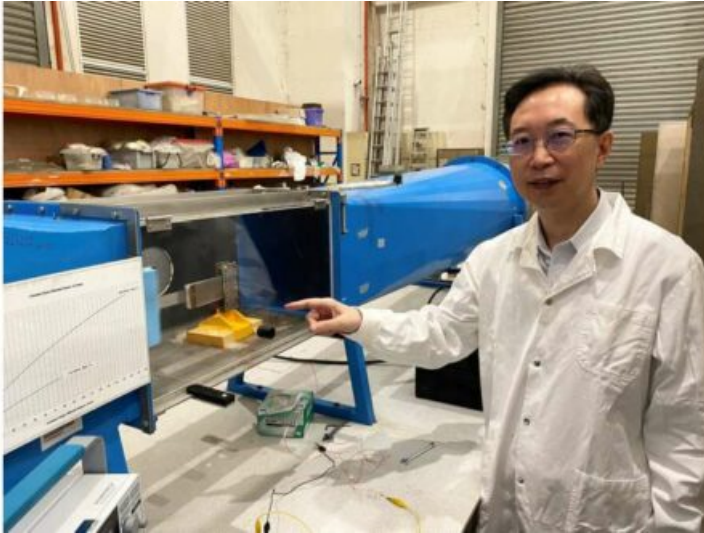


Harvesting Energy From Gentle Breeze

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Researchers at Nanyang Technological University, Singapore have developed a device that can harness energy from wind as gentle as a light breeze and store it as electricity.



NTU Professor Yang Yaowen demonstrating how the device can generate and store electricity when exposed to a breeze generated by a wind tunnel. Credit: Nanyang Technological University

The light and durable device called a wind harvester, is exposed to winds with a velocity as low as 2 meters per second (m/s), can produce a voltage sufficient to power a commercial sensor device. The device generates voltage of three volts and generates electricity power of up to 290 microwatts, which is for it to also send the data to a mobile phone or a computer.

Professor Yang Yaowen, a structural engineer from NTU's School of Civil and Environmental Engineering (CEE), who led the project, said, "As a renewable and clean energy source, wind power generation has attracted extensive research attention. Our research aims to tackle the lack of a small-scale energy harvester for more targeted functions, such as to power smaller sensors and electronic devices."

The body is made of fiber epoxy, a highly durable polymer, with the main attachment that interacts with the wind and is made of inexpensive materials, such as copper, aluminum foil, and polytetrafluoroethylene, a durable polymer that is also known as Teflon. Due to the dynamic design of its structure, when the harvester is exposed to wind flow, it begins to vibrate, causing its plate to approach and depart from the stopper. This causes charges to be formed on the film, and an electrical current is formed as they flow from the aluminum foil to the copper film.



When tested, it was observed that the device was capable of powering 40 LEDs consistently at a wind speed of 4 m/s. It could also trigger a sensor device, and power it sufficiently to send the room temperature information to a mobile phone wirelessly.

Prof. Yang added, "Wind energy does not contaminate, it is inexhaustible and reduces the use of fossil fuels, which are the origin of greenhouse gasses that cause global warming. Our invention has demonstrated its potential as an energy generator to power the next generation of electronics, which are smaller in size and require less power."

References : Chaoyang Zhao et al, A cantilever-type vibro-impact triboelectric energy harvester for wind energy harvesting, *Mechanical Systems and Signal Processing* (2022).

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