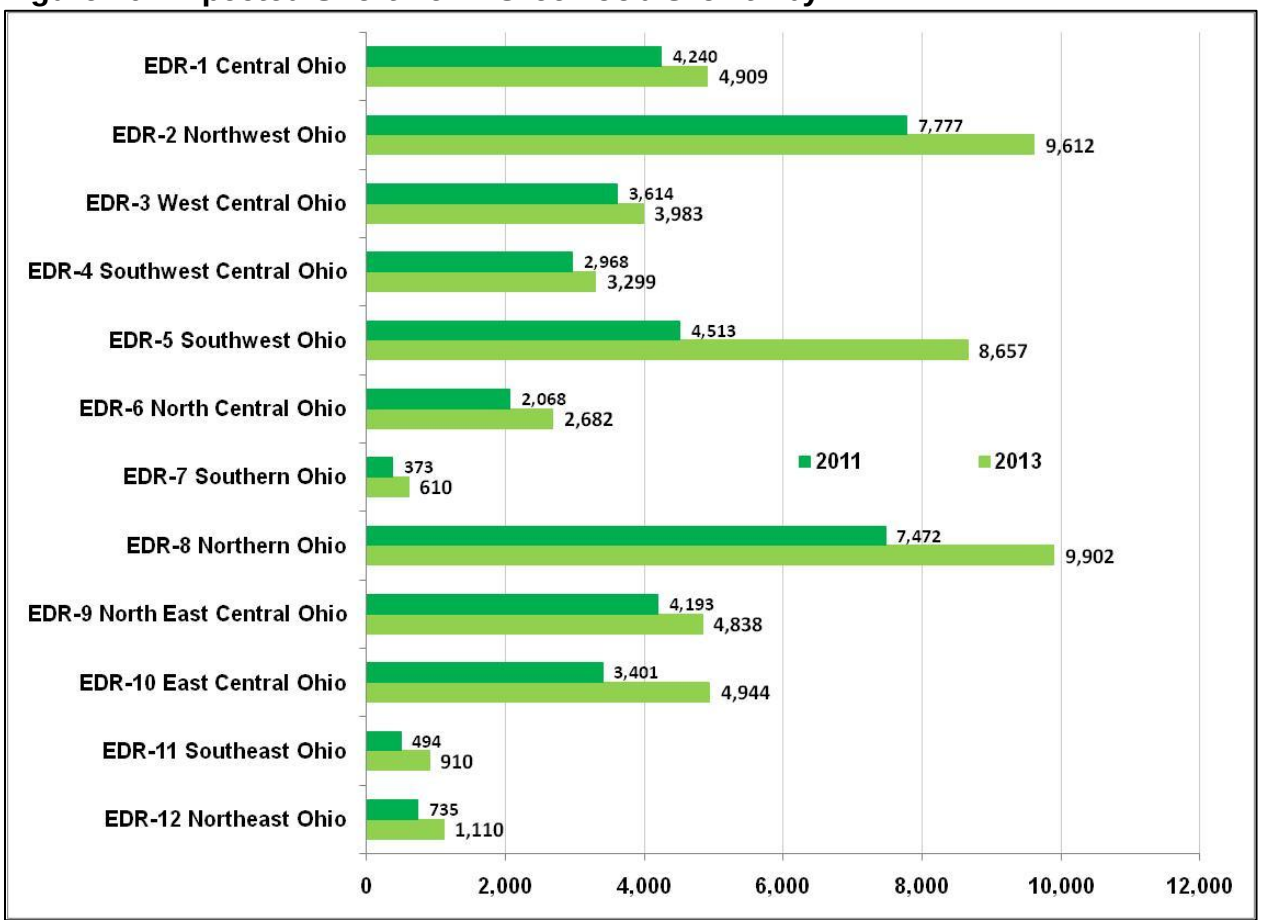


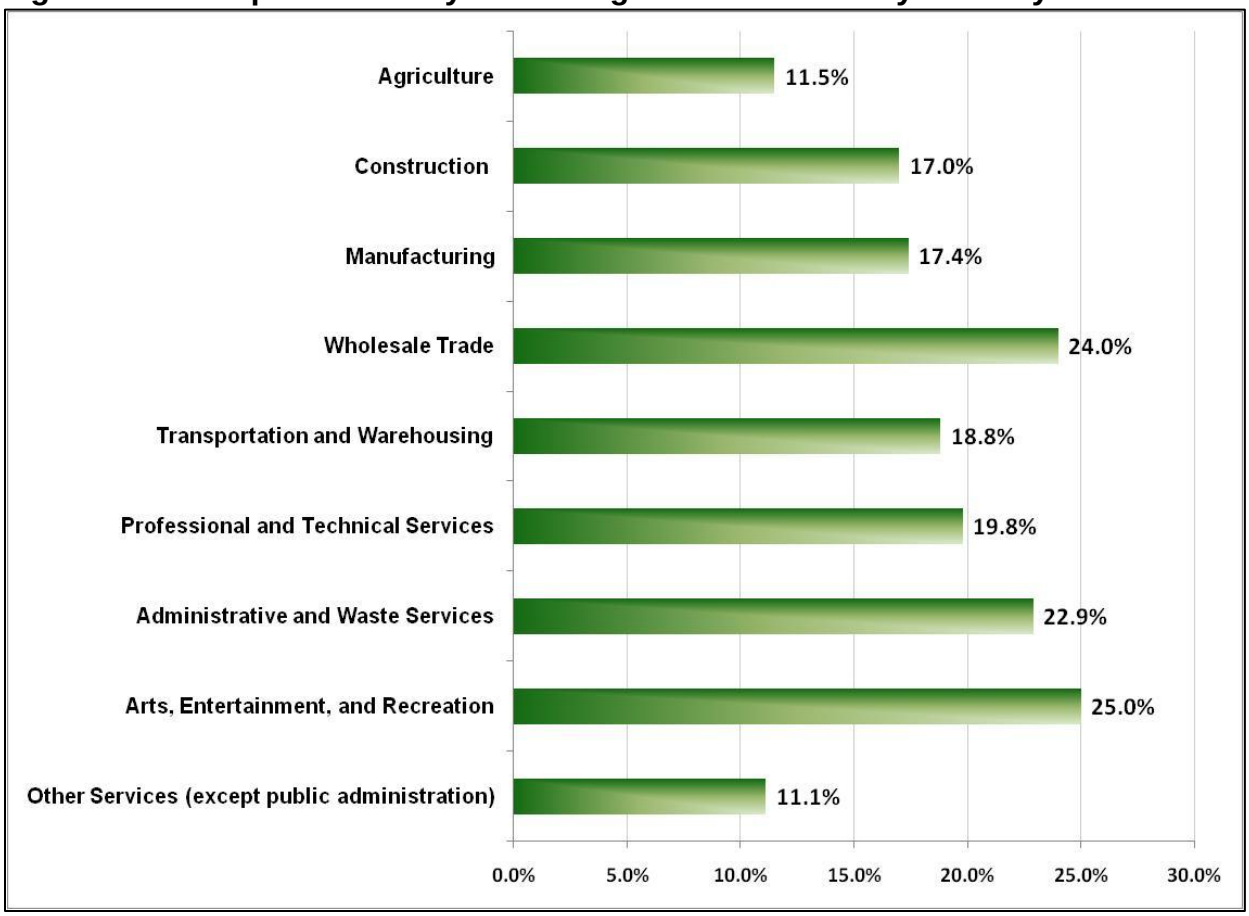
Figure 41. Absolute and Percent Expected Growth by Region

Region	Expected Growth	Percent Change
EDR-5 Southwest Ohio	4,143	91.8%
EDR-8 Northern Ohio	2,430	32.5%
EDR-2 Northwest Ohio	1,835	23.6%
EDR-10 East Central Ohio	1,544	45.4%
EDR-1 Central Ohio	669	15.8%
EDR-9 North East Central Ohio	645	15.4%
EDR-6 North Central Ohio	614	29.7%
EDR-11 Southeast Ohio	416	84.1%
EDR-12 Northeast Ohio	375	51.1%
EDR-3 West Central Ohio	370	10.2%
EDR-4 Southwest Central Ohio	331	11.2%
EDR-7 Southern Ohio	237	63.5%

Filling Green Jobs

One of the concerns for the economic and workforce development communities is the ability to fill green job openings. O*NET has suggested that some green occupations will see changes in their required skills, knowledge, and abilities,[5] which could possibly lead to shortages of qualified workers. Employers were asked if they anticipated any difficulty recruiting workers for green jobs and if there were any unique skills for the green jobs.

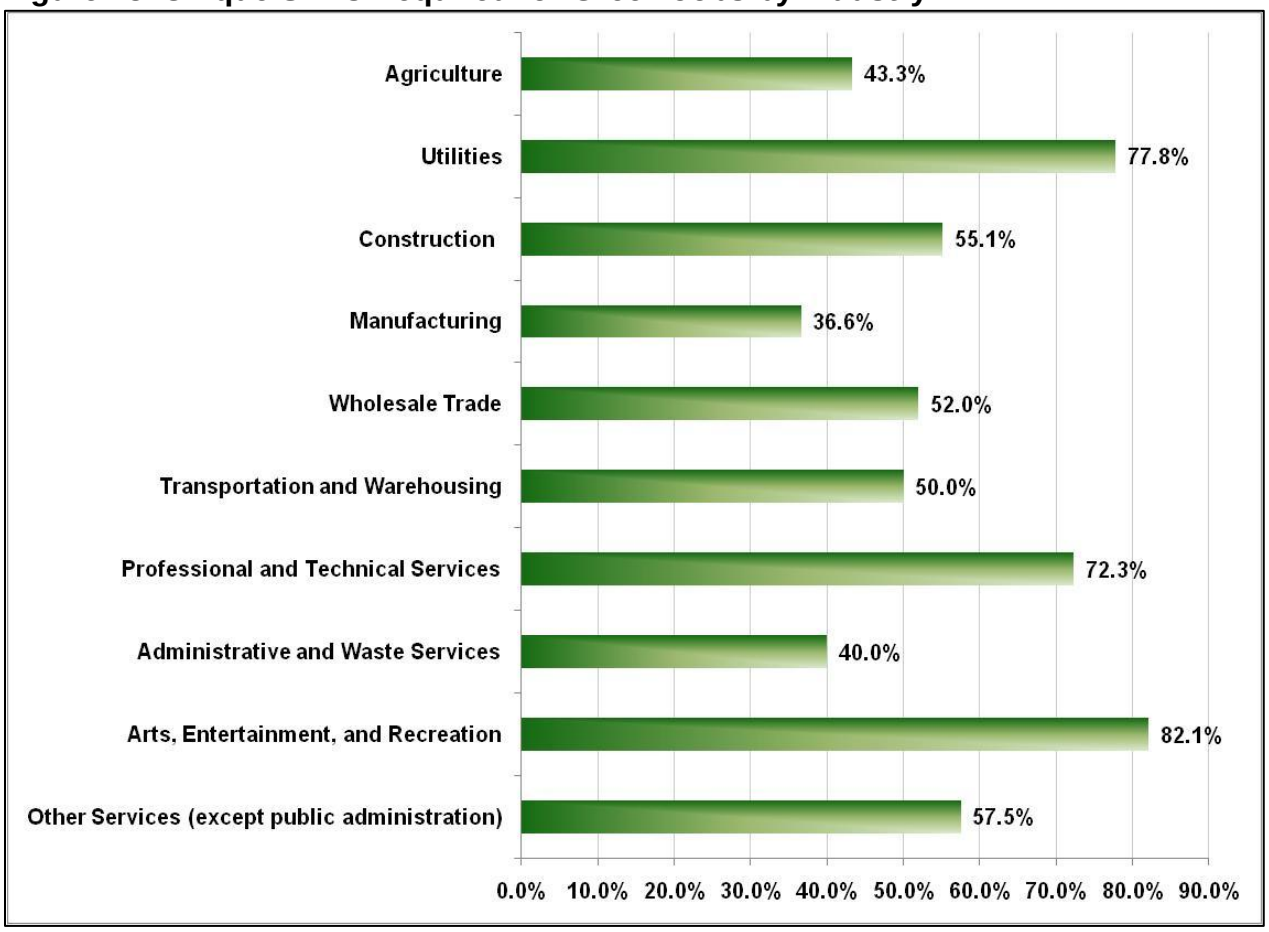
Figure 42. Anticipate Difficulty Recruiting Green Workers by Industry



Employers expect difficulty in recruiting workers for about 11 to 25 percent of their green jobs. Please see Figure 42. Employers in the arts, entertainment, and recreation sector reported they anticipated hiring difficulties for 25.0 percent of their green jobs. Employers in the other services sector were the most optimistic. They anticipated hiring difficulties for only 11.1 percent of their green jobs.

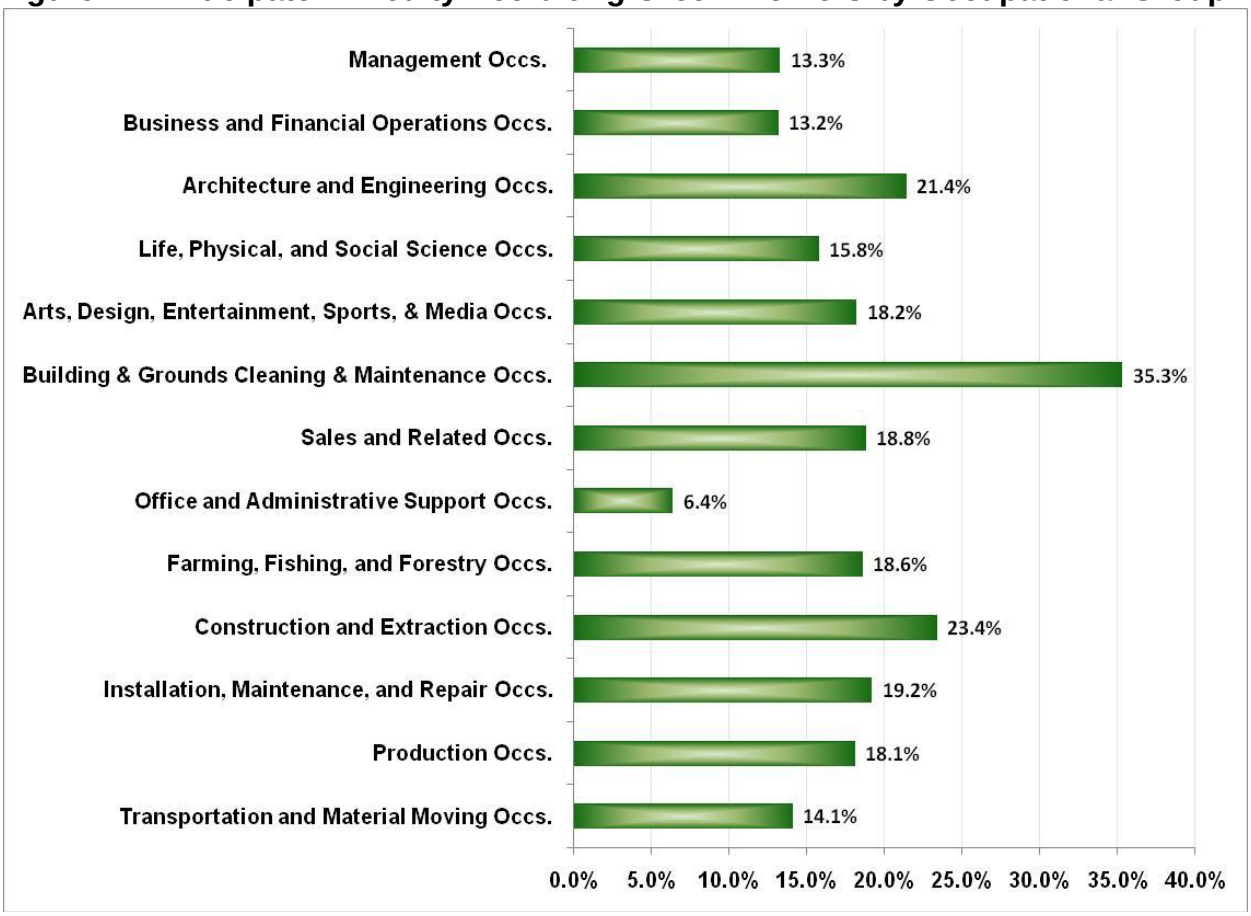
[5] Lewis, Phil M. & Rivkin, David R. "O*NET Program Briefing" [PowerPoint presentation] National Center for O*NET Development, February 3, 2009.

Figure 43. Unique Skills Required for Green Jobs by Industry



Employers said many of their green jobs require 'unique' skills. Depending on how unique the skills are, it is possible green workers might need to them through on-the-job training or through formal training and education programs. Please see Figure 43. At the low end, employers in the manufacturing sector said 36.6 percent of their green occupations would require unique skills. Although this is the lowest percentage for unique skills (among the sectors for which there was sufficient data), this could still be a substantial number of workers because manufacturing had the most green jobs. At the high end of needing unique skills was the arts, entertainment, and recreation sector. Employers in this sector said 82.1percent of their green occupations would require unique skills.

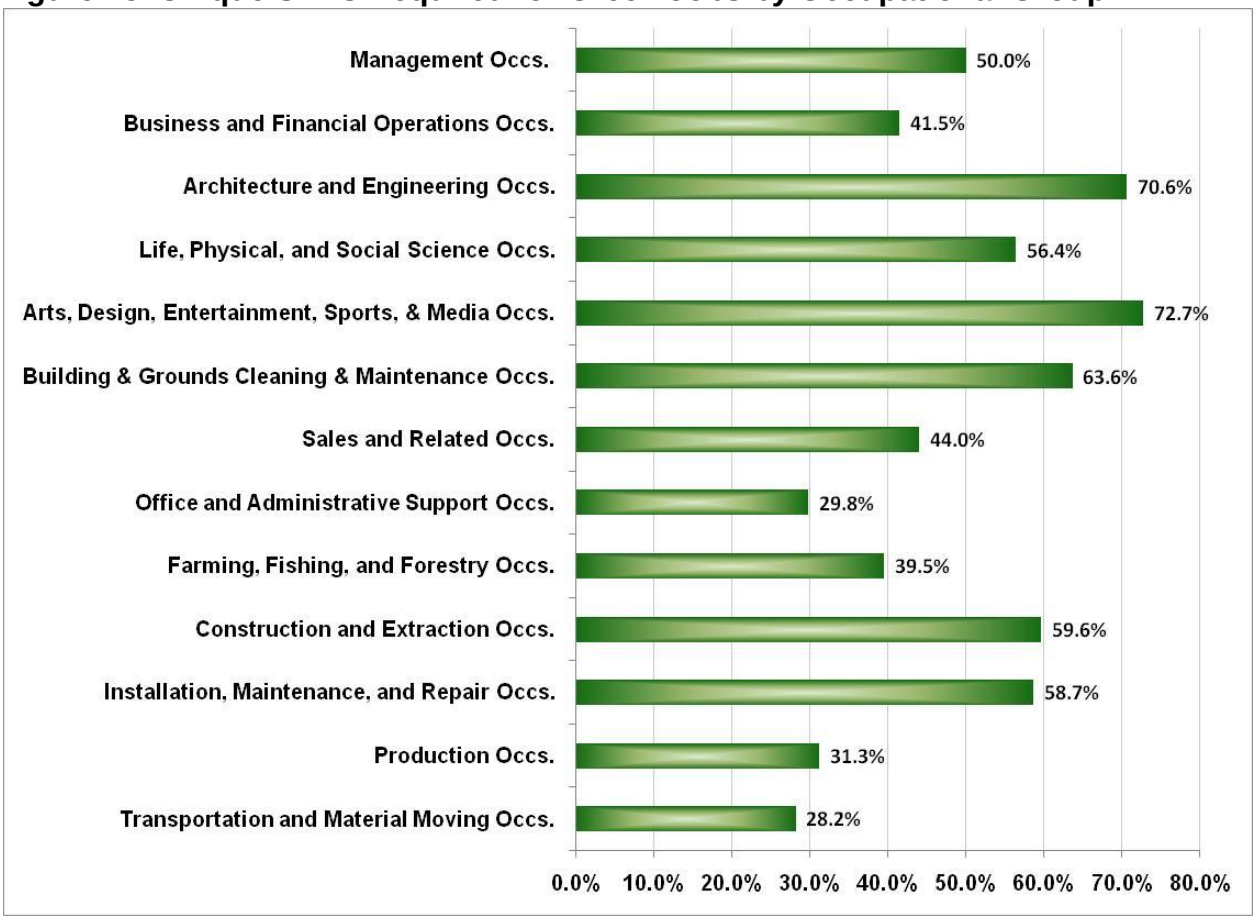
Figure 44. Anticipate Difficulty Recruiting Green Workers by Occupational Group



Employer anticipation of difficulty in recruiting workers for green jobs varied across occupational groups. Please see Figure 44. The office and administrative support occupations group had the lowest rate of anticipated difficulty at 6.4 percent. The highest rate of anticipated difficulty was for the building and grounds cleaning and maintenance occupational group at 35.3 percent. This is interesting because, at least nationally, the supply of workers in this occupational group appears to greatly exceed demand.[6] General competition for workers in this occupational group may not be the issue with the anticipated difficulty in recruiting green workers.

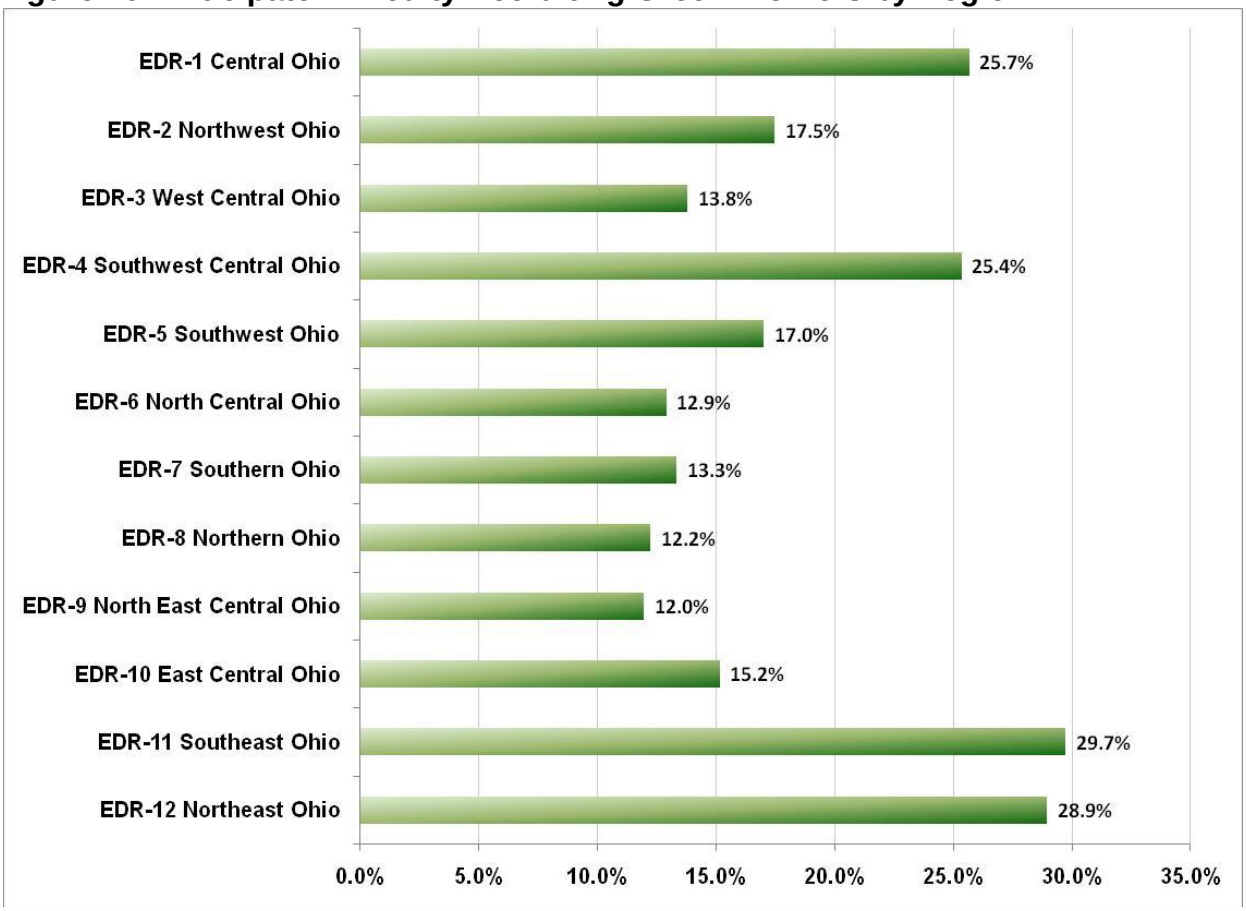
[6] See the monthly press release for The Conference Board's Help Wanted OnLine data series at http://www.conference-board.org/data/helpwantedonline.cfm

Figure 45. Unique Skills Required for Green Jobs by Occupational Group



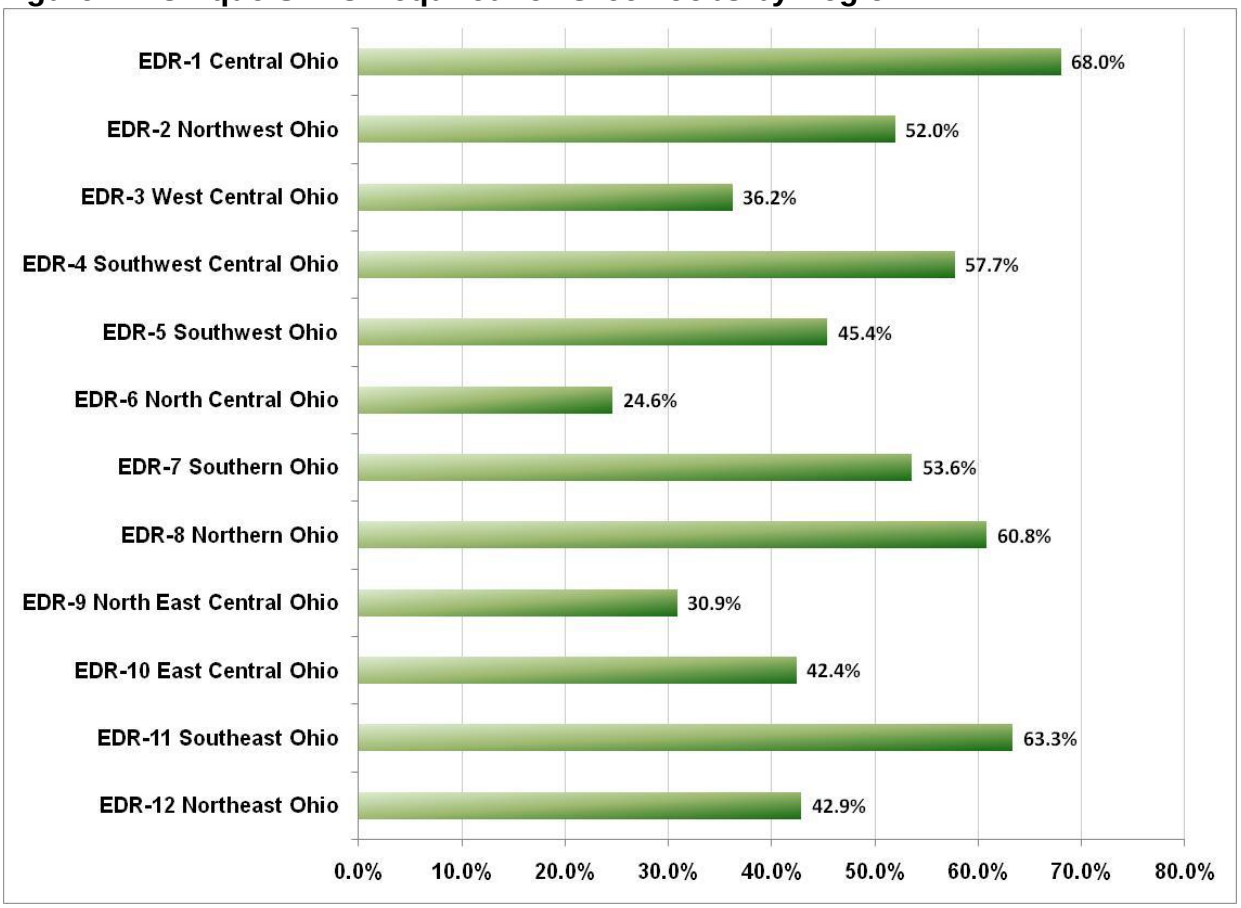
The need for unique skills for green jobs is high among some occupational groups. Please see Figure 45. At the low end of the 'unique skills' spectrum was the transportation and material moving occupations group with 28.2 percent of green jobs needing unique skills. At the high end of the spectrum was the arts, design, entertainment, sports and media occupations group with 72.7 percent of green jobs requiring unique skills.

Figure 46. Anticipate Difficulty Recruiting Green Workers by Region



Employers' anticipation of difficulty in recruiting workers for green jobs varies widely across the regions. Please see Figure 46. It was lowest in the North East Central region (EDR 9) where employers anticipated recruiting difficulties for about 12.0 percent of their green jobs. At the high end was the Southeast region (EDR 11). There, employers anticipated recruiting difficulties for about 29.7 percent of their green jobs.

Figure 47. Unique Skills Required for Green Jobs by Region



The requirement for unique skills varies widely across the regions. Please see Figure 47. Employers in the North Central region (EDR 6) said only about 24.6 percent of their green jobs would require special skills, while employers in the Central region (EDR 1) said 68.0 percent of their green jobs would require special skills.

Training Needs for Green Jobs

Green jobs may require special training for unique skills. As noted earlier, O*NET suggested that some green jobs would require new knowledge, skills, and abilities. Training could occur through formal means, such as community college programs or providers other than the employers, through on-the-job training provided by employers, or through some combination of the two. Employers were asked what percentages of training for their green jobs workers would be formal or on-the-job training.

Figure 48. Average Green Jobs Training Type by Industry

Industry Sector	Formal Training	Informal On-the-Job
Agriculture	8.7%	79.3%
Construction	27.1%	60.0%
Manufacturing	8.7%	82.4%
Wholesale Trade	26.3%	76.8%
Professional and Technical Services	29.7%	53.8%
Administrative and Waste Services	23.1%	71.6%
Other Services	40.7%	40.0%

Figure 48 shows employer preferences for green jobs training by sector. Responses from individual employers ranged from zero to 100 percent for each type of training, but it is clear that, on average, employers prefer or expect most training green jobs training will happen as informal on-the-job training. Perhaps this should be expected considering that many green jobs are in occupational groups that don't require as much formal training. The amount of on-the-job training ranged from 40.0 percent to 82.4 percent. Employers in the agriculture and manufacturing sectors preferred on-the-job training at higher rates than employers in other sectors. It is interesting to note that employers in the professional and technical services sector said only 29.7 percent of their green jobs workers would need formal training. While this rate is higher than other sectors except for the other services sector, this is an industry in which many occupations require some form of formal postsecondary education.

Figure 49 on the next page shows the breakdown by Economic Development Region. In no region does formal training predominate. The East Central region (EDR 10) was low on formal education preference (8.6%), and the Northeast region (EDR 12) was highest (33.2%). Educators within the regions will need to determine employers' training needs with respect to a specific mix of green jobs, and then develop appropriate programs.

Figure 49. Average Green Jobs Training Type by Region

Region	Formal Training	Informal On-the-Job
EDR-1 Central Ohio	22.5%	71.7%
EDR-2 Northwest Ohio	23.7%	69.3%
EDR-3 West Central Ohio	17.8%	82.9%
EDR-4 Southwest Central Ohio	19.9%	73.9%
EDR-5 Southwest Ohio	18.7%	71.8%
EDR-6 North Central Ohio	10.7%	77.8%
EDR-7 Southern Ohio	15.5%	84.5%
EDR-8 Northern Ohio	24.1%	62.4%
EDR-9 North East Central Ohio	19.3%	68.2%
EDR-10 East Central Ohio	8.6%	75.6%
EDR-11 Southeast Ohio	17.1%	71.9%
EDR-12 Northeast Ohio	33.2%	55.4%

Conclusion

The Ohio green jobs survey found that green jobs were a small but significant part of the state's labor market. The employers who participated in the survey said they expected modest, short-term growth in green jobs. What does this mean for Ohio in terms of economic and workforce development?

Although all regions of the state have green jobs, some regions have a stronger green jobs presence than others. Four regions had a larger portion of green jobs than they did of all jobs, suggesting that those areas have been able to develop green industries. For example, the Northwest region, which includes the Toledo area, accounts for only about 7.5 percent of all jobs in Ohio but 15.7 percent of the state's green jobs. Part of the reason may be that the Toledo area has been able to capitalize on its resources to become a center of solar power research and manufacturing.[7] Each region has its own mix of industries and resources that might be leveraged to support the development of green industries and jobs.

The development of green jobs in Ohio will inevitably raise questions about the preparedness of the workforce. The survey found a wide diversity of occupations among Ohio's green jobs, and many green jobs were in occupational groups that do not usually require extensive formal, postsecondary education. This does not mean these jobs are unskilled. Depending on the industry, employers said that 40 to 80 percent of their green jobs required "unique skills." This may support O*NET's identification of a group of "enhanced skills" green occupations. These are occupations for which workers would need to acquire new knowledge, skill and abilities in order to fill green jobs. A question for workforce development is how green workers might acquire those unique skills. Although a majority of employers said they would be willing to offer on-the-job training for workers, a substantial portion said workers would need more formal training. The results suggest that, as green jobs grow, more education and training programs will be needed to keep pace with the labor market. The Ohio Green Career Pathways Grant project[8] has examined green jobs training and education for Ohio workers in two publications: *The Workforce Skills and Training Ohio Green Industries Need*[9] and *Education and Training Programs*.[10]

Economic and workforce development for green jobs will require data to guide all efforts. The Ohio green jobs survey was designed to provide preliminary data about Ohio's green industries and occupations. As noted earlier in this paper, the systems used to classify industries and occupations have no mechanisms for identifying green

[7] "Toledo reinvents itself as a solar-power innovator" USA Today, June 15, 2010. http://www.usatoday.com/money/industries/energy/2010-06-15-toledo15_CV_N.htm

[8] http://ohiolmi.com/green/green.htm#Pathways

[9] *Green Jobs and the Ohio Economy, Part 3: The Workforce Skills and Training Ohio Green Industries Need*, Center for Urban and Public Affairs, Wright State University, 2011. http://ohiolmi.com/green/reports/Pt3SkillsTraining.pdf

[10] *Green Jobs and the Ohio Economy, Part 4: Education and Training Programs*, Voinovich Center for Leadership and Public Affairs, Ohio University, 2011. http://ohiolmi.com/green/reports/Pt4EdTraining.pdf

industries or occupations, and several states, including Ohio, developed surveys to find out more about the green jobs in their areas.

These efforts themselves can be problematic, however. Until recently, no standard definitions have existed for green jobs. This makes comparing data across states difficult if the definitions differ. Michigan, Indiana and Ohio agreed on green jobs definitions and shared a common survey design, but delays in fielding the Ohio green jobs survey have made it difficult to compare to Ohio's data to Michigan's and Indiana's.

Since the survey was conducted, the U.S. Bureau of Labor Statistics has developed green jobs definitions and two different approaches to measuring green jobs. These will most likely become the national standards for green jobs data. The first approach for collecting data about green jobs is called the "process approach." The process approach defines green jobs as those in which workers' duties involve making their establishments' production processes more environmentally friendly or making them use fewer natural resources. Data from this approach can be found at http://www.bls.gov/gtp/. The second approach is called the "output approach." In the output approach, green jobs are those in businesses that produce goods or provide services that benefit the environment or conserve natural resources. The Ohio green jobs survey used definitions similar to those in the output approach. Data from this approach can be found at http://www.bls.gov/ggs/.

Appendix

Figure A1. Survey Cover Letter and Questionnaire

Ohio | Department of Job and Family Services

Ted Strickland, Governor
Douglas E. Lumpkin, Director

(Date)

Dear Ohio Employer:

We need your help to attract investment, create jobs, and diversify Ohio's economy.

The Office of Workforce Development is conducting a green jobs survey for Ohio. For the first time, we will have a count of jobs in this rapidly evolving sector, identify core growth areas, and provide critical information that will help train Ohio's workforce for in-demand green jobs.

What is the green economy? Your company contributes to the green economy if you have employees working to provide products, parts, goods, or services in any of the following core areas:

1. Producing renewable energy
2. Increasing energy efficiency
3. Clean transportation and fuels
4. Agriculture and natural resources conservation
5. Pollution prevention and environmental cleanup

The following pages of the survey provide a more complete definition and examples of the wide range of core green-related activities. For your convenience, it also discusses multiple ways of responding to this survey and provides contact information for questions.

To get an accurate count of green jobs, we need employers to respond to this survey even if they don't have green jobs. To be included, please respond by FILL DATE. Your response will be confidential; data you provide will be combined other businesses, so that your business cannot be identified in published results. Results of the survey will be published at **www.OhioImi.com**.

Please direct this survey to a manager who understands the work activities of your personnel at this location, such as your operations manager or human resources manager.

Through your assistance, we can build Ohio's competitive advantage in the rapidly evolving green economy and corresponding green technologies. Thank you for your time and attention to this survey.

Sincerely,

John B. Weber
Deputy Director

Office of Workforce Development
P.O. Box 1618
4020 East Fifth Avenue
Columbus, OH 43216-1618
www.jfs.ohio.gov/owd

Figure A1. Survey Cover Letter and Questionnaire (cont.)

State of Ohio Green Job Survey

Please direct this survey to a manager who understands the work activities of your personnel at this location, such as your operations manager or human resources manager. There are four options for completing the survey:

1. Online at www.xxx.com (the easiest method). You will be asked for you unique ID number which is **XXXXX**
2. Return the survey form in the enclosed pre-paid reply envelope to our research partner, Market Decisions.
3. Fax it to Market Decisions at 207-767-8158
4. You may also complete over the phone by contacting Market Decisions at 1-800-293-1538 ext. 107. You will be asked for you unique ID number which is **XXXXX**

To ensure that your information is included, please complete the survey by FILL DATE

Please rest assured that your survey responses will be treated confidentially. No individual responses will be reported, and your organization's identity will not be linked to responses. If you have any questions about the survey, please email us with "green jobs" in the subject line at briann@marketdecisions.com or contact the study director, Dr. Brian Robertson at 1-800-293-1538 ext. 102.

Definitions of Green Jobs:

Green Economy: Industries that provide products or services related to renewable energy, increased energy efficiency, clean transportation and fuels, agriculture and natural resource conservation, and pollution prevention or environmental cleanup.

Green Jobs: Includes primary occupations engaged in generating a firm's green-related products or services, and the other support jobs created by the firm's green related revenue.

Green-related Industry: A detailed industry sector that is likely to contain firms that produce parts, components, products or services related to the green economy. Industries and firms were classified as green-related based on their primary product or service; not based on whether they were taking internal steps to use less energy or be more environmentally responsible.

Green-related Occupation: Job titles commonly utilized by green-related industries to produce products and services for the green economy. Green-related occupations can be found in a variety of educational and skill levels, such as:

- Scientists and engineers needed in energy research
- Skilled production workers utilized in a manufacturing setting
- Critical occupations at small start-up green firms, such as technical sales staff
- Construction laborers and skilled trades used in LEED construction projects.

What is the difference between a "green job" and "being green?"
A green job is a position that produces a good or a service in one of the following five categories: (1) producing renewable energy, (2) increasing energy efficiency, (3) clean transportation and fuels, (4) agriculture and natural resource conservation, (5) pollution prevention and environmental cleanup. A green job is not a position that helps a business take steps to be "greener" or more environmentally friendly; or to take steps like using less energy, or increasing recycling.

Answers to common questions regarding this survey are provided beginning on page 5.

Figure A1. Survey Cover Letter and Questionnaire (cont.)

When answering these questions, please report for this Ohio business location:

FILL BUSINESS NAME
FILL BUSINESS ADDRESS
FILL CSZ

The survey will identify jobs that produce goods or services related to any of the following five core green-related activities:

Producing renewable energy	Agriculture and natural resource conservation
Increasing energy efficiency	Pollution prevention and environmental cleanup
Clean transportation and fuels	

If your firm conducts "green-related" business activities that produce goods or supply services related to any of these five core areas, please complete the information below and continue to page 3. If not, please fill out Section 1 and Section 2 below and return using the postage-paid envelope.

1. **Do you or any of your staff work to provide goods or services in any of the above five core green-related areas?**

☐	YES	***Please answer questions 2 and 3 on this page and then answer questions 4 and 5 beginning on page 3.***
☐	NO	***Please provide your contact information in question 2 and either mail survey in postage paid envelope or fax it to 207-7678158.***

2. **Your contact information should we need to contact you if we have a question:**

Name			
Title			
Telephone		Date	

3. **For this Ohio business location:**

	Enter # of Employees
A. How many employees do you currently have at this location in Ohio?	
B. How many of these are employees whose primary function is the production of "green-related" products and services?	
C. How many of these are employees who hold support jobs for your "green-related" business activities?	
D. How many of these are employees engaged in business functions unrelated to your "green" business activities?	

Figure A1. Survey Cover Letter and Questionnaire (cont.)

4. Total Number of Workers in Ohio and Job Titles Related to Five Core Areas

- Enter total number of workers for each job title and the core areas they work in.
- Please estimate how many employees have one of the following five core areas as their primary focus. Choose only one core area per employee. For employees responsible for more than one core area, choose the one that accounts for the most time on the job.
- Exclude consultants, outside contractors, vendors, and others not considered employees.

			Core Areas for Green Jobs			
			1 Producing Renewable Energy	2 Increasing Energy Efficiency	3 Clean Transpor-tation and Fuels	4 Agriculture and Natural Resource Conservation
	Job Title Related to Core Area	Total Number of Workers in Job Title	Number of Workers in this Core Area	Number of Workers in this Core Area	Number of Workers in this Core Area	Number of Workers in this Core Area
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

5. Employee Training

Some green-related employees may require job training. Please estimate what percentage of employee training for your "green-related" workers will be:

	Enter %
Formal training provided by community colleges or outside training providers	
Informal training of staff on the job.	

Figure A1. Survey Cover Letter and Questionnaire (cont.)

4. Total Number of Workers in Ohio and Job Titles Related to Five Core Areas (continued)

- Enter total number of workers for each job title and the core areas they work in.
- Please estimate how many employees have one of the following five core areas as their primary focus. Choose only one core area per employee. For employees responsible for more than one core area, choose the one that accounts for the most time on the job.
- Exclude consultants, outside contractors, vendors, and others not considered employees.

		Core Areas for Green Jobs					
		5 Pollution Prevention and Environmental Cleanup	Total number of workers you expect to employ in this occupation in two years (By the year 2013)	Do you anticipate difficulty recruiting future qualified workers for this green-related occupation		Are there any unique skills required for this occupation when working on "green-related" projects?	
		Number of Workers in this Core Area	Number of Workers	Yes	No	Yes	No
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						

Thank You for your help!

Please return the survey in the envelope provided.
Mail postage paid to:
Market Decisions, P.O. Box 1240
Portland, ME 04104-1240

Figure A1. Survey Cover Letter and Questionnaire (cont.)

Frequently Asked Questions

I: Purpose and Objectives of the Ohio Green Jobs Survey

What is the purpose of this study?

- The purpose of this survey and study is to measure for the first time the number of current jobs in Ohio in the "green" economy. This will provide a baseline to measure whether this sector continues to add jobs to the future Ohio economy. It also will produce an idea of the most common "green" job titles, whether these jobs need unique skills, and will shed light on future growth expectations and training needs.

Is there a political motivation for this survey and study?

- No, there is no political motivation for this survey. The survey will be used solely for statistical purposes, to attempt to measure for the first time the number of current jobs in Ohio in the "green" economy. This will provide a baseline to measure whether this sector continues to add jobs to the future Ohio economy. All information collected in the survey from individual employers will be kept strictly confidential.

When will the study be available?

- The study will be available in late spring 2011. It will be released during a Tri-State Conference (Ohio, Michigan and Indiana) on green jobs. The survey responses of your company and other firms along with other research will be highlighted in the report and at the conference.

Can I get a copy of the study when it is completed?

- The results of the green jobs study will be posted on OhioLMI.com in late Spring 2011.

Who will use my responses to this survey?

- Your responses to this survey will be used by Ohio Department of Job and Family Services, Labor Market Information Bureau, to complete a study on green jobs in Ohio. This study will be used throughout the state to determine what the key green occupations are in Ohio, what the expectation for future growth is, and to begin any needed training of the Ohio workforce to fill those job openings.

II: Additional Questions about the Survey and How to Complete It

Is this survey mandatory?

- No, this survey is not mandatory. However, we have selected your firm because it is representative of other firms that may have greens jobs, therefore, we would truly value your participation.

Is this confidential?

- Absolutely. This data will be used by Ohio Department of Job and Family Services, Labor Market Information Bureau to complete a study on green jobs in Ohio, but no firm-specific information will be published.

What if I have lost my postage paid envelope?

- You may report your answers by telephone or by fax; we invite you to contact our staff at 1-800-293-1538 ext. 107.

What if we cannot respond by FILL DATE

- Please return the survey at your earliest convenience. We will be conducting telephone follow-up calls, so if you receive a phone call from us, we can take the survey information over the phone or via an electronic file if that is more convenient.

Figure A1. Survey Cover Letter and Questionnaire (cont.)

Is the survey available in an alternative format? (disabilities)

- Yes, you may report your answers by telephone; we invite you to contact our staff at 1-800-293-1538 ext. 107.

Who should complete this survey if our company does not have a human resource department?

- If you do not have a human resources department, this survey should be completed by your firm's owner or any other person who has knowledge of your firm's jobs and products and services.

We are just a branch location, what should we do with the survey?

- Even though you are just a branch, this survey aims to capture employment information about your location. Please complete the survey for your branch location only.

How do I figure out what core areas my staff works in?

- The best way to figure out what core area an employee works in is to read the definitions provided in the insert to this survey. Choose the core area that best describes the activity that the person's job contributes to (energy efficiency, clean transportation, alternative energy, pollution prevention, etc).

Due to revenue concerns, my company does not plan to do any training this year. How should I respond to the training question?

- This question is focusing on your future training needs. If you anticipate some of your green workers needing future training, please estimate the share of that training that may be formal training provided by a community college or outside training provider versus the share that will be informal on-the-job training.

What if I have an employee that works in a core area but only part time?

- Even if the green job the employee performs is only part of their job, please report it.

What if I don't have any green jobs now, but anticipate some green jobs in the future?

- Please list those occupational titles in the space provided, show zero current jobs, but complete the column on the number of jobs expected in that occupation in two years (2013).

My firm has some positions that meet the definition of a green job, but we use a temporary staffing agency to fill those jobs. Should I report them?

- No, only report persons you consider employees of your company.

My company fabricates parts that can be used in a variety of industrial applications, including wind turbines. Should we report the workers producing those parts as green jobs?

- It depends. If your company's parts can be used in wind turbines but are instead being used exclusively in industrial applications unrelated to the green economy, your jobs are probably not green jobs. However, if your parts are being used in wind turbines or other green goods, your jobs probably are green jobs.

My firm produces toys, but I have a worker who handles our internal recycling efforts and energy conservation efforts. Should I report that person as a green job?

- A green job is a position that produces a good or a service in one of the following five categories: (1) producing renewable energy, (2) increasing energy efficiency, (3) clean transportation and fuels, (4) agriculture and natural resource conservation, (5) pollution prevention and environmental cleanup.
- A green job is not a position that helps a business take steps to be "greener" or more environmentally friendly; or to take steps like using less energy, or increasing recycling.

Continued on Next Page

Figure A1. Survey Cover Letter and Questionnaire (cont.)

II: Additional Survey Definitions

What is the Labor Market Information?

- This bureau of LMI produces statistics and analysis on the Ohio work force; including data on employment and unemployment, jobs by industry and occupation; wage data on occupations and industries, and forecasts of future job growth.

What is the difference between a "green job" and "being green?"

- A green job is a position that produces a good or a service in one of the following five categories: (1) producing renewable energy, (2) increasing energy efficiency, (3) clean transportation and fuels, (4) agriculture and natural resource conservation, (5) pollution prevention and environmental cleanup. A green job is not a position that helps a business take steps to be "greener" or more environmentally friendly; or to take steps like using less energy, or increasing recycling.

What is a job title?

- A job title refers to an individual's primary or principal work-related duties or skills, i.e. their occupation. Unlike industries, which are based on the firm's primary service or product delivered, job titles or occupations are concerned with the specific day-to-day tasks of individual employees. A janitor, nurse, or electrical engineer would each be examples of job titles.

What is a support job?

- A support job is a job whose primary purpose is not in the production of green-related products or services, but whose work contributes to the delivery or production of green-related goods or services. For example, a staff accountant who supports day-to-day activities of a firm that manufactures solar panels would not be considered a primary green job, but would fall under the support occupation category.

What is a core area?

- Brief descriptions of the core green-related areas can be found in the accompanying survey insert. These are broad categories referring to the type of green-related activity a firm might be involved in.

What is energy efficiency, renewable energy, clean transportation, etc?

- Brief descriptions of specific core green-related areas can be found in the accompanying survey insert.

What is meant by unique skills?

- An employee working on a "green" project may utilize essentially the same skills as when working on a "non-green" project. However, another employee may be in a different occupation that requires special additional training, certification, or education to effectively work on a "green" project. For this employee, you would indicate "Yes" on the survey question that asks if special skills are required for this occupation when involved with a "green" project. The key question is whether workers in this occupation need different skills or knowledge sets when they work on a green-related project versus other projects.

THANK YOU FOR PARTICIPATING!

Ohio Department of Job and Family Services
Office of Workforce Development
Bureau of Labor Market Information
P.O. Box 1618
Columbus, OH 43216-1618

TOLL-FREE AT (888) 296-7541

An Equal Opportunity Employer and Service Provider

Figure A2. Final Sample Disposition

Disposition	Count
Resolved - Non-working number	2042
Contacted by Telephone but Unresolved	1804
Refusals to Telephone Screening Survey	1233
Cases Without a Telephone Number Sent Initial Mail Survey	1549
No Address or Phone Number in Sample File	336
Wrong Business Identified Via Telephone	1010
Mail Surveys Returned as Undeliverable - Non-working telephone number	200
Mail Surveys Returned as Undeliverable - Contacted by Telephone but Unresolved	89
Mail Surveys Returned as Undeliverable - Refusals to Telephone Screening Survey	52
Mail Surveys Returned as Undeliverable - Wrong Business Identified Via Telephone	64
Mail Surveys Returned as Undeliverable - Cases Without a Telephone Number	215
Complete - No Green Jobs	5111
Unsure if Have Green Jobs	53
Refused to Indicate Whether Has Green Jobs	111
Had Green Jobs Sent Email Invitation	109
Had Green Jobs Sent Mail Survey	22
Had Green Jobs Refused to do Email or Mail Survey	76
Had Green Jobs unresolved during follow up calls	184
Had Green Jobs non working number or wrong business during follow-up calls	7
Had Green Jobs follow-up via fax, email, resent survey link – DID NOT COMPLETE	60
Had Green Jobs indicated already did survey– DID NOT COMPLETE	13
Had Green Jobs indicated would complete survey– DID NOT COMPLETE	38
Had Green Jobs Accessed but did not Start Email Survey– DID NOT COMPLETE	41
Had Green Jobs Partially Completed Email or Mail Survey	36
Had Green Jobs Completed Email or Mail Survey	540
Total	**14995**

Office of Workforce Development
P.O. Box 1618
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Bureau of Labor Market Information
Business Principles for Workforce Development

Partner with the workforce and economic development community.

Develop and deploy new information solution tools and systems for the workforce and economic development community.

Provide products and services that are customer and demand driven.

Be known as an important and reliable source for information solutions that support workforce development goals and outcomes.

This report was published by the Bureau of Labor Market Information, Coretta Pettway, Bureau Chief. For further information, visit http://OhioLMI.com or call the Ohio Bureau of Labor Market Information at 1-888-296-7541 or 614-752-9494.

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(09/2012)

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