

Researchers make advances in wind energy generation

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Engineers at the University of Alberta have created a wind energy generator that they hope people will one day be able to use to power their own homes.

"We have developed a simple, reliable, controller for small scale wind energy generators that is cheaper than competing technologies," said Dr. Andy Knight, a professor in the U of A Department of Electrical and Computer Engineering and lead author of a paper on the subject published recently in IEEE Transactions on Energy Conversion.

The traditional problem with harnessing wind energy has been the high cost and the low return of energy, especially for small-scale generators, Knight explained. A particular problem is that the devices have been unable to convert any energy when winds fall below specific cut off speeds, and much energy is therefore wasted.

However, Knight's open loop control system can be built with a few, simple electronic components that are cheap and easy to find, use and repair. As well, Knight's system is able to transfer even light winds into electric energy.

Although Knight and his colleagues have not yet built anything that is ready to sell, they have designed and tested a generator that they are working to improve before they expect to apply for a patent and possibly bring it to market.

Current small-scale wind energy generators cost about \$2,400 US and, on an average wind speed day, produce 5.2 kiloWatt-Hours per day, Knight said. According to Natural Resources Canada, the average household consumes between 34 and 67 kiloWatt-Hours per day.

Generally, current small-scale wind energy generators require wind speeds of at least 18 km/h to generate any power, but Knight's device could be used in low wind environments, such as the Edmonton, Alberta area, where the average wind is 10 km/h.

"But it wouldn't be something you'd put in your garden. Energy is already cheap and abundant in Edmonton, so it wouldn't be financially viable in the city," Knight said, adding that fast turning wind turbines in a small yard would create a hazard.

However, the generators could be used at remote locations outside of the city, where the power supply is more expensive and less abundant.

Based on the results of his ongoing work, Knight is hopeful that wind energy might one day become a clean, renewable, viable source of energy for everyone to use, which would counter the environmental damage occurring from our current use of fossil fuels as our main source for energy.

"My work is something that can make a small change, and it's probably a bunch of small changes here and there that will add up and one day have a big impact," he said.

Source: University of Alberta

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