

Penn State offers an emerging educational and research program in wind energy, and it is aiming to become a major contributor to research excellence in the U.S. wind industry.

THE UNIVERSITY PARK campus of The Pennsylvania State University is the home of emerging research and educational activities in the field of wind energy. The Commonwealth of Pennsylvania is fostering its position among the leading “wind states” in the Northeastern United States, and since 2004 has been aiming to meet 8 percent of the state’s energy needs with Tier 1 renewables such as wind energy by 2021. Additionally, with a good local wind resource and incentives provided by the state government, there are a growing number of wind companies locating in the state. Individual researchers at Penn State started investigating wind-related topics several years ago. Faculty members from across campus interested in wind energy organized the “Pennsylvania Wind Energy Symposium: Power for the Future” in late 2008. The first fulltime faculty position in wind energy was filled this year in the Department of Aerospace Engineering. It is one of 25 new faculty positions at Penn State in energy science, engineering, and policy cosponsored by an academic department and the Penn State Institutes of Energy and the Environment. Current activities include:

Wind for Schools Program: This program (www.wind.psu.edu/wfs) is part of DOE’s Wind Powering America (www.windpoweringamerica.gov) and supports wind energy education at K-12 schools across the state. Additionally, the program initiated the formation of a Penn State Wind Application Center, which focuses on wind energy education within the university as well as providing outreach to the surrounding community. The goal is to install three to five wind turbines at K-12 schools across the state while integrating wind energy activities into the curriculum, as well as promoting wind workforce development within the university. For more information contact Susan Stewart at ssewart@psu.edu.

Short Course in Wind Energy: A unique curriculum was developed for a 32-hour short course in wind energy engineering, offered for the first time this November. A total of 11 lecturers from seven departments and institutes at Penn State provided and presented the course material. Topics included wind resources, mesoscale modeling, turbine dynamics and aerodynamics, grid connection, tower design and foundation, icing on wind turbine blades, acoustics, experimental methods, drive trains, design and analysis methods, and

more. Stewart, listed previously, can provide more information.

Graduate Certificate in Wind Energy Engineering: The wind industry is seeking an educated workforce, so Penn State is developing courses that will constitute the basis for a graduate certificate. This effort is led by the Department of Aerospace Engineering as part of a DOE grant. Two new courses to be offered in the spring of 2011 include a junior-level course titled “Wind Energy Engineering and Projects” and a graduate course in “Wind Turbine Aerodynamics.” Another graduate course anticipated for fall 2011 is “Engineering of Wind Power Plants,” which will involve all the aspects that are important to the design, operation, and maintenance of future wind power plants. Several online courses are also planned. For more information contact George Lesieutre at g-lesieutre@psu.edu.

Wind Turbine Field Test Facility: Students in the Department of Aerospace Engineering have about three years of experience with the operation and field measurements of a 3.5 kW Southwest Windpower Whisper 500 wind turbine. The field test facility is located in Penn State’s Center for Sustainability (www.cfs.psu.edu). Two new small wind turbine system installations are planned in support of the Wind for Schools and Center for Sustainability programs, as well as to upgrade fielding testing. Furthermore, students are designing and manufacturing their own wind turbine blades that will soon be tested in the facility, and health monitoring studies are underway. To learn more contact Dennis McLaughlin at dkm2@enr.psu.edu.

Research in Wind Energy: Penn State offers a wealth of expertise to conduct cutting-edge research in wind energy. Close interaction between faculty in the College of Engineering, the College of Earth and Mineral Sciences, and the Applied Research Laboratory has initiated research activities transversing the areas of mesoscale modeling, wind siting over complex terrain, acoustics, icing on wind turbine blades, turbine blade interactions with the atmospheric boundary layer, composite materials, and offshore systems. Expertise in Computational Fluid Dynamics (CFD) plays an integral part in many of the current activities. For more information contact me at the phone number or e-mail address listed below. 

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