ENERGY

Cheap wind harvester generates electricity from a gentle breeze

By Nick Lavars
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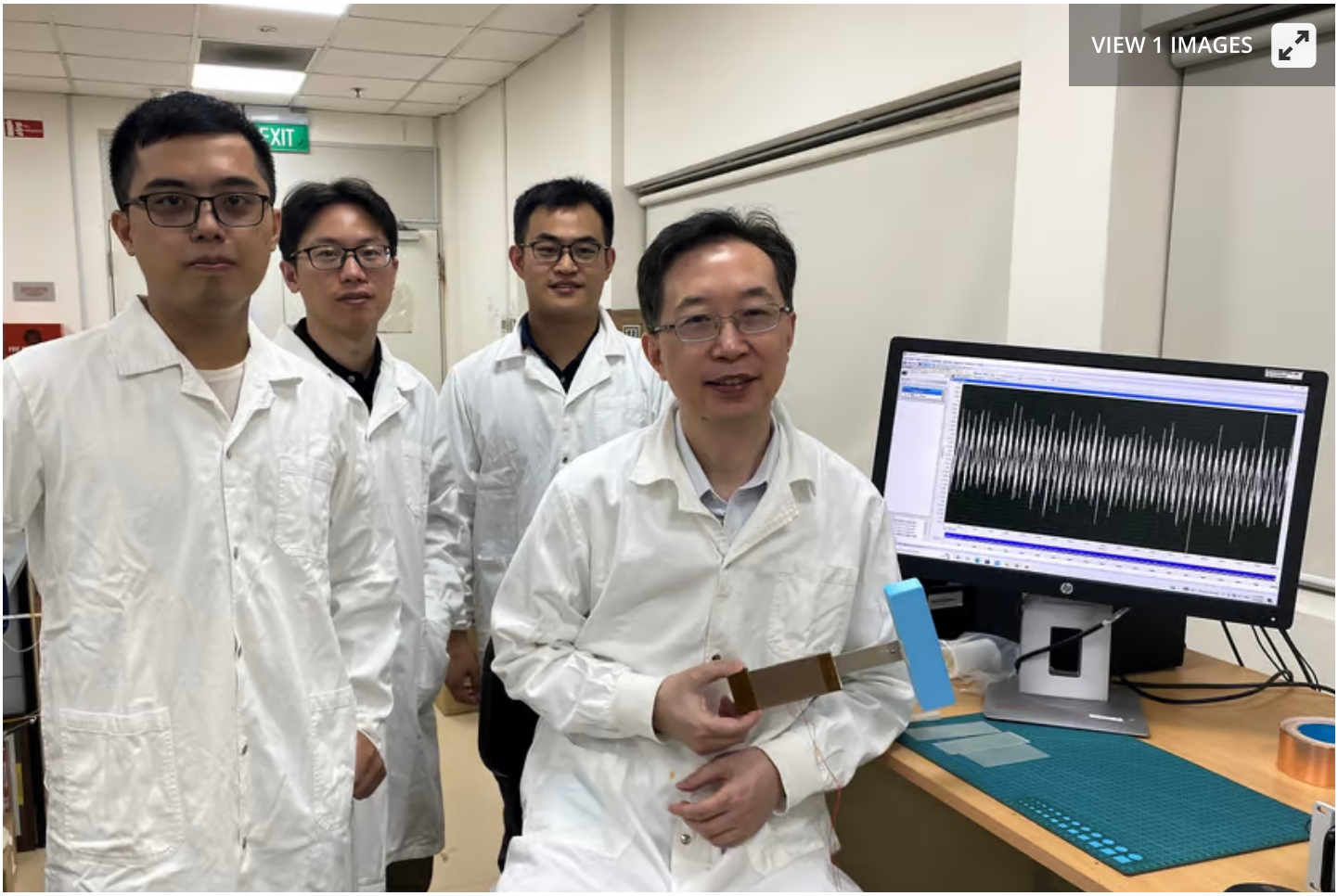

Nanyang Technological University scientists with their newly developed wind harvester Nanyang Technological University

While wind energy systems can come in some pretty big forms, scientists at Nanyang Technological University (NTU), Singapore have been working on a low-cost solution at the other end of the spectrum. The team has developed an inexpensive device sensitive enough to capture energy from a light breeze and turn it into electricity, generating enough to run a small commercial sensor.

The harvester is small, low-cost and measures around 15 x 20 cm (6 x 8 in). It consists of a cantilevered beam attached to a middle plate made of layers that harness energy through the triboelectric effect, in which different materials become electrically charged as they separate, in this context caused by vibrations from the wind. We've seen this type of triboelectric technology deployed in other advanced wind harvesters, such as wearable devices that generate energy from the wind as you walk.

The NTU team's device is instead designed to be mounted on the exterior of buildings in urban environments. In their testing, the scientists showed it could harvest energy from a light breeze and can generate up to 290 microwatts of electricity, produce up to three volts and also store electricity for use when there is no wind.

In one experiment, they used the device to power 40 LEDs consistently from a wind speed of four meters (13 ft) per second. In another, it was used to power a sensor that wirelessly relayed room temperature data to a mobile phone. The team is continuing work to improve the performance of the device, and are filing a patent as they pursue commercialization of the technology.

"As a renewable and clean energy source, wind power generation has attracted extensive research attention," said Professor Yang Yaowen, who led the research. "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 device we developed also serves as a potential alternative to smaller lithium-ion batteries, as our wind harvester is self-sufficient and would only require occasional maintenance, and does not use heavy metals, which if not disposed of properly, could cause environmental problems."

The research was published in the journal *Mechanical Systems and Signal Processing*.

Source: Nanyang Technological University