Wind farms like this one require trained and qualified workers to manufacture, construct, operate, and manage these facilities.

Courtesy of Iberdrola Renewables Inc./PIX15180

Wind Power Career Chat

Overview

Students will learn about careers in the wind energy industry. Wind energy, both land-based and offshore, is expected to provide thousands of new jobs in the next several decades. Wind energy companies are growing rapidly to meet America's demand for clean, renewable, and domestic energy. These companies need skilled professionals.

Trained and qualified workers manufacture, construct, operate, and manage wind energy facilities. In addition, the nation will continue to need skilled researchers, scientists, and engineers to plan and develop the next generation of wind energy technologies. Wind power careers will require educated people from a variety of areas.

Wind Industry Professionals

Interviews with professionals working in the wind industry demonstrate the diversity of jobs and the paths that led them to their current work. Beyond their passion for renewable energy, wind industry professionals share a universal theme: Education has played a significant role in their abilities to meet career opportunities.

PIX15756. PIX05097, PIX04141

Kevin Rackstraw

Developer, Rackstraw Consulting LLC

Courtesy of Kevin Rackstraw/PIX18264

1. How did you become interested in wind energy?

I wanted to work in a "green" technology, and I happened to see a job posting to run the American Wind Energy Association's (AWEA's) international programs. I hadn't thought about wind power at all, although I had thought about solar. Once I'd researched it, it seemed really promising and exciting. The AWEA job fit my prior background working internationally, so I was hired and was off and running in the wind biz.

2. How does your job contribute to the wind industry?

I think of developers as the "front line" of the wind industry's interface with the public. We are often the first ones to introduce people to the technology, and we are at a highly sensitive interface with communities, officials, and the public where expectations are set and impressions are made. A good developer can create an atmosphere in which "win-win" scenarios can be found and put into practice. A good developer also creates designs that are as compatible with the surrounding community and environment as possible.

3. Describe your key activities and responsibilities.

Developers oversee the process that starts with finding an appropriate site (prospecting) to negotiating with landowners (site control) to permitting and interfacing with community members and leaders (community relations). Developers are also engaged in the preliminary site engineering and design because you need that information to present the project to landowners, community members, officials, and investors and to ensure that you can meet not only the letter of the law but also best management principles. I am a relatively experienced developer, so much of my time is spent managing the "functional" teams in site control, permitting, community relations, wind measurement, and construction. Sometimes these are internal staff, and sometimes they are external consultants. Managing the dozens of people who might work on a given project, and who are usually working on multiple projects as well, can be quite a challenge.

Creating and managing budgets is another important component of my work, as well as reporting, because the development company's senior management needs to know the risks and liabilities undertaken by the company. Development is expensive and risky. No good development company survives for long in this business without accurate and frequent reporting on activities, schedules, and budgets.

4. Give us an example of one of your successes.

I worked for more than 8 years on one project in western Maryland, a 70-megawatt project called Criterion. It is a complex project spread over 9 miles of ridgeline, carefully designed to avoid or minimize impacts on sensitive habitat and surrounding landowners and meeting some of the toughest construction standards in the United States. Construction began on that project in March 2010, and it will be the first wind project in Maryland.

5. What is the most rewarding part of your job?

The most rewarding part is knowing that I am building clean power plants that make a difference for both the local and global environments.

6. What education is needed for this job?

Developers come from a wide variety of educational backgrounds, so a particular degree or training isn't necessary (although today there are more formal training programs for wind energy, and some of those schools have development-focused curricula as well). I have a liberal arts education combined with a master of business administration (MBA) degree. Many developers are generalists with a college degree, and a good liberal arts grad usually has the critical-thinking and problem-solving skills needed for development careers. People skills are very important, and not all college grads have those unless it was part of their programs (for example, communications). Some development jobs require a technical background, such as grid interconnection specialists who need electrical engineering backgrounds, while others such as site control tend to use skills that are found in the real estate business (leasing, negotiations with landowners, etc.). One of the best training grounds for the wind industry is an employer like GE, which rotates its trainees in a wide variety of positions for maximum exposure to the variety of the business, but the value of joining a small start-up company can't be overestimated either because you also have to perform different jobs because you don't have the luxury of a large staff.

7. What other jobs did you have that led to your current position?

Prior to entering the wind industry, I helped U.S. companies export to foreign markets, a skill that the U.S. industry seeks. I'm currently a solo consultant, and it is my broad experience and many industry contacts from more than 18 years in the business that enable me to stay busy.

8. Besides being smart, creative, hardworking, and a team player, what other qualities contribute to success in this kind of job?

I hire people for development positions who are honest, organized, and patient; have integrity; can present well but can also listen (including to opponents); and can really connect with people. Members of the communities we work in can easily spot phonies, and if they don't trust you or don't find you credible, then you're in a hole to start with and may never get out. You have to like people and genuinely want a good

outcome for the people in the communities or you're going to have trouble. If you aren't comfortable talking to people, then I've found that extra phone call or visit doesn't happen, and the important relationships in a wind project don't work as well as they should.

Christine Watson Mikell

Senior Project Development Manager, Wasatch Wind Intermountain

Courtesy of Jeff Mikell/PIX18275

1. How did you become interested in wind energy?

I was in graduate school working on my MBA degree when I found a part-time job with the Utah Energy Office. When I graduated, they asked if I would be interested in managing their new wind energy program. I had several job offers, but I felt this was the one that would have the greatest impact to society: a career in clean energy.

2. How does your job contribute to the wind industry?

After my stint with the Utah Energy Office, I worked as a consultant to the wind industry. One of my clients was Tracy Livingston, who founded Wasatch Wind. He and I worked on the development of Utah's first wind farm at Spanish Fork. Since Spanish Fork, I have managed the development of many wind farms for the company, including finding a site and permitting meteorological towers to measure the wind; working on leases and interconnection and power purchase agreements; and working with engineering, procurement, and construction contractors to build the wind farms.

3. Describe your key activities and responsibilities.

I manage a staff of specialists to get the project to commercial operation date, review contracts, manage timelines and budgets, and work with the public (counties, Bureau of Land Management, environmental groups, and state and federal agencies).

4. Give us an example of one of your successes.

I was part of Utah's first wind farm that is located at the mouth of a very well-traveled canyon—the gateway for southeastern Utah tourists.

5. What is the most rewarding part of your job?

My most rewarding experience is being able to point to the Spanish Fork Wind Farm and tell my kids that their mom has in a small way contributed to a more progressive and cleaner future for them and their children.

6. What education is needed for this job?

I have a bachelor of engineering degree in civil and environmental engineering from Vanderbilt University and a master of business administration degree from the University of Utah. I think anyone could do my job who is motivated and intelligent, has attention to detail, is an excellent problem-solver, has the ability to have good working relationships with many constituents, and has a financial background. Having a business, engineering, or law degree would be extremely helpful for this job.

7. What other jobs did you have that led to your current position?

I was a math teacher at a private boarding school. I worked in Thailand as an environmental educator on a renovated rice barge, and I worked for the State of Utah. These positions were extremely valuable; I learned to relate to people of all levels, from kids to the Governor's office. Living in Thailand gave me a greater understanding of the world. I recommend that everyone spend time being a minority!

8. Besides being smart, creative, hardworking, and a team player, what other qualities contribute to success in this kind of job?

One can get beaten down by many as you try to develop a wind farm—you can never get everyone excited or even lukewarm about your project. Perseverance and a thick skin are paramount in overcoming the hurdles of wind development.

Tom Gray

Director of Communication, American Wind Energy Association

Courtesy of Carl Levesque, American Wind Energy Association/PIX17978

1. How did you become interested in wind energy?

From a very early age, I was interested in politics. I succeeded in wrangling a job with a Congressman. I wanted to work on defense because it was at the height of the Cold War and that was the most important issue at the time.

Unfortunately, or perhaps fortunately, he wasn't on any of the right committees, and the closest I could get to the strategic issue of national security was energy. He was on a subcommittee of the House Science and Technology Committee that dealt with renewable energy research and development. At heart, I am a numbers guy, and so one of the first things I did was dig into the numbers to get a sense of the scale of renewable energy resources. I was surprised to find they were vast. I spent a few years working on renewable energy, and when I left Capitol Hill, a job opened up at the American Wind Energy Association (AWEA).

2. How does your job contribute to the wind industry?

The wind energy industry has a great story to tell: It produces energy with no mining, drilling, air pollution, water pollution, global warming pollution, or hazardous waste. It uses virtually no water while its conventional competitors use huge quantities. It also generates new manufacturing jobs. The more people who become aware of that story, the more the industry will be able to attract the political support that it needs to grow. My job is to find ways to tell that story.

3. Describe your key activities and responsibilities.

- Generating content for Twitter that reflects AWEA's key messages of job growth, industry growth, and success stories (more than 4,000 followers in this new medium of communication)
- Overseeing AWEA's Facebook page (15,000 fans) and Power of Wind public advocacy Web site (mailing list of 35,000)
- Generating content for and overseeing AWEA's blog
- Working with substantive experts at AWEA to develop fact sheets and responses to misinformation about wind (there is a steady stream of this owing to false information deliberately propagated via the Web)
- Overseeing AWEA's weekly and monthly newsletters (Wind Energy Weekly and WindLetter, respectively) and other publications.

4. Give us an example of one of your successes.

I founded Wind Energy Weekly shortly after becoming AWEA's executive director. Its purpose was to provide a factually accurate trade publication that would enhance the credibility of AWEA and the wind energy industry. We've released almost 1,400 issues. I also came up with the name WINDPOWER for AWEA's annual conference.

5. What is the most rewarding part of your job?

Mentoring staff members I supervise and helping them grow, gain confidence, and become more and more valuable contributors to AWEA's mission.

6. What education is needed for this job?

No specific education is needed, although we look for someone with several years of experience writing and editing, ideally in the energy or environmental fields, and a willingness to assume responsibility. I have a bachelor of arts (BA) degree from Haverford College (Pennsylvania) and a juris doctor (JD) degree from Catholic University of America.

7. What other jobs did you have that led to your current position?

- Three years as a reporter for weekly and daily suburban newspapers
- Two years as press secretary for a state political party
- Five years as a legislative assistant to a U.S. Congressman.

8. Besides being smart, creative, hardworking, and a team player, what other qualities contribute to success in this kind of job?

You forgot handsome. That aside, I would say it's very important for me to have a job that contributes to some worthwhile, ideally inspiring, social goal. That makes it easy to work long hours, contribute my best efforts, and maintain the attitude that is required for success.

Amanda Ormond

Owner, Ormond Group LLC and Clean Energy Advocate

Courtesy of Amanda Ormond/PIX17981

1. How did you become interested in wind energy?

I worked for the state energy office in Arizona for many years and recognized that in addition to energy efficiency, the country needed to start developing cleaner energy sources. When I started my own consulting company, I decided to concentrate on renewable energy development.

2. How does your job contribute to the wind industry?

I work to create wind energy markets through the development of supportive policy and education. Renewable energy standards and other such policies create a stable market that encourages private companies to invest. I also strategize with other clean energy advocates throughout the West to create a compelling vision for energy development that will provide for growth while protecting our wild and beautiful places.

3. Describe your key activities and responsibilities.

I work directly with policy makers (particularly public utility commissioners) and utilities to educate them about the benefits of wind energy, how to deal with its variability, and what policies would support greater wind development. I also work with local government officials so they can understand and develop the ordinances that will protect citizens and encourage wind development.

4. Give us an example of one of your successes.

With the help of other advocates, I worked to get Arizona to raise its Renewable Portfolio Standard from 1.1% to 15% by 2025. I also encouraged Arizona's largest utility to file a resource plan that voluntarily doubles the higher renewable energy standard.

5. What is the most rewarding part of your job?

I enjoy working with other advocates and wind supporters on common goals. It is extremely rewarding to work on long-term goals that should pay dividends long after I am gone.

6. What education is needed for this job?

You need a basic understanding of science, good communication skills (both written and verbal), and a knowledge of public policy.

7. What other jobs did you have that led to your current position?

Being director of the state energy office allowed me to build strong relationships with energy professionals throughout the region.

8. Besides being smart, creative, hardworking, and a team player, what other qualities contribute to success in this kind of job?

Qualities that would contribute to success include the ability to get the message across to different audiences, to translate technical information to a non-technical crowd, and to treat everyone with respect and have fun while you work.

Jerry Bianchi

Owner, Bianchi Tech Services

Courtesy of Jerry/PIX17988

1. How did you become interested in wind energy?

I started in the renewable energy industry in 1976 working with Rankine cycle systems using waste, heat, solar, and geothermal energy sources. Over the years, my interests expanded into other areas of renewable energy. I realized that wind turbines were similar to Rankine cycle systems. The difference: Rankine cycle turbines were high speed and used gear reduction to generator speed while wind turbines were slow speed gearing up to generator speed. The control philosophy (which was my area of expertise) was also very similar.

2. How does your job contribute to the wind industry?

One of the major problems with small wind turbines is the high installation costs. Most installations require a large amount of time and money for taking soil samples and hiring an engineer to design a foundation and provide wet-stamped drawings to local building inspectors. Our goal was to develop a foundation kit that would meet all Class 1 to 5 soil requirements and to provide drawings and all components except the concrete. Our motto is, "We supply everything and no trips to Home Depot."

3. Describe your key activities and responsibilities.

My first job at AnemErgonics was to instrument and test the initial foundation designs and develop efficient production procedures. Now most of my time is spent training and helping customers install wind turbines.

4. Give us an example of one of your successes.

My most satisfying successes were during my tenure at the National Renewable Energy Laboratory when I was involved in the installation of wind and hybrid electric power plants in China and Mexico. I designed, built, and installed the instruments and data acquisition systems to evaluate the plant operation.

5. What is the most rewarding part of your job?

Seeing the smile on a customer's face when his turbine comes online.

6. What education is needed for this job?

When I started 50 years ago, an apprenticeship program or on-the-job training was the norm. Now that's no longer true. A well-rounded education program is important. Think of school as a toolbox...you add tools with every class. Sometimes it may appear that you may never use some of the tools, but often you will be confronted with a task and you will remember the tool in the toolbox.

7. What other jobs did you have that led to your current position?

My career path started in the aerospace industry working as an electro/mechanical technician. However, over time it involved a higher focus on electrical controls and instrumentation. Later, during my 17-year tenure at Barber Nichols Engineering, my work required more experience in electrical power. My main focus was field engineering, which required a multitude of skills to address any issues that might surface.

8. Besides being smart, creative, hardworking, and a team player, what other qualities contribute to success in this kind of job?

There are two things that I think are important to success no matter what career field you choose. First is a commitment and belief in what you want to do. In other words, I don't recommend entering a career field for the pay scale or because it's the "in" thing (although I always seemed to be at the

forefront of technology). Instead, choose a career field that is near and dear to your beliefs. Those who have a love for their work will be far more successful than those who choose a career field for the financial opportunities. So if you want to succeed, you must evaluate your likes and dislikes.

Second, in addition to keeping up with the technology in your field, it's important to broaden your range of expertise. Too often we fall into a comfort zone where we become pigeonholed. Constantly evaluate where you are and where you want to be in the future.

Steve Reutcke

Vice President, RES Americas Construction Projects for the North-Central and Northeast Regions

Courtesy of Steve Reutcke/PIX17987

1. How did you become interested in wind energy?

I started working in the energy construction industry while in graduate school, where I studied clean-coal technology. I was initially hired by an electric utility to oversee nuclear power plant construction and later managed nuclear waste cleanup projects. I migrated into wind energy after deciding to get back into renewable energy, and a job offer led me to Texas to manage the construction of a wind farm. To date I've managed the construction of almost 1 gigawatt of wind energy projects.

2. How does your job contribute to the wind industry?

My job is to manage the design and construction of the wind farm. This involves working with developers, engineers, construction companies, and turbine manufacturers to a) plan the site; b) design and build the roads to allow deliveries of steel, concrete, and the turbines; c) design and build the foundations on which the turbines sit; d) design and install the electrical collection system, which gathers the electricity generated by the wind turbines; e) design and build the substation, which will increase the electrical output of the turbines to a voltage suitable for transmission to the cities that will use the wind power; and f) erect and commission the wind turbines. My job ends when the wind farm is turned over for operation.

3. Describe your key activities and responsibilities.

As vice president of construction, my responsibilities are to direct and manage the construction of from two to five wind farms during any year. Each wind farm is managed by a project manager who is responsible for all construction activities on a project site. Their success and mine is measured by the safe, on-time, and cost-efficient management of each project.

4. Give us an example of one of your successes.

The biggest focus of a construction professional is safety. A wind farm typically employs between 150 to 250 construction workers and involves various heavy equipment that presents a dangerous workplace. To me, the most successful project is one in which every worker goes home safely each night to his or her family. If I can do this, construct the project according to my customer's schedule and quality requirements, and generate a profit for my company in the process, I have been successful.

5. What is the most rewarding part of your job?

There are many aspects of my job that are rewarding. I gravitated to math and engineering in college because I liked to solve problems, and I think I gravitated to construction after college for the same reason. In construction, each day presents a series of challenges that require problem-solving because no matter how well you design on paper, something always comes up that requires a new resolution. In my role now, I coach my project managers to come up with the answers. It makes for a busy but rewarding work day.

6. What education is needed for this job?

Most individuals in my role have a college degree in engineering, construction management, or business. I have also met many successful construction company owners who went to work in the industry right out of high school and have built successful businesses after spending 10 years or more learning the construction business. Clearly the best combination is both education and experience. I have earned a bachelor of arts (BA) degree and a master of science (MS) degree from Southern Illinois University and an MBA degree from the University of Illinois - Chicago. I also completed the Executive Business Program at the University of Cincinnati.

7. What other jobs did you have that led to your current position?

I started working at 15 as a dishwasher and never stopped, even through college, where I held jobs as a warehouse worker, bus driver, and engineering graduate assistant. After college graduation, I started as a construction inspector at a nuclear power plant and received increasingly more responsible roles as a quality assurance supervisor, a quality manager, an engineering coordinator, an engineering manager, a project manager, and finally a project director before earning my current role. Along the way, I owned a design and construction business for 6 years.

8. Besides being smart, creative, hardworking, and a team player, what other qualities contribute to success in this kind of job?

Never stop learning. I have been working in construction for more than 30 years, and I am still learning daily how to perfect my art.

John Wade

Owner, John Wind Consultant LLC and Meteorologist

Courtesy of Helen Wade/PIX18009

1. How did you become interested in wind energy?

I wanted to work in applied meteorology, and I was always interested in the relationship between climate and plants. Working on a study that used vegetation as an indicator of the strength of the wind really intrigued me.

2. How does your job contribute to the wind industry?

My job is to find good wind locations, measure the wind, evaluate the project energy potential, and determine which wind turbine will work best in a particular location. I also have been involved in forecasting wind project output.

3. Describe your key activities and responsibilities.

The key activities are going to the field and, in a car or small airplane, looking for windy locations (prospecting), selecting places to measure the wind (micrositing), collecting that data, assuring the data quality, analyzing the data, and writing a design projected output report.

4. Give us an example of one of your successes.

Whenever I fly across the United States and look out airplane windows, I often see wind farms that I have been involved with at some stage in their development. What I am most known for is developing techniques for using biological indicators in wind prospecting.

5. What is the most rewarding part of your job?

I love field work more than anything else, but I also enjoy mentoring younger people in my field and encouraging their enthusiasm. I have traveled all over the world, and I have met many fascinating people.

6. What education is needed for this job?

It helps to have a degree in meteorology, fluid dynamics, or physical geography. Advanced degrees are also useful because the work is scientific and research skills are needed.

7. What other jobs did you have that led to your current position?

I have a master's degree in civil engineering (air and water resources) and an undergraduate degree in atmospheric sciences. I also have worked as an environmental project manager compiling environmental impact statements. This background has been very useful. Finding a strong wind location is somewhat easy, but finding one that is feasible is more difficult.

8. Besides being smart, creative, hardworking, and a team player, what other qualities contribute to success in this kind of job?

I think resourcefulness and being a good observer are really important. This is a multidisciplinary field, and the ability to work with engineers, scientists, lawyers, business people, environmental groups, farmers, ranchers, and local political leaders all contribute to success in my work. As in every field, communication is very important.

Debra Lew

Senior Project Leader, National Wind Technology Center

Courtesy of Lee Jay Fingersh, NREL/PIX17979

1. How did you become interested in wind energy?

I decided to work in renewable energy in China as a way to manage climate change. China has a fast-growing economy, the largest population, and a high proportion of coal usage.

2. How does your job contribute to the wind industry?

My work with utilities and transmission planners helps them to better understand and quantify the impacts of wind on their systems so that they can better mitigate the impacts of variability and uncertainty and, most important, not be overly conservative because they do not understand the potential impacts.

3. Describe your key activities and responsibilities.

I manage large projects that include utility operations modeling, transmission planning, and wind modeling.

4. Give us an example of one of your successes.

The Western Wind and Solar Integration Study is the largest wind and solar integration study to date in the western United States. It evaluates the impact of up to 30% wind and 5% solar energy in parts of the western United States. The results of this study found that energy from 35% wind and solar is feasible if important changes to operations are made, including cooperation between balancing areas and intra-hourly scheduling. There is a now a proposal underway to implement an energy imbalance service that would do this in the West.

5. What is the most rewarding part of your job?

Seeing real policy change happen as a result of our technical analysis. Learning more about how to mitigate the impacts of variable generation on the grid. Coming up with new ways of mitigating variable generation.

6. What education is needed for this job?

For this job, a master's degree in engineering is required (power systems engineering would be best). My educational background is a Ph.D. in applied physics from Stanford University, an MS degree in applied physics from Stanford University, a BS degree in physics from the Massachusetts Institute of Technology, and a BS degree in electrical engineering from Massachusetts Institute of Technology.

7. What other jobs did you have that led to your current position?

I've held jobs as a project manager, group manager, postdoctoral researcher, and senior energy analyst.

8. Besides being smart, creative, hardworking, and a team player, what other qualities contribute to success in this kind of job?

Perseverance in getting things done with a diverse set of players; diplomacy in working with diverse groups of people; and understanding of how the political and institutional systems work so that we can get things done.

Many Wind Energy Jobs Do Not Require an Engineering Degree

You may have noticed that some of the interview candidates do not have engineering degrees. Besides mechanical and electrical engineering, there are many career opportunities for individuals in the following areas:

- turbine manufacturing
- blade manufacturing or repair
- transportation logistics
- project management
- finance
- legal
- planning
- communications and public relations
- environmental science
- site testing
- tower manufacturing
- green electricity sales
- meteorology
- wind turbine technician
- renewable energy systems
- real estate
- economics
- construction
- utility operations
- research and development

Additional Resources

This Web site profiles Boise State University students who are now employed in the wind energy industry: *http://coen.boisestate.edu/WindEnergy/AlumRoster.asp*

The American Wind Energy Association maintains a wind energy education programs database at *http://www.awea2.org*

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