OSU Develops â€œMicroâ€• Wind Turbine for Green Buildings

by Bend Weekly News Sources

An Oregon State University engineering professor has helped design a new â€œmicroâ€• wind turbine that can be mounted along the edges of building roofs to generate electricity.

The new small-scale turbine design could revolutionize the wind power industry, with rows of small rooftop turbines enabling power generation in urban and suburban settings, instead of only from large, towering, traditional wind farms in rural areas.

Stel WalkerStel Walker, director of the Energy Resources Research Laboratory at OSU and a leading consultant in the wind energy industry, helped create the design with AeroVironment, Inc., the California-based manufacturer of the new wind turbine.

â€œThere are only a few wind turbine manufacturers in the U.S., and theyâ€™ve been telling city planners, architects and building owners for years that they havenâ€™t designed their wind turbines to be placed on or around buildings,â€• said co-inventor Tom Zambrano of AeroVironment. â€œBut no one understands wind resources better than OSU and Stel Walker says the wind in the Pacific Northwest doesnâ€™t stop at city lines.â€•

Walker helped the company envision a small, quiet and architecturally pleasing wind turbine designed to attach to a track running along the perimeter of a roofline, similar to the way lighting is attached to tracks. The number of turbines mounted to the track can vary, depending on power needs and the size and design of the building.

When mounted on a building, the new turbines combine architectural, aerodynamic and mechanical engineering to collect more wind and produce more energy than previously thought possible.

â€œWhen wind senses an object in its path, such as a building, its velocity can increase as it shoots up and over the roofline,â€• Walker said. â€œThis depends, however, on the architectural design of the building and landscaping design of the surrounding property. The new turbines are designed to be installed on existing commercial building designs and can work with other renewable energy technologies such as photovoltaic.â€•

Customers can start with as few as six kilowatts â€“ about 10 of the four-foot turbines â€“ and then add more as power needs increase. Some buildings, such as large warehouses and distribution centers, may be able to accommodate 100 or more turbines. Banks of the new wind turbines, which are called â€œArchitectural Wind,â€• have already been installed on buildings in California and elsewhere.

Stel Walker, a pioneer in wind energy at Oregon State University, helped devise small wind turbines that can be mounted on industrial buildings to produce electricity, and may lead to an entirely new way to use wind energy in industrial and residential settings.Although the new turbines are designed primarily for use on commercial buildings, micro turbines could one day be used in residential applications, officials say. As green building technologies are gaining acceptance, building owners and designers want buildings to clearly show that they employ these technologies. Unlike many green technologies that are generally not visible, such as solar panels, the new wind turbines are designed to be highly visible, yet also blend in architecturally.

Wind and other forms of alternative energy production are an integral part of â€œgreenâ€• building design, which OSU is committed to supporting.

Zambrano says he views OSUâ€™s research as critical to the global acceptance of wind energy.

Walker, now assistant head of OSUâ€™s Department of Mechanical Engineering, was a graduate student at OSU in the 1970s when it was one of only two universities in the U.S. doing wind energy research. He helped pioneer wind studies at OSU by creating computerized aerodynamic performance design analyses of wind turbines, and maintaining the foremost wind database in the nation. In 2004, he was presented the Academic Achievement Award by the American Wind Energy Association at the Global Windpower Conference.

The program at OSU also developed aerodynamics for horizontal axis wind turbines and created design analysis codes for structural engineering.

â€œOur team created all of the first computer models for wind energy that are still used today,â€• said former OSU professor Robert Wilson. â€œStel has been successful in every aspect of wind energy design, and with his help, wind energy production has gone from a research and development interest to a Fortune 500 concern.â€•

Information about current and historical wind levels in and around the Pacific Northwest, which helps to determine the viability of wind energy production, is stored in the database that OSU began developing for the Bonneville Power Administration in the 1970s. This database is the longest running record of wind levels in the nation for wind energy purposes, and can be useful to residential and other commercial property owners, as well as large wind farm developers. Itâ€™s also used by other research universities.

Anemometers are also available for loan through OSUâ€™s Anemometer Loan Program, sponsored by the Energy Trust of Oregon, for home use and small-scale wind energy development.

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