

Cleanfield Energy – McMaster’s collaboration boosts wind turbine performance

Mechanical engineering department improves power performance by 50 percent.

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by DE staff

Vertical Axis Wind Turbine (VAWT) company —Ancaster, Ontario-based Cleanfield Alternative Energy Inc.—announced that a collaboration with McMaster University’s Department of Mechanical Engineering, and Ontario Centres of Excellence’s (OCE’s) Centre for Earth and Environmental Technologies resulted in design improvements that increased its V3.5 system’s power generation performance by approximately 50%.

"All the leading-edge work we’ve done with the help of McMaster’s engineering expertise and the OCE’s financial support since 2005 is paying off by making an Ontario made product globally competitive," Cleanfield CEO Tony Verrelli said. "The sophisticated

testing and technical modifications to the blades, struts and shaft have further established our V3.5 as a leading, high performance product. Cleanfield’s V3.5 is capable of performing well on rooftops or on ground mounted towers, thereby reducing property owners’ dependence on utility grid electricity."

Cleanfield’s V3.5 system consists of a VAWT with an integrated sensor/communication interface board that monitors vibration, generator temperature, ambient temperature, wind speed and turbine RPM. The board provides the inverter the necessary feedback for optimum control and safe turbine



operation. The turbine inverter is designed with a custom algorithm for direct control of its permanent magnet generator. In generating mode, the control algorithm allows variable speed operation by closely following the power curve of the turbine.

"The project team has achieved several key improvements to the V3.5," said Dr. Stephen Tullis, leader of the research project and Assistant Professor at McMaster. "It is now much better structurally, and we have raised the power curve – increasing power performance by approximately 50% from that of Cleanfield's previous commercial turbine – as measured in large-scale wind tunnel tests. With Cleanfield's control system, the turbine can operate with low vibration and very low noise levels which are practically unnoticeable."

"We have a resonant frequency band skipping algorithm that protects against detectable vibration and sound for various rooftop applications, which further differentiates our technology in the marketplace," added Cleanfield Chief Technology Officer Mihail Stern. "This translates into smooth and quiet rotation of our turbines in urban settings. For example, within the auditorium of Mohawk College, directly below two of our rooftop VAWTs, neither vibration nor sound is perceptible on a windy day."

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