

Changing winds: A new technology for a model ‘green’ city

Singapore based Katru Eco-Energy’s new building-integrated wind turbine prototype is part of the recent wave of technologies targeting future sustainable cities. By Vani Segaram

With a dense built environment, finite space and continuing economic growth, Singapore has stated its aims to be the next ‘model green city’ in Asia. Many companies are shifting to energy efficient processes and improved building design; however renewable technologies with potential for on-site zero-emissions power generation are also increasingly being viewed as an integral component of future sustainable cities.

Katru Eco-Energy Pte Ltd, a start-up company dedicated to developing renewable energy technologies, has recently completed the first full-scale prototype of its building-integrated wind turbine Implux™ in Singapore. Directly mounted atop high-rise buildings, Implux™ is designed to generate on-site electricity from the turbulent and interrupted winds found in dense built environments. Unlike turbines used in large open area wind farms, in which blades spin around a

horizontal axis to generate power from high speed winds moving in a single direction, Implux™ utilises airfoil blades attached to a vertical axis set within a unique shroud cover, designed to continuously capture winds of varying speeds moving around buildings in multiple directions.

After 5 years of R&D and patenting in over 24 countries including U.S.A, Japan and China, the new turbine design is now ready for testing as a full-scale prototype, says Varan Sureshan, the Managing Director of Katru Eco-Energy. He says, “Our turbine has performed very well in CFD (computational fluid dynamics) simulation studies, with much higher efficiencies than currently available building-integrated turbines.” Mr. Sureshan continues, “As a dense high-rise city, Singapore is ideal for testing the prototype and acts as a model for cities worldwide.”

To date, wind turbines have had limited application in the built

environment due to the poor compatibility of the typical horizontal axis design with urban wind patterns, potential safety hazards of exposed spinning blades and low frequency noise levels when in use. Implux™ was designed with these limitations in mind. “Our shroud design encloses the moving blades, so it’s less noisy, vibration-free and safe for use in populated areas. The shroud’s wind accelerating feature also makes it suitable for low speed wind regimes present in many cities, like Singapore”, says Mr. Sureshan.

Mr. Sureshan says the Economic Development Board’s (EDB) promotion of Singapore as a ‘living laboratory’ to test-bed innovative urban sustainability solutions encouraged the company to move its first prototype construction and testing work to Singapore.

“We’re currently in discussions with private developers and academic institutions to gain access to a 12-20 storey building, to mount our prototype for field tests over the next 12 months. This will be the ultimate proof”, says Varan Sureshan.



Building-integrated wind turbines, like Katru Eco-Energy’s Implux™ (above), are designed to utilise low speed urban winds and have zero impact on the land footprint of expanding cities.