Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

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Compact, Residential Wind Power Generation System

Energy consumption in the United States was three times greater in 2012 than in 1948, and projections support continued growth in demand. Most electricity is produced from burning coal, petroleum, natural gas, propane, and through consumption of uranium. These materials are not renewable sources of energy and eventually will run out. Renewable energy sources are important because burning fuels is destructive to the environment and human health. Developing renewable energy promotes job growth and helps a nation become secure through energy independence. Unfortunately, 91% of all energy consumed in America comes from nonrenewable energy sources. Energy developed from the wind is clean, inexpensive, and it is a reliable source of energy. Large commercial wind turbine systems have been proven to be a highly efficient source of energy. There is a need to develop smaller wind power generation systems for residential and rooftop commercial use that are dependable and efficient.

Researchers at Arizona State University have developed a compact wind power generation system for residential and commercial rooftop use. The system is light, inexpensive, has few moving parts and, although it is small, it can be scalable to meet various installation demands. The system utilizes an air intake system that accelerates the velocity of the airflow, increasing the wind speed by a factor of 10. Internally there is a uniquely designed turbo-propeller blade that is capable of getting the most energy out of the wind resources. The propeller spins at a slower rate so the energy is transferred to the generator through a system that steps up the generator speed. Finally, there is a special exhaust plenum that enhances system operation. Although this innovation is mechanically simple, it provides high efficiency at low cost.

Potential Applications

- Residential
- Commercial rooftops
- Remote, unserved areas

Benefits and Advantages

- Lower Costs – Inexpensive simple system with few moving parts
- More Power – Potentially provides more power than comparable wind technologies
- Retrofit – Can be installed on any existing building

For more information about the inventor(s) and their research, please see Dr. Timothy Takahashi's directory webpage