

**House Committee on Education and Labor
Subcommittee on Higher Education, Lifelong Learning and
Competitiveness**

**Hearing on
“Green Jobs and Training”**

March 23, 2009

Written Testimony of
Tom Quick
Human Resources Leader
Power & Water
GE Energy Infrastructure

Mr. Chairman and members of the Committee, I am Tom Quick, Human Resources Leader for GE’s Power & Water business. I appreciate the opportunity to testify before you today on the topic of green collar jobs and training.

GE Power & Water is a global leader with more than 100 years of industry experience. Our global team of more than 30,000 employees operates in 140 countries around the world, and had 2008 revenues of \$23 billion. GE Power & Water offers a diverse portfolio of products and services including renewable energy technologies such as wind, solar, and biomass, and fossil power generation, gasification, nuclear, oil & gas, water, transmission, and smart meters. The focus of my testimony

will be on the opportunities and challenges for jobs and training in the wind industry.

Wind Energy in the US

The recent record-setting growth of wind energy has been one of the bright spots of the US economy. According to the American Wind Energy Association (AWEA), the US installed 8,358 MW of wind power in 2008, setting another record for annual growth. This growth increased installed wind capacity by 50 percent to 25,170 MW, enough to power 7 million households, and stimulated \$17 billion of investment in the economy.¹ The US is now the global leader in wind power, having surpassed Germany last year in both wind energy generation and wind installed capacity.

In 2008, wind accounted for 42 percent of all new US nameplate installed capacity, second only to natural gas at 46 percent. AWEA estimates that the wind industry employs over 85,000 people directly and indirectly, with 13,000 manufacturing jobs created in 2008 alone. When one includes the induced economic effect of new workers spending money on goods and services, the number of wind-supported jobs approaches 185,000.²

¹ American Wind Energy Association (AWEA), "Wind Energy Grows By Record 8,300 MW in 2008," press release, 27 January 2009.

² Estimate is based on Navigant Consulting analysis prepared for AWEA, November 2008, which uses US Department of Energy (US DOE) Jobs and Economic Development Impact (JEDI) model.

Wind Energy at GE

GE's Wind business has grown dramatically to keep up with growing US and global demand. Since entering the industry in 2002, GE has invested over \$850 million in renewable energy technology and production. We have tripled the number of US assembly facilities and increased wind turbine production six-fold, ramping our production rate from 10 per week to 13 per day.

As a result of these investments, over 10,000 of our 1.5-megawatt wind turbines have been installed worldwide. GE is the leading wind turbine supplier in North America, and nearly one out of every two wind turbines installed in the US is a GE turbine. This growth supports GE wind turbine assembly in Pensacola, Florida; Greenville, South Carolina; Salem, Virginia; Erie, Pennsylvania; and Tehachapi, California.

The industry growth also supports professional jobs at our headquarters in Schenectady, New York, many of these related to our Wind Services business and ensuring the reliability of our wind turbines. We have invested in a world-class service center and a 24-hour call center. And we have hired engineers to track the availability of our fleet and provide remote monitoring of our turbines. These investments have boosted the availability of our turbines by a full percentage point, from 98 to 99%, in just one year.

The growth of our installed base of wind power has also spurred unprecedented demand for skilled workers who can operate and maintain wind projects. These are long-term jobs, lasting the full 20-year lifetime of a wind farm. But the need for more of these workers is great, and it reflects a broader challenge facing the US wind industry.

Job Opportunities in Wind

A 2008 report from the US Department of Energy illustrates the labor requirements to support the growth of the wind industry. The report examined a scenario in which wind supplies 20 percent of US electricity by 2030. It assessed the manufacturing, material, and labor requirements; transmission and integration needs; siting and environmental concerns; and economic and environmental impacts of achieving the 20-percent scenario.³

The DOE report indicates that a 20-percent wind scenario could support over 160,000 direct jobs in the wind industry by 2030. These jobs include manufacturing the major components and subcomponents of wind turbines, towers and blades; constructing wind turbines onsite; and operating and maintaining wind turbines over the lifetime of a project. Including the induced effect from these wind-related jobs, the total number of jobs that can be supported by the industry exceeds 500,000 in 2030. (See Figures 1 and 2.)

³ US Department of Energy (US DOE), "20% Wind by 2020: Increasing Wind Energy's Contribution to U.S. Electricity Supply," July 2008.

Figures 1 and 2

Figure C-6. Direct manufacturing, construction, and operations jobs supported by the 20% Wind Scenario

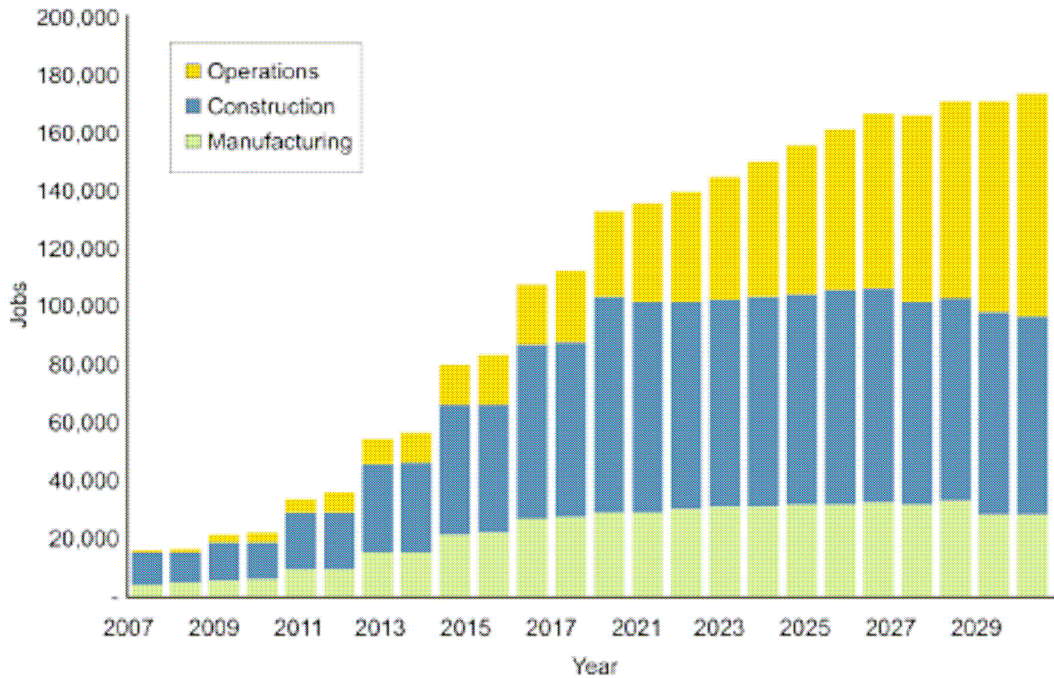


Figure C-7. Jobs per year from direct, indirect, and induced categories

In the last ten years of the scenario, the wind industry could support 500,000 jobs, including over 150,000 direct jobs.



Source: US DOE, op. cit. note 3, p. 209.

Wind Training Challenges

While it is true that the growth potential of the wind industry presents substantial employment opportunities, it is equally true that the educational infrastructure does not exist to support this opportunity. The DOE identifies availability of labor as one of the largest potential constraints to achieving its 20-percent wind scenario: “major expansion of wind power in the United States would require substantial numbers of skilled personnel available to design, build, operate, maintain, and advance wind power equipment and technology.”⁴

As the 20-percent report indicates, several educational programs already exist to train personnel for the wind industry are being offered around the nation, including several community colleges in New York and Texas. (See Table 1.) The list below is not comprehensive but provides an indication of the types of activities that are now underway to address training needs in the wind industry. Yet they represent only the beginning of the training effort that is truly needed to support the growth of the wind industry.

⁴ US DOE, op. cit. note 3.

Table 1

Table 3-6. Wind technology-related educational programs around the United States today

School	Location	Degree or Program
Wind Energy Applications Training Symposium	Boulder, Colorado	Workshops for industry
Colorado State University	Fort Collins, Colorado	65 MW turbine on campus for research (engineering, environmental, etc.)
Advanced Technology Environmental Education Center: Sustainable Energy Education and Training	Bettencourt, Iowa	Workshops for upper level high school and community college technology instructors
Iowa Lakes Community College	Estherville, Iowa	One-year diploma for wind technician; two-year associate in applied science degree for wind technician
University of Massachusetts at Amherst: College of Engineering, and Renewable Energy Research Laboratory (becoming University of Massachusetts Wind Energy Center in late 2008)	Amherst, Massachusetts	MS and Ph.D. level engineering programs specializing in wind energy
Minnesota West Community and Technical College	Canby, Maine	Associate of applied science degree program in wind energy technology; diploma for wind energy mechanic; online certificate program for "windsmith"
Southwestern Indian Polytechnic Institute	Albuquerque, New Mexico	Under development: Integration of renewable energy technology experiential learning into the electronics technology, environmental science, agricultural science, and natural resources certificate and degree programs
Mesalands Community College: North American Wind Research and Training Center	Tucumcari, New Mexico	Under development: Curriculum for operations and maintenance technician; two-year associate degree in wind farm management
Wayne Technical and Career Center	Williamson, New York	New Vision Renewable Energy Program for high school seniors
Columbia Gorge Community College	Hood River, Oregon	One-year certificate and two-year degree for renewable energy technician
Lane Community College	Eugene, Oregon	Two-year associate of applied science degree for energy management technician; two-year associate of applied science option for renewable energy technician
Texas Tech and other American universities: Wind Science & Engineering Research Center	Lubbock, Texas	Integrative graduate education and research traineeship
Lakeshore Technical College	Cleveland, Wisconsin	Associate degree in applied science; electromechanical technology with a wind system Technician track
Fond du Lac Tribal and Community College	Fond du Lac, Wisconsin	Clean Energy Technician Certificate Program

Source: US DOE, op. cit. note 3, p. 71.

GE Wind Training Activities

At GE, training a skilled workforce to operate our power generation turbines has been part of our business for decades. At our Energy Learning Center, located just north of Albany in Niskayuna, New York, we have been training personnel to operate and maintain our steam, gas, and nuclear turbines for 35 years. In response to the dramatic growth of our wind turbine fleet, in 2007 and 2008 we expanded the Center to include a Wind Training Program and Facility. The mission of our Wind Training Program is to deliver an educational foundation to facilitate the development of a world-class services team and support the world's best running fleet. The program's instructors are technical and field experts and its curriculum includes topics such as the fundamentals of wind turbine operation and management, the roles of site managers and leaders, and updates on GE turbine technology.

To support this program, our new Wind Training Facility features wind turbine components, eight classrooms, over 11,000 square feet of lab space, and a dedicated controls room in which to train future wind fleet operators. Combined with our training facility in Germany, GE's wind facilities trained more than 2,700 students globally in 2008. In the US, we provided training to more than 200 customers and added over 500 O&M technicians, turbine commissioners, installation technicians, site leaders and managers to our US field operations.

GE is also reaching out to colleges to advance wind technician training. The goal of these college partnerships is to develop entry-level technicians who are well educated in electrical and mechanical theory and practice, as well as in basic wind theory and practice, and are well positioned to be top candidates for GE-specific wind technical training. We have initiated discussions with seven colleges in New York, Texas, New Mexico, Iowa, and Wyoming. These are colleges that have developed or intend to develop a wind technician program and are located near wind farms.

Partnerships like these are mutually beneficial for both colleges and GE. Colleges receive advice on curriculum design, network with other colleges and universities participating in the program, and develop a pipeline for internships and entry-level positions. And by developing this pipeline of technicians to serve our Wind Field Operations, GE ensures that its growing US fleet of wind turbines runs reliably.

Industry Wind Training Activities

GE is also working to address wind training needs as a member of the American Wind Energy Association, a national trade association consisting of more than 1,900 members. AWEA has created an Education Working Group that provides a forum for wind industry members and individuals from the educational community to promote: wind K-12 education programs; job and career training programs for community and technical colleges; academic and career development

programs at undergraduate and graduate institutions; and scholarship opportunities through an AWEA Educational Scholarship Program.⁵

As one outgrowth of this group, AWEA is currently working with member companies and educational institutions to develop a national skill set for wind technicians. Programs abiding by the skill sets will receive a “stamp of approval” from AWEA.

The AWEA Education Working Group recently conducted a national survey in which over 200 industry and educational members participated. The goals of the survey were to:

- Identify the industry’s short- and long-term workforce needs;
- Identify the skill set required for wind turbine technicians;
- Gather information regarding wind energy programs currently offered or under development by AWEA member companies, community colleges, technical schools, universities and other training groups;
- Identify community and K-12 outreach efforts; and
- Anticipate future industry needs in order to plan educational programs to meet those needs.

⁵ AWEA, “Education Working Group,” <http://www.awea.org/education/workinggroup/goals.html>.

Results of this survey will be presented at the industry's annual WINDPOWER Conference & Exhibition, which will be held in Chicago from May 4th to May 7th. In conjunction with this conference, AWEA is also working with the U.S. Department of Energy, and National Renewable Energy Laboratory to hold a Workforce Action Plan Development Meeting on May 4th to discuss the implications of workforce development for the wind industry.

In closing, GE and the wind industry are working to address the wind training challenge. We welcome the federal government's support of this work, such as the recent authorization of grants for research, labor exchange and job training projects to prepare workers for careers in energy efficiency and renewable energy. And we look forward to partnering with you in coming weeks and months to build a robust "green jobs" pipeline.

Thank you for the opportunity to present this testimony. I look forward to your comments and questions.