

Harnessing the power of the wind

WVU researchers work on turbine with horizontal blades

Submitted to The Dominion Post

Researchers in WVU's College of Engineering and Mineral Resources are working to develop a new type of turbine for generating electricity from the wind.

James E. Smith, professor of mechanical and aerospace engineering, is the principal investigator on the project, which aims to bring the new technology to the U.S. marketplace.

Shenfei Group, a large, diversified Chinese manufacturing company, awarded the \$1.6 million contract. GT Technologies, a Michigan-based company, is also a partner in the project.

Most wind turbines in current use consist of large blades rotating around a horizontal axis, with the blades spinning in a vertical plane.

About two years ago, Smith and fellow researchers began developing the concept of a new type of wind turbine, with a vertical axis and the blades spinning in a horizontal plane.

"By requiring less wind power, we expect that vertical-axis wind turbines will be more efficient and less costly to operate," Smith said, "and that they will also operate longer and produce more electricity than traditional turbines."

Smith said a vertical axis device will better adjust to accommodate changes in wind direction, unlike a horizontal axis wind turbine, which requires stopping and adjusting the entire assembly when the wind changes direction.

"In order to decrease our nation's dependence on foreign oil, the United States Department of Energy has set as its goal that 20 percent of the electricity in the nation will come from wind energy," Smith said. "We hope to contribute to that effort by increasing the cost-effectiveness of wind power."

In addition, some environmentalists have raised concerns about the effects of today's large horizontal-axis wind turbines on the ecosystem and especially on birds, which often get caught in propellers.

Smith said that the research group believes that vertical axis wind turbines will prove less disruptive to birds.

Smith and his team began working on the initial design phase of the project last summer. They have now moved into the second phase, involving design fabrication and the construction and testing of a scaled prototype. The final phase will involve an analysis of data and scaling the prototype up to its full dimensions.

Smith is the director of WVU's Center for Industrial Research Applications. Prior to joining the WVU faculty in 1976, he was a research engineer for the Department of Energy. He earned his bachelor's, master's and doctoral degrees in engineering from WVU. Smith has been the principal or co-principal investigator for 89 research contracts, exceeding \$18 million in funding for various projects funded by federal agencies, international corporations and West Virginia companies. Smith is currently serving as president of SAE International.