

# ARIZONA GREEN JOBS VACANCY REPORT

Available Jobs, March 2010 to March 2011

Prepared for the Office of Employment and Population Statistics,  
Arizona Department of Administration

May

2011

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## EXECUTIVE SUMMARY

As part of a U.S. Department of Labor grant through the American Recovery and Reinvestment Act of 2009, the Arizona Office of Employment and Population Statistics seeks to assess green job opportunities in the state's green economy. The Council for Community and Economic Research (C2ER) assembled a team to provide research assistance. Burning Glass Technologies, working in collaboration with the C2ER team, prepared a job vacancy study, examining **web-published** ("real-time") job postings for the period of March 2010 to March 2011. This represents the third analysis of Arizona's green jobs in a series of research studies designed to explore alternative ways to track the emergence of this sector. Unlike other studies, this research focuses on job openings rather than previously existing jobs.

The data in this study include:

- Overall number and characteristics of job openings in Arizona in green vs. non-green industries
- Education and skill requirements of green job openings compared with all other jobs
- Reported wages available to green jobseekers in comparison to their non-green counterparts

The most significant findings from the Job Vacancy Report are as follows:

- Between March 2010 and March 2011, Arizona organizations and companies advertised an estimated 402,119 jobs, of which 7,187 were clearly green job openings. These green job openings represented about 1.8 percent of total overall state openings. It is important to note that if a job requires a green skill it is categorized as a green job for the purposes of this report.
- The industries advertising for the largest number of green employees in Arizona during the period March 2010 to March 2011 included:
  - Professional, Scientific, and Technical Services
  - Educational Services
  - Administrative and Support Services
  - Hospitals

- Utilities
  - Accommodation
  - Waste Management and Remediation Services
  - Transportation Equipment Manufacturing
  - Specialty Trade Contractors
  - Ambulatory Health Care Services
- 
- During the March 2010 to March 2011 time period the number of postings in each green job category trended upward, illustrating growth of the green economy in Arizona. This trend could have been caused by a wide variety of factors, not limited to federal investments to catalyze the green economy.
  - Most web-posted job openings -- green as well as non-green -- were found in the central region of Arizona, followed by the southern region, and then the northern region.
  - The percentage of postings classified as green was fairly consistent among the three regions, at 1.7 percent in the central region, 1.9 percent in the northern region, and 2 percent in the southern region.
  - For the period of March 2010 to March 2011, green job openings in Arizona by BLS categories of green economic activity are distributed as follows:
    - Pollution Reduction and Removal, Greenhouse Gas Reduction, and Recycling and Reuse – 35 percent
    - Natural Resources Conservation – 26 percent
    - Energy Efficiency – 17 percent
    - Energy from Renewable Sources – 12 percent
    - Environmental Compliance, Education and Training, and Public Awareness – 10 percent
  - The top five occupations that offered green job openings were:
    - Maintenance and Repair Workers
    - Information Technology Project Managers
    - Sales Representatives
    - General and Operations Managers
    - Mechanical Engineers.
  - Overall, employers looking to fill green jobs demanded applicants that had greater experience, higher education, and more specific technical skills than employers seeking workers for other occupations.
  - Green employers are looking for workers with experience. About three-quarters of green job openings required at least 4 years of experience compared to about two-thirds of all other jobs.

- Educational attainment is also a significant factor in hiring for green jobs. During the period of March 2010 to March 2011, 38 percent of green jobs required a Bachelor’s degree or a Graduate/Professional degree.
- A significant portion of green job openings provided average annual wages above the statewide median. The median annual salary in Arizona for current green job openings is \$53,737. The median wage for all jobs in Arizona as of the 2009 Occupational Employment and Annual Wage Estimates was \$32,215.

## BACKGROUND

In November 2009, the State of Arizona received a \$1.2 million Labor Market Information (LMI) Improvement grant from the U.S. Department of Labor as part of the American Recovery and Reinvestment Act of 2009. One of the grant tasks focused on understanding the nature of available job opportunities in the state's green economy. Tapping the expertise of a national research team, the Council for Community and Economic Research (C2ER) conducted a series of studies designed to better understand the green economy in Arizona. Two previous studies examined green companies and their employment using company and product information to categorize employment and green occupations using a business survey designed to gather information about occupations and job titles involved in green activities. This study represents the third analysis of Arizona's green jobs in this series of research studies designed to explore alternative ways to track the emergence of this sector.

Unlike the other studies, this research focuses on job openings rather than previously existing jobs. In this research, C2ER collaborated with Burning Glass Technologies to identify the most critical findings about available jobs in Arizona. This data, referred to as "real-time labor market information," are derived by using innovative information search and retrieval technology to collect information about millions of job postings across thousands of job boards, corporate websites, and other online sources. The raw data are then converted into a database of unduplicated job postings and assigned characteristics regarding the industry, occupation, salary, education or skill requirements, position location, and any other information provided within each job posting.

From an analysis of the Burning Glass real-time vacancy LMI database, the team was able to identify web-published job openings in Arizona for the March 2010 to March 2011 period and report the following information:

- ✓ Overall number of job openings, including the subset that requires green skills
- ✓ Characteristics of green job openings compared to all available jobs
- ✓ Education and skill requirements of green job openings compared to all other jobs
- ✓ Reported wages available to green jobseekers

## AVAILABLE GREEN AND NON-GREEN JOBS

Two basic issues are central to the challenge of defining the green economy: developing consensus on how to define green jobs and determining how best to "parse out" the jobs that are green from those that are not within green companies. It is rare that all jobs in a company can be classified as green. Furthermore, many companies that are not considered green often require workers with unique green-related skills. A definition for green jobs was finalized in September 2010 by the Bureau of Labor Statistics (BLS) of the U.S. Department of Labor. By this definition, green jobs are characterized as:

- **Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources**
- **Jobs in which workers’ duties involve making their establishment’s production processes more environmentally friendly or use fewer natural resources**

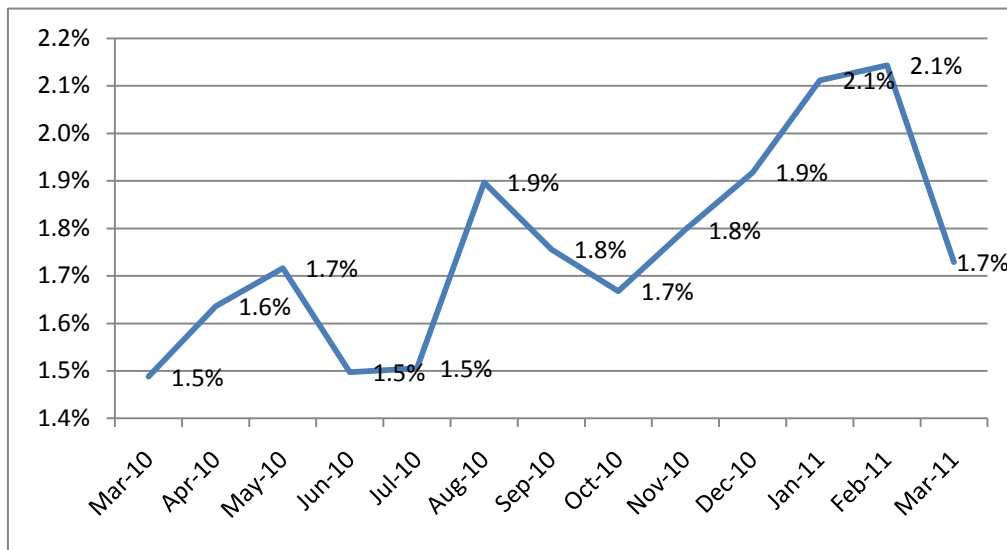
For the period of March 2010 to March 2011, Burning Glass’ review revealed a total of 402,119 unduplicated job postings in Arizona, of which 7,187 openings were for green jobs, representing 1.8 percent of total state employment vacancies. For this report, if a job falls within the purview of the BLS definition and requires a green skill it is categorized as a green job. During this period, about 30,932 jobs were available each month on average, of which 553 were green jobs.

**Figure 1: Number of Green & Non-Green Jobs, Statewide**

	Number of Green Openings	Total Number of Openings	Percent Green Jobs
Mar-10	295	19,827	1.5%
Apr-10	341	20,844	1.6%
May-10	425	24,765	1.7%
Jun-10	319	21,303	1.5%
Jul-10	387	25,705	1.5%
Aug-10	642	33,846	1.9%
Sep-10	486	27,673	1.8%
Oct-10	461	27,645	1.7%
Nov-10	594	33,049	1.8%
Dec-10	703	36,663	1.9%
Jan-11	744	35,233	2.1%
Feb-11	713	33,268	2.1%
Mar-11	1,077	62,298	1.7%
<b>Total</b>	<b>7,187</b>	<b>402,119</b>	<b>1.8%</b>
Monthly Average	553	30,932	

**Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011**

Figure 2: Proportion of Arizona Job Openings that were Green, March 2010 to March 2011



Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

### CHARACTERISTICS OF GREEN JOB OPENINGS

The firms seeking the largest number of green employees in Arizona during the period of March 2010 to March 2011 represent a variety of industries, which include Professional, Scientific, and Technical Services; Educational Services; Administrative and Support Services; Hospitals; and Utilities. At the broadest level, it is difficult to identify a typical green business in Arizona. Green businesses operate in a very diverse set of industries and regions and provide a mix of employment and career opportunities.

Not surprisingly, the largest number of jobs in Arizona is found in the Central Region, which comprises the Phoenix metropolitan area (with more than 4.4 million residents) and includes Maricopa, Pinal, Graham, Greenlee, and Gila counties. These counties represent approximately 67 percent of the state’s population and have the largest concentration of skilled workers in the state. During the

Figure 3: Top Arizona Employers Advertising Green Jobs, March 2010 to March 2011

- Freeport McMoran Copper Gold
- Pinnacle West Capital Corporation
- University of Arizona
- City of Phoenix
- Marriott International Incorporated
- Knowledge Learning Corporation
- First Solar
- Power One Incorporated
- Think Energy Incorporated
- Honeywell
- Arizona State University
- Northern Arizona University
- Republic Service Incorporated
- CH2M Hill
- Pepsico Inc.

Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

March 2010 to March 2011 period, 74 percent of all web-posted job openings were available in central Arizona. A total of 72 percent of the state’s green job openings were also found in this region.

Southern Arizona, comprising Pima, Yuma, Santa Cruz, Sierra Vista, Nogales, and Cochise counties and including the city of Tucson, represents the next most populous region, with 21 percent of the state’s population. About 18 percent of all web-posted job openings were available in this region during this March 2010 to March 2011 period. The region accounted for 20 percent of the state’s green job postings during this period.

The Northern Region has a much smaller population and job base than Central and Southern Arizona. The Northern Region of Arizona is comprised of mountain communities and vast Indian reservations, including Mohave, La Paz, Yavapai, Navajo, Apache, and Coconino Counties. It represents about 11 percent of the state’s population but only about 8 percent of all web-posted job openings in the state and 8 percent of all green job openings.

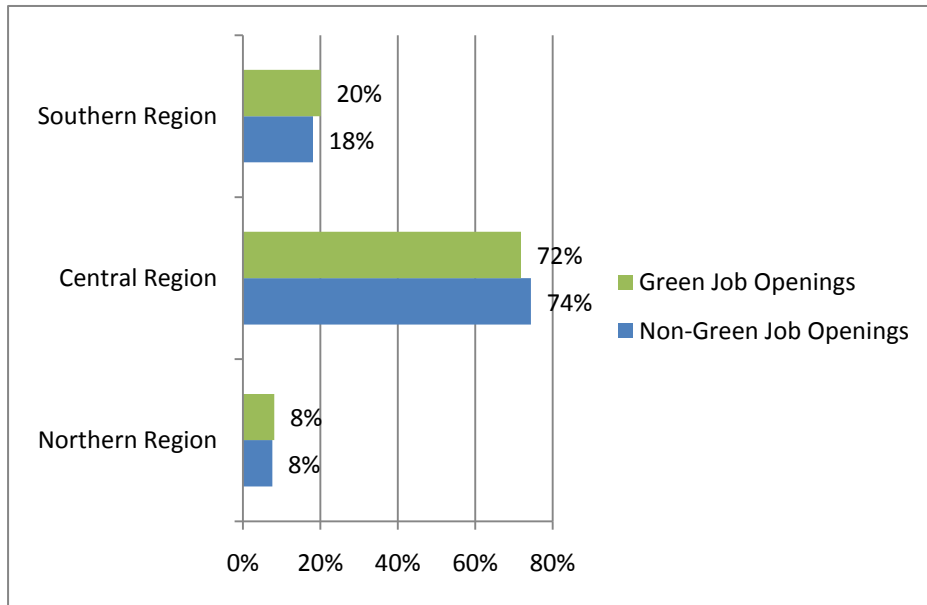
**Figure 4: Geographic Distribution of Available Web-Posted Green and Non-Green Jobs**

Region	Total Job Openings March 2010 to March 2011	Non-Green Job Postings	Green Job Postings	Green Jobs as a Proportion of All Job Postings
Northern Region	28,700	28,151	549	1.9%
Central Region	281,915	277,050	4,865	1.7%
Southern Region	68,622	67,264	1,358	2.0%
<b>Total</b>	<b>379,237</b>	<b>372,465</b>	<b>6,772</b>	<b>1.8%</b>

Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

A higher share of the vacant jobs in the Northern and Southern regions require green skills. Those regions provided about 28 percent of green job vacancies.

Figure 5: Proportion of Available Jobs by Region

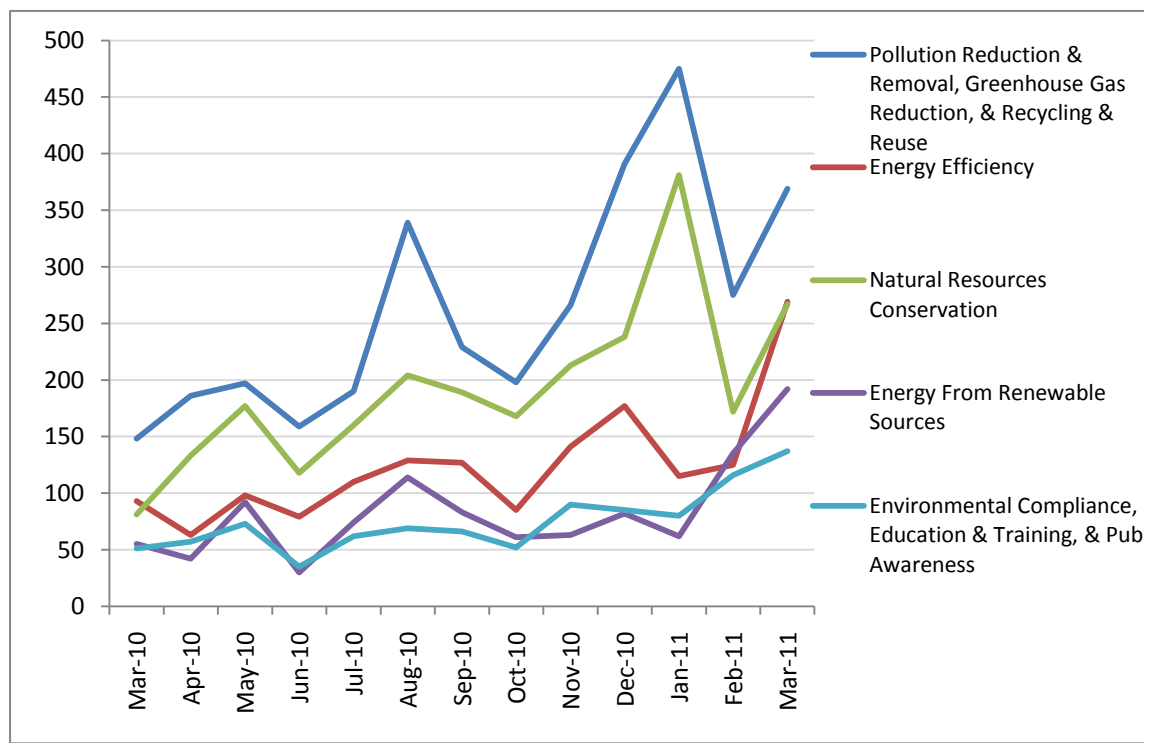


Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

**DISTRIBUTION OF GREEN JOBS BY TYPE OF ECONOMIC ACTIVITY**

Approximately one-third of available web-posted green job openings during the March 2010 to March 2011 time period can be found in traditional Pollution Reduction & Removal, Greenhouse Gas Reduction, & Recycling & Reuse activities. Natural Resources Conservation and Energy Efficiency represent the next two largest categories of available jobs. Combined, these categories represent 78 percent of the state’s available green job opportunities.

**Figure 6: Trends in Available Green Jobs by Economic Activity**



Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

Rapid increases in employment demand occurred with workers undertaking Pollution Reduction & Removal, Greenhouse Gas Reduction, & Recycling & Reuse and Natural Resources Conservation activities. Job postings for all five green economic areas have been in a positive trajectory over the time period, with spikes in job postings in August 2010 and January 2011.

**Figure 7: Distribution of Green Job Openings by Economic Activity**

Economic Activity Area (Clusters of Green Industries)	Number of Green Job Postings	Percentage of Green Job Postings
Pollution Reduction & Removal, Greenhouse Gas Reduction, and Recycling & Reuse	3,557	35%
Natural Resources Conservation	2,597	26%
Energy Efficiency	1,668	17%
Energy From Renewable Sources	1,160	12%
Environmental Compliance, Education & Training, and Public Awareness	1,045	10%

Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011; BLS Green Sectors

The largest proportion of firms that advertised available green jobs were in Professional, Scientific and Technical Services, Educational Services, and Administrative and Support Services.

Figure 8: The Top 10 Industries with Green Job Openings

Industry Code	Industry Title	Number of Green Job Postings	Percentage of Available Green Job Openings
541	Professional, Scientific, and Technical Services	660	9.2%
611	Educational Services	564	7.8%
561	Administrative and Support Services	412	5.7%
622	Hospitals	300	4.2%
221	Utilities	261	3.6%
721	Accommodation	177	2.5%
562	Waste Management and Remediation Services	160	2.2%
336	Transportation Equipment Manufacturing	149	2.1%
238	Specialty Trade Contractors	120	1.7%
621	Ambulatory Health Care Services	120	1.7%

Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

Service firms dominated employment demands for green jobs in Arizona’s economy during the March 2010 to March 2011 period. Of the 7,187 available green jobs during this period in Arizona, the Professional, Scientific & Technical Services industry accounted for the most jobs (660), followed by Educational Services (564), and Administrative and Support Services (412).

### In-demand Green Occupations by Green Industry Cluster

The green economy offers opportunities in a wide range of occupations and career paths. While many of these career pathways cross from industry to industry, different industry clusters also offer their own unique opportunities. The most in-demand green jobs are in occupations related to Architecture & Engineering; Management; Installation, Maintenance & Repair; Life, Physical & Social Science; and Sales. However, different occupations are in-demand, depending on the green economic activity area (or “industry cluster”). Following is a summary of the most in-demand occupation groups in each of the five BLS-defined categories of the green economy.

**Figure 9: Web-posted Natural Resource Conservations Jobs**

Natural Resources Conservation by Occupation Group	Number of Jobs	Median Salary
Life, Physical & Social Science	388	\$55,484
Architecture & Engineering	189	\$70,220
Office & Administrative Support	153	\$38,346
Management	134	\$74,675
Healthcare Practitioners & Technical	125	\$81,865
Computer & Mathematical	104	\$70,475
Education, Training & Library	101	\$41,394
Production	92	\$48,588
Installation, Maintenance & Repair	85	\$51,875
Sales & Related	75	\$65,260
Business/Financial Operations	68	\$60,882
Transportation & Material Moving	62	\$38,678
Arts, Design, Entertainment, Sports & Media	51	\$90,000

**Figure 10: Web-posted Pollution Reduction & Recycling Jobs**

Pollution Reduction & Recycling Jobs by Occupation Group	Number of Jobs	Median Salary
Architecture & Engineering	327	\$65,500
Installation, Maintenance & Repair	304	\$43,737
Management	251	\$76,512
Production	243	\$43,275
Life, Physical & Social Science	133	\$55,000
Healthcare Practitioners & Technical	132	\$75,101
Building & Grounds Cleaning & Maintenance	110	\$20,675
Office & Administrative Support	110	\$37,924
Transportation & Material Moving	108	\$44,699
Education, Training & Library	92	\$20,800
Sales & Related	86	\$41,972
Business/Financial Operations	72	\$112,500
Computer & Mathematical	71	\$65,342
Food Preparation & Serving-Related	66	\$32,000

Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

**Figure 11: Web-posted Energy Efficiency Jobs**

Energy Efficiency Job Openings by Occupation Group	Number of Jobs	Median Salary
Architecture & Engineering	217	\$80,000
Management	181	\$28,662
Installation, Maintenance & Repair	163	\$52,000
Computer & Mathematical	109	\$57,138
Business/Financial Operations	95	\$34,066
Production	93	\$60,000
Sales & Related	88	\$59,000
Construction & Extraction	79	\$37,440
Arts, Design, Entertainment, Sports & Media	57	\$76,183
Transportation & Material Moving	57	\$67,143

**Figure 12: Web-posted Renewable Energy Jobs**

Renewable Energy by Occupation Group	Number of Jobs	Median Salary
Computer & Mathematical	155	\$80,000
Architecture & Engineering	145	\$60,000
Installation, Maintenance & Repair	129	\$54,038
Management	98	\$100,000
Business/Financial Operations	93	\$79,079
Transportation & Material Moving	73	\$180,000
Construction & Extraction	62	\$47,304
Life, Physical & Social Science	61	\$65,000
Sales & Related	54	\$101,169

**Figure 13: Web-posted Environmental Compliance/Training Jobs**

Environmental Compliance/Training by Occupation Group	Number of Jobs	Median Salary
Sales & Related	90	\$90,000
Management	86	\$73,429
Architecture & Engineering	75	\$83,250
Life, Physical & Social Science	73	\$60,320
Computer & Mathematical	58	\$79,130
Personal Care & Service	49	.
Healthcare Practitioners & Technical	44	\$72,065

Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

## Jobseeker Pre-requisites to Compete for Green Job Openings

Jobseekers applying for green job openings must have the right combination of education, skills, and experience to compete for openings. The data from real-time web-postings provide insights into the background that employers expect applicants to have. This section reviews the requirements that companies describe as criteria for job applicants.

For many jobs, work experience is a vital pre-requisite. This is true especially for green job openings. Employers frequently seek applicants with a proven track record, hands-on experience, and strong prior work references as a way to increase the likelihood that they will find a qualified, high performing employee. Examining only those job postings classified as green, and for postings requiring work experience, a vast majority (76 percent) required applicants to have four or more years of experience. By comparison, only 63 percent of non-green job postings requiring experience demanded that much experience.

**Figure 14: Work Experience Required of Job Seekers**

Experience Required	Non-Green Job Postings	Green Job Postings
Less than 1 Year	18%	12%
1 to 3 Years	19%	13%
4 to 7 Years	48%	51%
7+ Years	15%	25%

Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

Slightly less than half (46 percent) of job openings identified the experience required. Web-based green job postings were more likely to identify work experience as prerequisite (70 percent of the postings required work experience). It is unclear whether the difference between green and non-green experience requirements can be explained by the higher experience requirement of green jobs or whether employers with green jobs are simply more likely to advertise information about the required experience than employers advertising other types of jobs.

### Education Requirements for Green vs. Non-green Job Openings

Higher education is another frequent job prerequisite demanded by green employers at a higher rate. During the March 2010 to March 2011 period, 38 percent of green jobs and 22 percent of non-green jobs required a Bachelor’s degree or Graduate/Professional degree, respectively. In addition, at each educational level other than graduate/professional degree, green jobs tended to offer a salary premium. For jobs requiring only a high school degree or not indicating an education requirement, the wage premium for green jobs was substantial, averaging about \$8,000 annually. It is likely that competition

Figure 15: Education and Annual Wage Profile of Available Arizona Job Openings

Education Required	Non-Green Job Postings Distribution	Non-Green Job Postings Median Salary	Green Job Postings Distribution	Green Job Postings Median Salary	Median Salary, All Job Postings
High School	17%	\$29,994	20%	\$38,813	\$30,046
Post Secondary/Some College	3%	\$47,050	4%	\$47,674	\$47,187
Bachelor's Degree	20%	\$60,000	34%	\$65,000	\$60,255
Graduate/Professional Degree	2%	\$63,700	4%	\$56,607	\$63,877
No Education Requirement Listed	55%	\$40,000	38%	\$48,984	\$40,560

Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

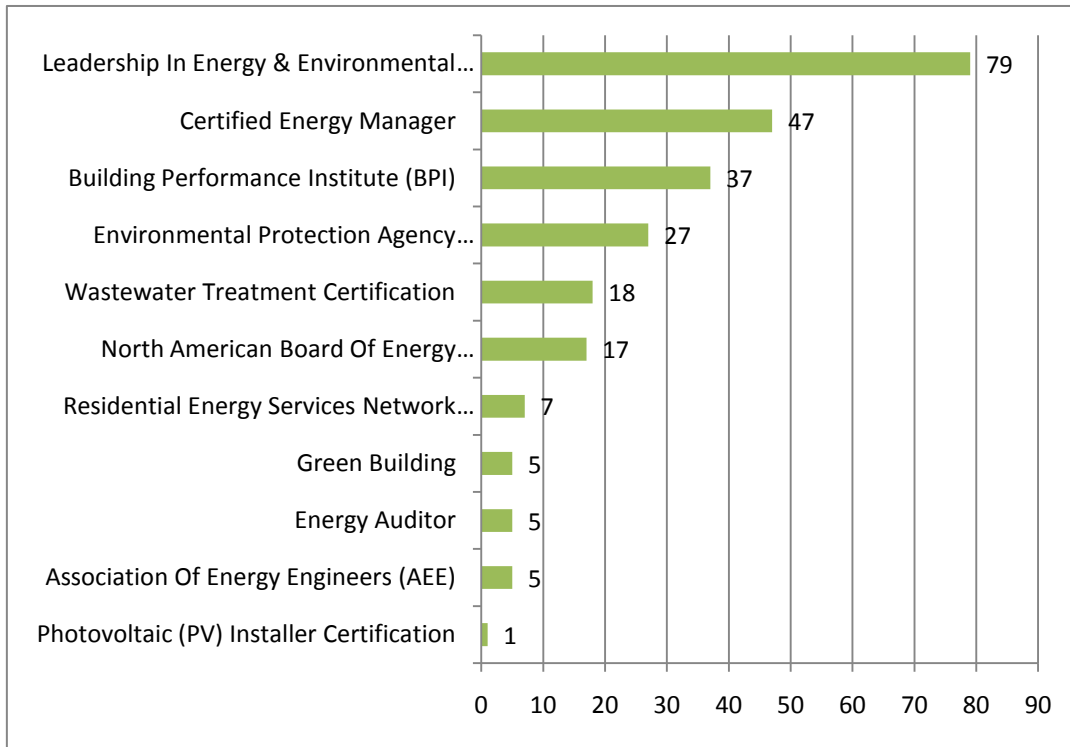
for these lower skill green jobs is particularly keen. Nevertheless, wages for jobs requiring a four year degree or more outpaced those requiring less education by a wide margin.

Because many new types of green jobs are emerging, the infrastructure for a formal education and certification system is not yet fully developed. Even so, nearly half of the web-posted jobs (42 percent) required education beyond high school. By comparison, about one-quarter of other web-advertised jobs required education beyond high school. It is unclear whether the job postings that do not identify an education requirement are lower skill jobs or simply did not identify the required education for the position.

### Certification Requirements

The most common types of certification were related to sustainable or “LEED” design as well as energy management or auditing. As green industry skill standards continue to emerge, it is likely that the proportion of jobs that require some form of licensing or certification will increase over time. In the meantime, employers and workers appear to rely mostly on a mix of formalized training and on-the-job skill development.

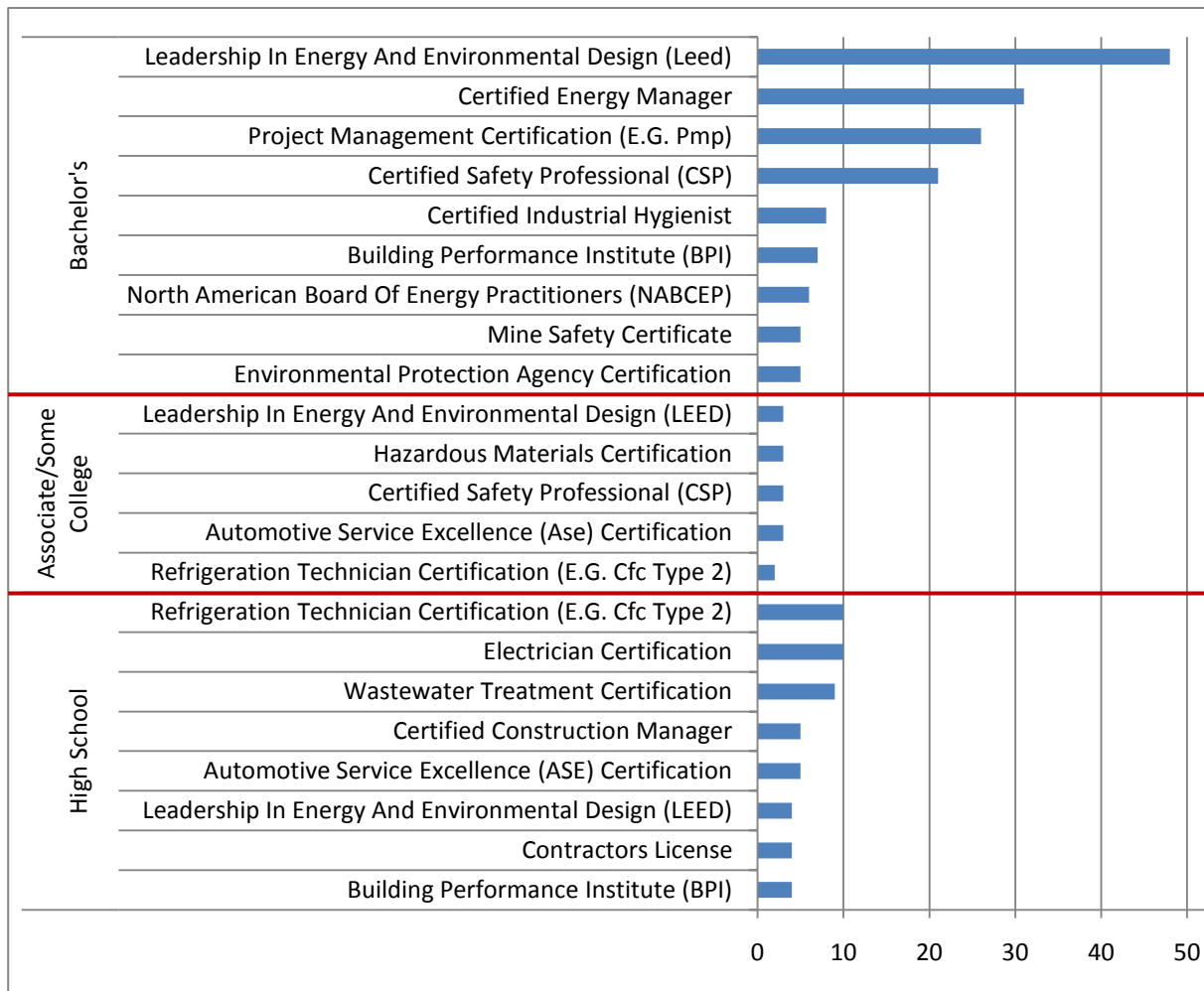
Figure 16: Most Frequent Green Skill-Related Certification Requirements, Arizona



Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

For many of these certifications (with the exception of the ASE certification), the vacant green jobs also required a Bachelor’s degree. Examples of the most common certifications that are offered to individuals who already have four-year degrees included LEED certification, certified energy manager, and project management certification (PMP). Certification requirements, combined with college education requirements, illustrate the higher skill demands that many firms ask of green job applicants, and help explain why employers are willing to pay a premium for that expertise.

Figure 17: Top Certifications Required for Green Jobs by Minimum Educational Attainment



Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

## OCCUPATION PROFILES

### Job Wage Benefits

Based on job vacancy data between March 2010 and March 2011, Arizona's green economy provides a diverse mix of job opportunities with varying pay and skill levels depending on industry sector and education/training requirements. Average annual wages for the highest in-demand green job postings ranged from a low of \$18,720 per year to a high of \$115,000. Most in-demand green job vacancies provided average annual wages above the statewide median of \$37,440 per year. In fact, the March 2010 - March 2011 real-time LMI data revealed that the median annual salary offered to prospective workers in Arizona for green jobs was \$53,737. This is approximately 29 percent higher than the median salary for non-green jobs (\$41,600). Although green jobs are currently a relatively small segment of the

state economy, the emerging green economy holds promise for Arizona in terms of growth in well-paying occupations.

The best-paying in-demand green job postings were for Engineering Managers; Electrical Engineers; and Computer Software Engineers. Each of these three occupations offered a median annual salary of at least \$77,000. More than 60 percent of the jobs available specifically required a Bachelor’s degree or higher. The most in-demand green jobs that typically did not require a Bachelor’s degree included Maintenance and Repair Workers, Production Workers, Medical and Clinical Laboratory Technicians, and Camera and Photographic Equipment Repairers. The median wages for those jobs ranged from \$18,720 to \$43,737.

**Figure 18: Wage Profile of the 20 Most In-Demand Green Occupations in Arizona**

ONET Code	Occupation Title	Number of Green Job Postings	Percentage of Green Jobs Requiring Less than BA	Median Salary
00-0000.00	All Green Jobs	7,164	37.6%	\$53,737
49-9042.00	Maintenance and Repair Workers, General	233	73%	\$43,737
15-1099.11	Information Technology Project Managers	202	30%	\$70,413
41-4012.00	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	195	33%	\$75,920
11-1021.00	General and Operations Managers	192	19%	\$71,965
17-2141.00	Mechanical Engineers	141	16%	\$75,000
17-2081.00	Environmental Engineers	136	9%	\$50,327
11-9041.00	Engineering Managers	127	38%	\$115,000
51-9199.00	Production Workers, All Other	108	79%	\$43,566
51-9061.00	Inspectors, Testers, Sorters, Samplers, and Weighers	99	46%	\$45,885
17-2071.00	Electrical Engineers	98	9%	\$77,500
51-1011.00	First-Line Supervisors/Managers of Production and Operating Workers	94	34%	\$66,000
19-2041.00	Environmental Scientists and Specialists, Including Health	88	7%	\$55,000
29-2012.00	Medical and Clinical Laboratory Technicians	81	97%	\$18,720
11-3051.00	Industrial Production Managers	78	21%	\$69,243
43-9061.00	Office Clerks, General	75	18%	\$30,623
15-1032.00	Computer Software Engineers, Systems Software	74	14%	\$77,500
49-9061.00	Camera and Photographic Equipment Repairers	72	81%	\$32,240

Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

By comparison, non-green in-demand vacancies offer a median salary of \$41,600, more than \$12,000 less than the median for green jobs. There are many of these in-demand non-green jobs that offer good wages, though. However, most require skills in science, technology, engineering and math, with thousands of job opportunities offering wages of \$50,000 or more.

## Knowledge-Specific Content and Related Skills By BLS Green Categories

Figure 19: Wage Profile of the 20 Most In-Demand Non-Green Occupations in Arizona

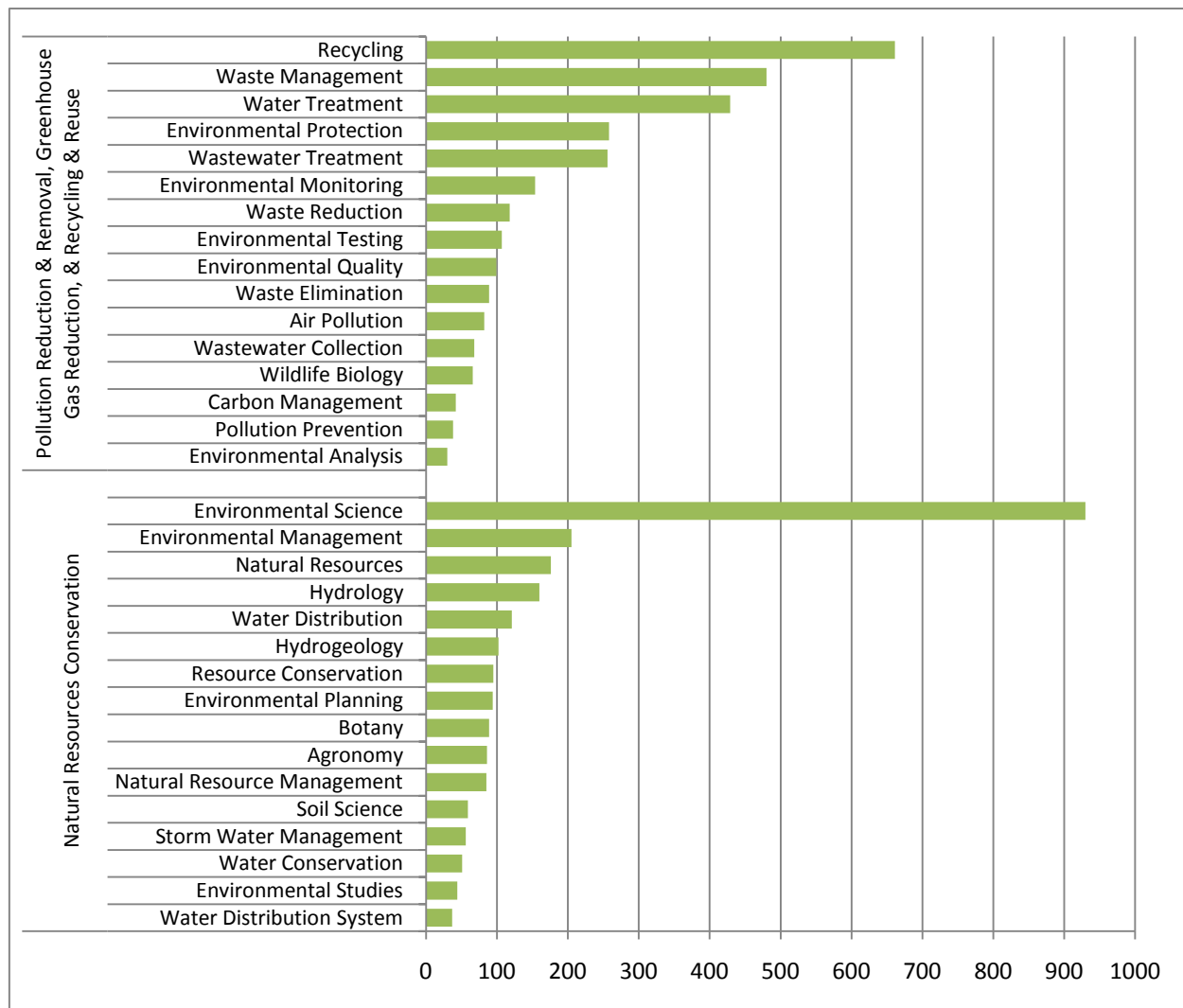
ONET Code	Occupation	Total Number of "Non-Green" Job Postings	Percentage of Jobs Requiring Less than BA (excluding no-requirement)	Median Salary
00-0000	All Non-Green Jobs	406,247	47%	\$41,600
41-4012.00	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	14,369	52%	\$55,000
41-2031.00	Retail Salespersons	12,245	79%	\$40,821
29-1111.00	Registered Nurses	11,056	38%	\$65,520
11-1021.00	General and Operations Managers	9,507	23%	\$76,525
15-1021.00	Computer Programmers	8,050	19%	\$74,006
41-1011.00	First-Line Supervisors/Managers of Retail Sales Workers	4,941	78%	\$50,000
25-3099.02	Tutors	4,762	29%	\$47,840
29-1123.00	Physical Therapists	4,654	35%	\$70,000
43-4051.00	Customer Service Representatives	4,353	72%	\$28,080
43-1011.00	First-Line Supervisors/Managers of Office and Administrative Support Workers	4,294	43%	\$52,500
15-1031.00	Computer Software Engineers, Applications	4,243	13%	\$83,200
49-9042.00	Maintenance and Repair Workers, General	4,186	83%	\$34,320
15-1099.11	Information Technology Project Managers	4,065	22%	\$75,000
53-3032.00	Truck Drivers, Heavy and Tractor-Trailer	3,667	67%	\$53,000
51-9199.00	Production Workers, All Other	3,537	67%	\$31,200
13-2041.00	Credit Analysts	3,488	24%	\$59,725
15-1041.00	Computer Support Specialists	3,342	72%	\$32,240
11-3051.00	Industrial Production Managers	3,277	31%	\$65,000
13-2011.01	Accountants	3,272	19%	\$53,750
53-7062.00	Laborers and Freight, Stock and Material Movers, Hand	3,201	81%	\$25,500

Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

Different green economic activities or industry clusters require unique knowledge, skills, and abilities. In Arizona, pollution reduction and recycling industries tend to focus on recycling, waste management, and water treatment. Within the natural resource conservation sector, many more workers were required to have knowledge about environmental sciences and environmental management.

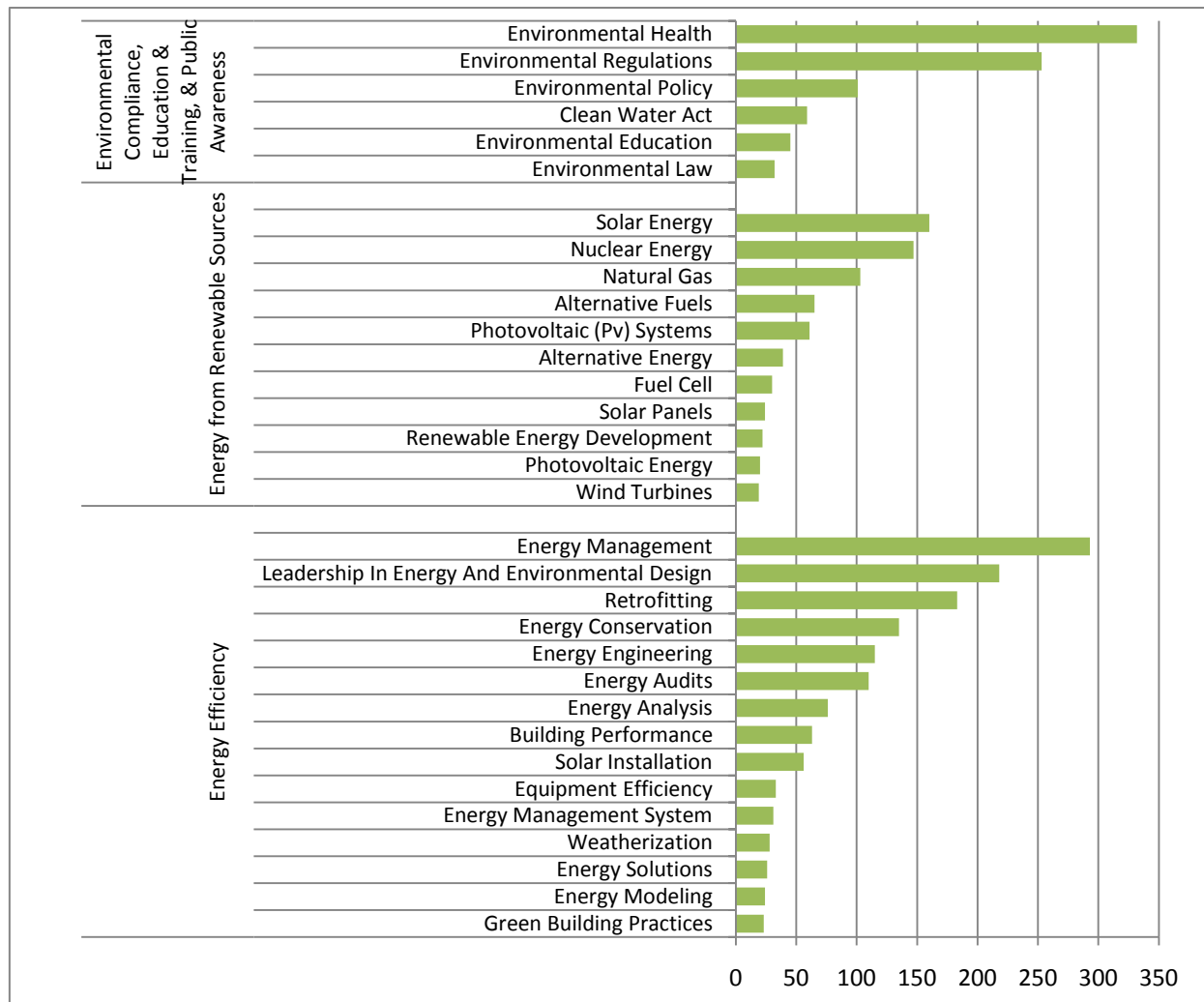
Among those involved with environmental compliance and training, the most common areas of expertise were environmental regulation and environmental health. In the renewable energy sector, workers are expected to have a broad background in renewable energy sources, especially solar, nuclear, natural gas, and alternative fuels. Energy efficiency jobs were most likely to require knowledge content in energy management, retrofitting, and energy conservation.

**Figure 20: Most Common Knowledge Content Requirements by Green Economic Activity Areas**



Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

Figure 20 (Continued): Most Common Knowledge Content Requirements by Green Economic Activity Areas



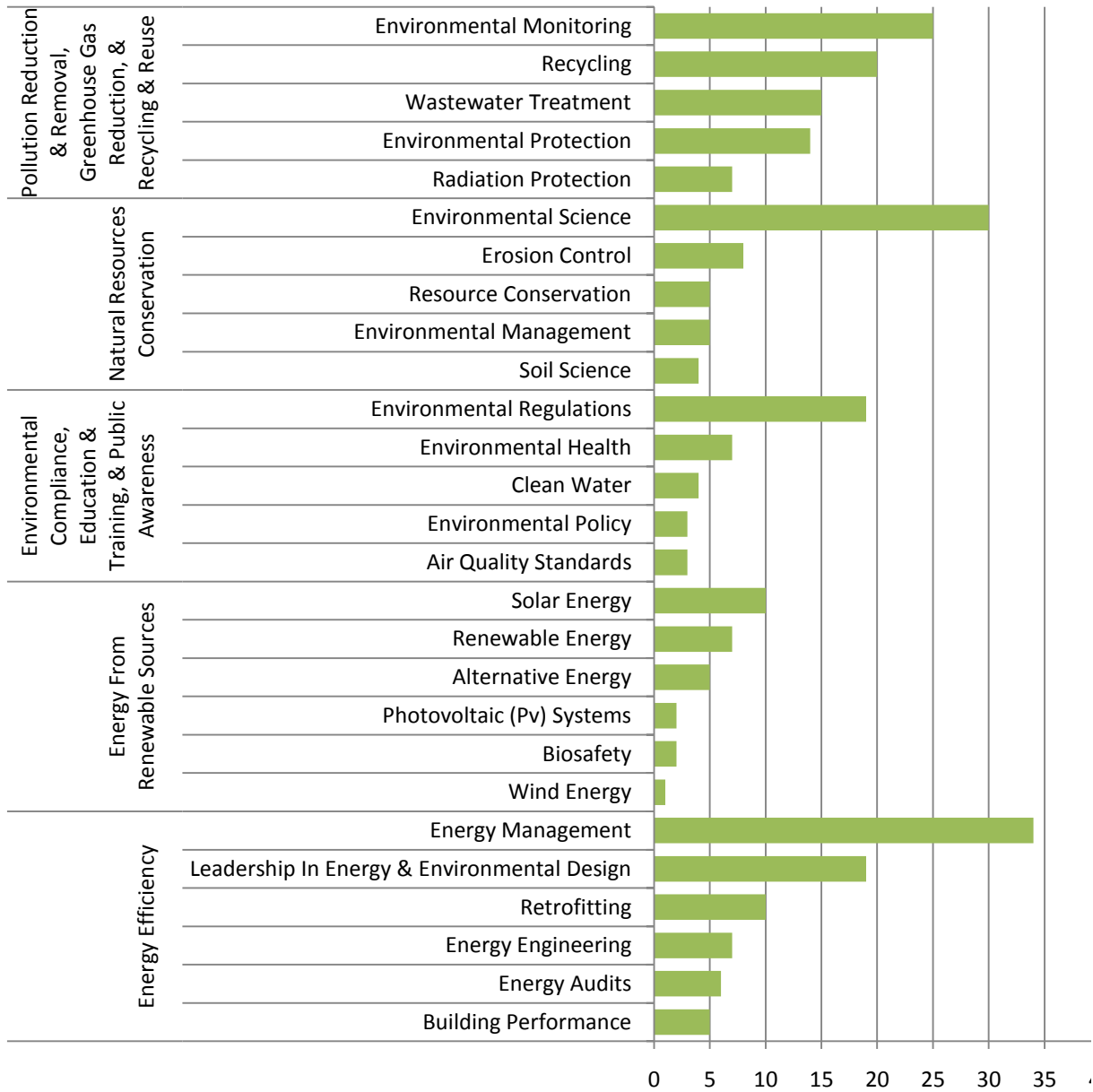
### Knowledge Content and Education for Green Job Vacancies

The knowledge content required for vacant green jobs varied widely by the type of job and level of education.

Among the lowest skill green jobs (those requiring a high school degree or less), the most common knowledge and skill requirements included recycling, environmental science and energy management.

Among the middle skill green jobs (those requiring some college or an Associate’s degree), the highest concentration of jobs required knowledge of energy management, environmental science and environmental monitoring.

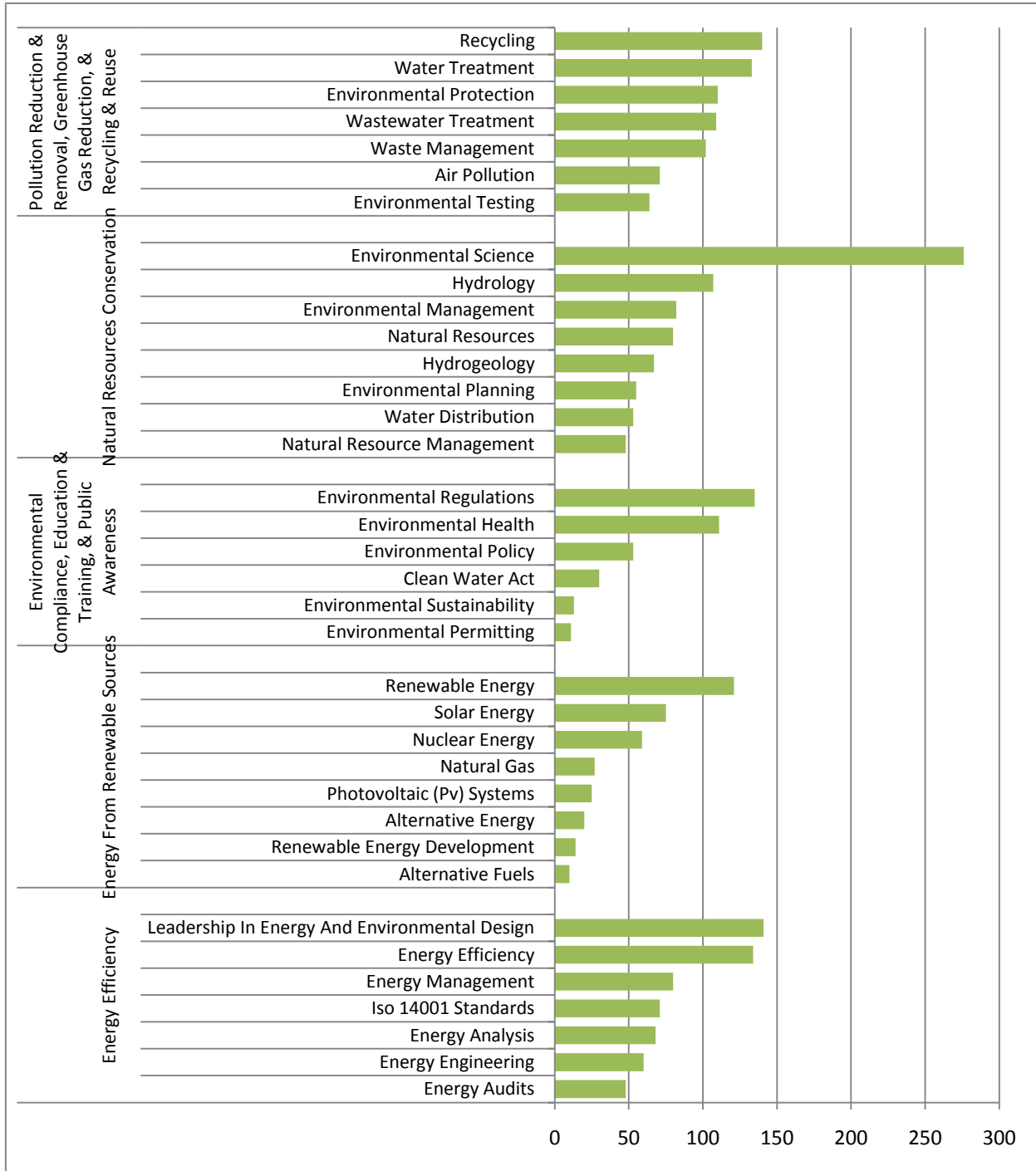
Figure 21: Number of Postings for Top Green Knowledge Content Areas for Jobs Requiring an Associate’s Degree or Some College



Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

Among the upper skill green jobs (those requiring a Bachelor’s degree), the highest concentration of jobs required knowledge of environmental science, recycling, environmental regulation and energy efficiency.

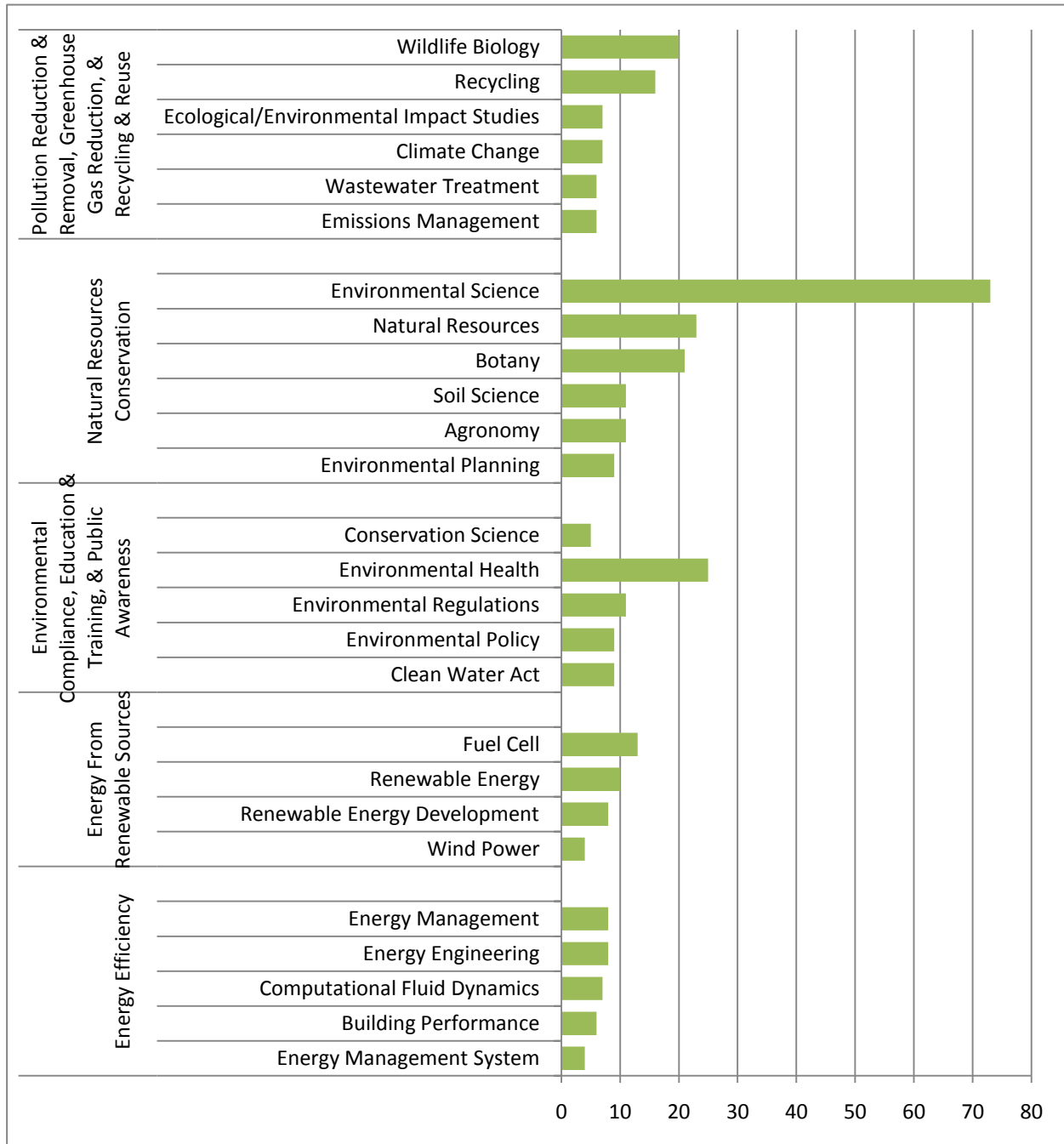
Figure 22: Number of Postings for Top Green Knowledge Content Areas for Jobs Requiring a Bachelor’s Degree



Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

Among the highest skill green jobs (those requiring a Master’s degree or higher), the highest concentration of jobs required knowledge of environmental science, natural resources, and environmental health.

Figure 23: Number of Postings for Top Green Knowledge Content Areas for Jobs Requiring at least a Master’s Degree



Source: Burning Glass Analytics & Real-Time Jobs Data, AZ, March 2010 to March 2011

## 2010-11 Job Vacancies in Arizona's Green Economy: The Bottom Line

The results of our analysis suggest a number of current themes about Arizona's green economy:

- ***Green jobs are found throughout Arizona, making up a small but significant percentage of overall job vacancies***

Of the estimated 402,119 unique jobs posted during the March 2010 to March 2011 period, 7,184 were openings for green jobs. This accounts for 1.8 percent of total job postings during that time period. Green job postings existed in the northern, central, and southern regions of the state at consistent rates, with a concentration of green and non-green employment opportunities in the population center of the central region. Of the five BLS green jobs categories, two accounted for a total of 61 percent of the job postings: Pollution Reduction and Removal, Greenhouse Gas Reduction, and Recycling and Reuse; and Natural Resources Conservation.

- ***A large number of the current green job postings frequently require previous experience, a high level of education, and certification.***

Employers are looking for workers with experience. About three-quarters of green jobs required at least 4 years of experience compared to about two-thirds of all other jobs. Educational attainment is also a significant factor in hiring for green jobs. During the March 2010 to March 2011 period, 76 percent of green jobs required a Bachelor's degree or a Graduate/Professional degree.

Overall, employers for green jobs are demanding applicants that have greater experience, higher education, and more specific technical skills than employers seeking workers for other occupations. The formal infrastructure of education, training, and certification is still developing for green-related jobs.

- ***Salaries are greater for experienced green workers.***

A significant portion of green job openings provided annual wages above the statewide median. The median wage for all jobs in Arizona based on the 2009 Occupational Employment and Annual Wage Estimates was \$32,215, whereas the median annual salary for green job openings during the March 2010 to March 2011 period was \$53,737.

- ***Green skills are increasingly in demand.***

The number of job postings classified as green trended upward for all five categories during the March 2010 to March 2011 timeframe. This illustrates the adoption of green skills throughout the economy in the state, which could be caused by a wide variety of factors. Should the demand for green skills continue to become more commonplace across industries, workers will need to ensure they are prepared for employment given the requirements found in most green job postings.