

# Green Jobs Come Into Focus

State's first comprehensive survey shows a growing role



**H**earing about or reading environmental news has become a part of daily life for most of us. Environmental issues capture radio, television, magazine, and newspaper coverage not only nationally, but in Alaska too. The environment has become an economic driver, promoting research and development along with creating demand for new products and advances in technology. This “greening” effect is changing the way we live and do business.

In most states, both private and public sectors are part of this new trend, especially in the areas of renewable energy and energy efficiency. Policy makers, educators, and economists have begun asking, how important is this growing sector of the economy? How many so-called “green jobs” are there? Is there an adequate workforce trained for these jobs? What education and training will workers need to gain the skills required for future work?

## Green Employment by Industry **1** Alaska, 2011

| Industry   | Estimated green jobs | As % of all green jobs | 3rd qtr 2010 employment | As % of industry employment |
|--|----------------------|------------------------|-------------------------|-----------------------------|
| Agriculture, Forestry, Fishing, and Hunting <sup>1</sup> | 205                  | 4.1%                   | 1,208                   | 17.0%                       |
| Mining, Quarrying, Oil and Gas                           | 125                  | 2.5%                   | 16,156                  | 0.8%                        |
| Utilities  | 110                  | 2.2%                   | 2,233                   | 4.9%                        |
| Construction of Buildings                                | 278                  | 5.6%                   | 5,698                   | 4.9%                        |
| Heavy and Civil Engineering Construction                 | 58                   | 1.2%                   | 4,540                   | 1.3%                        |
| Specialty Trade Contractors                              | 481                  | 9.7%                   | 9,341                   | 5.1%                        |
| Manufacturing  | 305                  | 6.1%                   | 19,040                  | 1.6%                        |
| Wholesale Trade  | 91                   | 1.8%                   | 6,666                   | 1.4%                        |
| Retail Trade   | 225                  | 4.5%                   | 36,898                  | 0.6%                        |
| Transportation and Warehousing                           | 53                   | 1.1%                   | 21,414                  | 0.2%                        |
| Information  | 0                    | 0.0%                   | 6,483                   | 0.0%                        |
| Financial Activities                                     | 91                   | 1.8%                   | 15,385                  | 0.6%                        |
| Professional, Scientific, and Technical Services         | 1,013                | 20.4%                  | 14,209                  | 7.1%                        |
| Administrative and Support Services                      | 17                   | 0.3%                   | 10,713                  | 0.2%                        |
| Waste Management and Remediation Services                | 367                  | 7.4%                   | 1,626                   | 22.6%                       |
| Educational Services, Private                            | 37                   | 0.7%                   | 2,065                   | 1.8%                        |
| Health Care and Social Assistance, Private               | 5                    | 0.1%                   | 39,891                  | 0.0%                        |
| Leisure and Hospitality                                  | 321                  | 6.5%                   | 37,399                  | 0.9%                        |
| Other Services (Except Government)                       | 158                  | 3.2%                   | 12,174                  | 1.3%                        |
| Local Government   | 1,033                | 20.8%                  | 30,996                  | 3.3%                        |
| <b>TOTAL</b>   | <b>4,973</b>         | <b>100.0%</b>          | <b>294,135</b>          |                             |

<sup>1</sup> Excludes the self-employed and most commercial fishermen and agricultural workers.

Note: All numbers exclude state and federal employment. Percentages won't sum due to rounding.

Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section








Although Alaska has a number of renewable energy and energy efficiency projects already built and more are on the horizon, no formal study had been done to measure this emerging part of the economy, until now.

## Green jobs defined


























In 2010, the Alaska Department of Labor and Workforce Development's Research and Analysis Section surveyed 4,826 private and local government firms. R&A received a response from 2,979 of these firms, with 375 reporting they employed at least one worker in a green job. R&A defined a green job as providing a good or service in at least one of seven categories:

- Renewable energy

- Energy efficiency
- Greenhouse gas reduction
- Pollution prevention, reduction, and cleanup
- Recycling and waste reduction
- Agricultural and natural resources conservation
- Education, compliance, public awareness, and training

| Icons Key   |   |
|---|---|
|    | Renewable energy                                      |
|    | Energy efficiency                                     |
|    | Greenhouse gas reduction                              |
|    | Pollution prevention, reduction, and cleanup          |
|  | Recycling and waste reduction                         |
|  | Agricultural and natural resource conservation        |
|  | Education, compliance, public awareness, and training |

## 2 Top Green Occupations by Employment Alaska, 2011

| Occupation  | Estimated green jobs | 3rd qtr 2010 employment | % of all green jobs | Categories of work*   |
|---|----------------------|-------------------------|---------------------|---|
| Tour Guides and Escorts   | 440                  | 1,133                   | 8.9%                |    |
| Carpenters  | 275                  | 3343                    | 5.5%                |   |
| Fishers and Related Fishing Workers <sup>1</sup>                              | 266                  | 605                     | 5.4%                |    |
| Environmental Scientists and Specialists, Including Health                    | 254                  | 401                     | 5.1%                |   |
| Retail Salespersons   | 247                  | 11,520                  | 5.0%                |    |
| Construction Laborers   | 212                  | 5461                    | 4.3%                |    |
| Zoologists and Wildlife Biologists  | 166                  | 254                     | 3.3%                |   |
| Environmental Science and Protection Technicians, Including Health            | 158                  | 158                     | 3.2%                |   |
| Geological and Petroleum Technicians  | 144                  | 649                     | 2.9%                |    |
| General and Operations Managers   | 139                  | 3,780                   | 2.8%                |    |
| Roofers   | 111                  | 324                     | 2.2%                |    |
| Environmental Engineering Technicians   | 93                   | 253                     | 1.9%                |    |
| Ship Engineers  | 93                   | 208                     | 1.9%                |    |
| Service Unit Operators, Oil, Gas, and Mining                                  | 63                   | 660                     | 1.3%                |    |
| Environmental Engineers   | 60                   | 177                     | 1.2%                |    |
| Hazardous Materials Removal Workers   | 58                   | 327                     | 1.2%                |    |
| First-Line Supervisors/Managers of Construction Trades and Extraction Workers | 52                   | 1,134                   | 1.1%                |    |
| First-Line Supervisors/Managers of Farming, Fishing, and Forestry Workers     | 52                   | 125                     | 1.1%                |   |
| Office Clerks, General  | 51                   | 6,236                   | 1.0%                |   |
| Power Plant Operators   | 49                   | 441                     | 1.0%                |    |

<sup>1</sup>Excludes most commercial fishermen

Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

\*See the top of this page for icon key.

## How many green jobs are there?

R&A identified 145 individual green occupations with reported employment in Alaska. Total green employment was estimated at 4,973 jobs<sup>1</sup> among 1,552 employers during 2010, with green work representing 1.7 percent of Alaska's private and local government employment. (See Exhibit 1.)

The results are consistent with existing research that suggests green jobs do not represent an industry of their own; rather, they are spread across all industries where employers pursue more environmentally sustainable concepts.

## The seven categories

*Renewable energy* accounted for 13 percent (639) of all positions.<sup>2</sup> These jobs were found primarily in utilities and local government.

*Energy efficiency* accounted for 39 percent (1,954) of all positions. These jobs were found primarily in construction.

*Greenhouse gas reduction* accounted for 9 percent (466) of all positions. These jobs were found primarily in utilities and mostly in jobs helping the transition to power sources with less carbon pollution.

*Pollution prevention, reduction, and cleanup* made up 33 percent (1,620) of all green positions. These jobs were found primarily in waste management and remediation.

*Recycling and waste reduction* accounted for 32 percent (1,611) of all positions. These jobs were found primarily in waste management and local government, but this category spanned the largest cross-section of industries.

*Agricultural and natural resources conservation* accounted for 26 percent (1,313) of all positions. These jobs were found primarily in agriculture and in professional and scientific services.

*Education, compliance, public awareness, and training* accounted for 35 percent (1,740) of all positions. These jobs were found primarily in professional and scientific services.

## Shades of green

Most workers in green jobs don't spend 100 percent of their time producing a green product or service.



Angoon residents install a solar power panel on a home as part of the Sustain Angoon Project. Photo courtesy of Central Council, Tlingit and Haida Tribes of Alaska.

Survey data support the idea of "shades of green." Many workers have accepted new environmentally conscious roles that supplement their primary workload. In other cases, workers have found themselves in essentially new occupations where the green work differs significantly from that of their nongreen counterparts.

By taking the average percentage of time workers in an occupation spend on green tasks, R&A estimated the various shades of green among industries and occupations. The results show that 8 percent of green occupations involved 50 percent or more time on average performing work in one of the green categories.

## Industries

The largest concentrations of green jobs were in local government at 1,033 jobs (20.8 percent); and in professional, scientific, and technical service organizations at 1,013 jobs (20.4 percent).

Among industries, local and tribal governments have the largest number of green jobs. In a rural community, people often wear many hats in addition to their regular jobs. It is not unusual to find seemingly unlikely combinations, such as cooks who also run the community compost program.

The Environmental Protection Agency's Indian General Assistance Program had a big impact in Alaska by providing funds for tribal governments to address solid and hazardous waste management, recycling,

# 3 Top Green Jobs by Green Score

## Alaska, 2011

| Occupation  | Estimated green jobs | 3rd qtr 2010 employment | Green score | Categories of work** |
|---|----------------------|-------------------------|-------------|----------------------|
| Environmental Science Teachers, Postsecondary   | *                    | *                       | 10          |                      |
| Wind Turbine Service Technicians  | *                    | *                       | 10          |                      |
| Materials Scientists  | *                    | *                       | 9           |                      |
| Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders                       | *                    | *                       | 8           |                      |
| Environmental Science and Protection Technicians, Including Health                          | 158                  | 158                     | 8           |                      |
| Zoologists and Wildlife Biologists  | 166                  | 254                     | 7           |                      |
| Boilermakers  | 30                   | 44                      | 5           |                      |
| Conservation Scientists   | 23                   | 28                      | 5           |                      |
| Foresters   | *                    | *                       | 5           |                      |
| Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic | 14                   | 30                      | 5           |                      |
| Power Distributors and Dispatchers  | 17                   | 34                      | 5           |                      |
| Ship Engineers  | 93                   | 208                     | 5           |                      |
| Chemical Engineers  | 40                   | 48                      | 4           |                      |
| Environmental Scientists and Specialists, Including Health                                  | 254                  | 401                     | 4           |                      |
| Fishers and Related Fishing Workers <sup>1</sup>  | 266                  | 605                     | 4           |                      |
| Environmental Engineers   | 60                   | 177                     | 3           |                      |
| Farm and Home Management Advisors   | *                    | *                       | 3           |                      |
| First-Line Supervisors/Managers of Farming, Fishing, and Forestry Workers                   | 52                   | 125                     | 3           |                      |
| Geological and Petroleum Technicians  | 144                  | 649                     | 3           |                      |
| Natural Sciences Managers   | 17                   | 28                      | 3           |                      |
| Sales Engineers   | 20                   | 45                      | 3           |                      |
| Tour Guides and Escorts   | 440                  | 1,133                   | 3           |                      |
| Travel Guides   | *                    | *                       | 3           |                      |
| Biological Technicians  | 7                    | 59                      | 2           |                      |
| Economists  | *                    | *                       | 2           |                      |
| Environmental Engineering Technicians   | 93                   | 253                     | 2           |                      |
| First-Line Supervisors/Managers of Landscaping, Lawn Service, and Groundskeeping Workers    | 13                   | 65                      | 2           |                      |
| Logging Equipment Operators   | 11                   | 50                      | 2           |                      |
| Roofers   | 111                  | 324                     | 2           |                      |
| Soil and Plant Scientists   | *                    | *                       | 2           |                      |
| Training and Development Specialists  | 32                   | 156                     | 2           |                      |

<sup>1</sup>Excludes most commercial fishermen.

An asterisk (\*) means the data are suppressed due to confidentiality and/or reliability reasons.

Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

\*\*See page 16 for icon key.

# Green Occupations With Special Requirements

By training category, Alaska, 2011

# 4

| Training category                                   | % reported | Examples  |
|---|------------|---|
| Renewable Energy Certification                      | 3.2%       | Wind Turbine Operation and Maintenance (O&M), Calibrating solar panels  |
| Cleanup and Abatement Certification                 | 15.5%      | HAZWOPER Oil Spill Response Training                                    |
| Equipment Operators License/CDL                     | 4.9%       | Class A CDL Hazardous Materials Endorsement (HME)                       |
| Energy Efficient Construction/LEED (Weatherization) | 16.4%      | LEED Certified Building Energy Efficiency Standard (BEES)               |
| Other Certification                                 | 10.4%      | Certified Erosion and Sediment Control Lead (CESCL), Certified Forester |
| Prior Experience/On-the-Job Training                | 17.8%      | Organic Farming Techniques, Knowledge of Regulations                    |

Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

and renewable energy.

Professional and scientific services came in a close second for number of green jobs. Work in this industry is broad and instrumental in development of renewable energy, energy efficiency, and sustainability education.

The highest concentration of green jobs was in the waste management and remediation industry. Its percentage of statewide employment is one of the smallest, but occupations in this sector are critical to supporting the state's environmental health. Many of this industry's jobs are fundamentally green because they deal overwhelmingly with handling waste and mitigating the effects of pollution.

Green jobs are found across almost all industries, but this survey didn't uncover any in the information industry, and found few in health care and administrative support. These results are in line with other states' research.

## Occupations

R&A asked employers to identify occupations that fell into at least one of the seven green categories. Those who responded reported:

- The total number of workers in these jobs
- How many performed green work
- The percentage of time each employee spent doing green work
- The green categories of work performed

By employment numbers, the top 25 green occupations represent 66 percent of green employment in the state. Tour guides and escorts are the largest

occupation by green employment. (See Exhibit 2.) Alaska has a highly seasonal tourism industry that depends on the state's natural beauty and resources. The survey shows that slightly less than 38 percent of tour guides and escorts educate the public on sustainable practices and increase public awareness of sustainability concepts.

As a major occupational group, construction and extraction occupations have the largest total employment and include eight of the top 25 green occupations. This result matches other states' data, and reflects a subset of the construction industry that focuses on home weatherization and energy efficiency upgrades.

The green occupations with the highest employment fall primarily into the energy efficiency category, which is followed closely by education.

## Green score

An occupation's green score is the weighted average of the percentage of time spent on green activities within a given occupation. The numbers are rounded up and indexed between 1 and 10, with 10 representing 100 percent of work qualifying as green, 9 representing 90 percent, and so on.

Thirty-five green occupations scored greater than 2. (See Exhibit 3.) Occupations with the most time spent on green activities (for example, wind turbine technicians) often have the lowest total employment.

It is also important to look at an occupation's green employment percentage to assess whether green is prevalent throughout the group or in just a fraction, represented by a few companies producing a

specific green product. This distinction is useful for determining how to discuss and target green occupations in the state.

Carpenters and construction laborers are two occupations ranking high in green employment and low on percentage of time spent in green activities. Both are large occupation groups doing important home weatherization work; however, targeting all of these positions for training may not be the best approach. It might make more sense to focus on businesses employing carpenters or construction laborers whose primary purpose is a green product or service.

On the other end of the spectrum, a wind turbine service technician's work is 100 percent green. Even though employment in this occupation is extremely low, any training would go directly toward producing green goods and services.

When grouped by green score, occupations are primarily performing work in the agriculture and natural resources category, followed closely by pollution reduction, then education.

Taken together, the employment estimates and green scores provide a more robust look at the effects of green work in Alaska. Jobs with high employment and low green activity, as well as jobs with low employment and high activity, are both critical to development of the state's green infrastructure. Understanding their differences will increase the efficacy of developments targeting these two groups and any combination.

## Training, skills, and certifications

Employers reported that 46 percent of green occupations require special skills, certificates, or licenses to perform the work. (See Exhibit 4.) This survey did not determine whether these requirements are a condition of hire.

About 3 percent of green jobs required renewable energy certification or training, and these requirements were primarily in the utilities and local government industries. Employers reported that 5 percent of green jobs required an equipment operator or commercial driver's license. A CDL was often paired with a Hazardous Materials Endorsement.

By far the most prevalent certification reported was the Hazardous Waste Operations and Emergency Response Standard, or HAZWOPER. Cleanup and abatement certification was required by 15.5 per-

cent of green occupations, with the HAZWOPER certification accounting for approximately half of the responses within the category. Energy efficient construction and certification in Leadership in Energy and Environmental Design, or LEED, was the largest specific requirement reported, at 16 percent of all occupations.

Other certifications at 10 percent and prior experience or on-the-job training at 18 percent captured a wide breadth of requirements that did not contain enough responses to stand on their own. Other certifications included occupations requiring a bachelor's degree specific to green work. Exhibit 4 provides examples of reported requirements.

## Recruiting green workers

Recruiting and retaining green workers is not currently an issue for 80 percent of all green jobs. Employers who have had difficulty cite a lack of workers in Alaska (6 percent), a lack of required green skills (4 percent), and other reasons (4 percent).

As a group, green occupations have a nonresident hire rate of 16 percent, compared to 20 percent across all private and local government employment. Occupations with the most difficulty recruiting due to lack of workers in Alaska usually reported nonresident hire rates above the rate for all green occupations.

These data support the conclusion that green jobs are an emerging component across all industries and occupations in Alaska. In some cases, workers have been doing green work without that previous classification, and their industries are well established. In other cases, occupations such as power plant operators integrate investments in renewable resources while supporting existing traditional power generation infrastructure.

The Alaska Green Jobs Report is available in its entirety on R&A's Web site: <http://labor.alaska.gov/research/greenjobs/greenjobs.htm>. The full report includes additional information, methodology, and a complete listing of the 145 occupations in which Alaskan employers reported green employment.

## Notes

<sup>1</sup>Except where otherwise noted, all employment references in this report only reflect private and local government employment. See the methodology appendix and the state government chapter in the full report online for a discussion of the challenges of reporting public green employment.

<sup>2</sup>An employer can classify workers in more than one category. The sum will exceed the total number of green jobs.