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Smartphones tend to need charging about once per day, even more if they are heavily used. The inconvenience of needing to find an open outlet to charge your phone when it dies can be frustrating. Not only do you need to find an open outlet, but you may not be comfortable just leaving your phone to charge somewhere. Fortunately, a research associate and an electrical engineering professor at the University of Texas Arlington have found a solution: windmills.

When people think about windmills these days, they often envision the massive, towering wind turbines that line hilltops and shorelines, generating power for a local power grid. Smitha Rao and J.C. Chiao have taken this idea and shrunk it down to a more manageable and portable size. A typical wind turbine these days is about 114 meters tall; the micro windmills Rao and Chiao have developed are 1.8 mm tall. They are more than 63 *thousand* times smaller than a wind turbine. You could fit about 10 of these micro-windmills on a grain of rice. By making a large sheet consisting of hundreds of these windmills, you could recharge your phone by waving it in the air, placing it by an open window, or placing it in front of a fan or vent.

WinMEMS Technologies Company contacted Rao and Chiao to create novel technologies, and in turn, the duo presented this micro windmill idea. The windmills were inspired by introducing origami concepts into wafer-scale semiconductors. The end result is an efficient, minimalist design that is flexible and durable. Many technologies being developed for micro and nano scales are not very durable — the materials needed are too fragile. The windmills are constructed from nickel alloy, which is very durable, even on such a thin scale. It can easily withstand the relatively intense winds from a fan or breeze. Chiao has successfully tested the micro windmills back in September of 2013, and their uses will be great.

The concept of using them to recharge phones and other portable devices is only the beginning. Theoretically, an entire house could be layered with thousands of these tiny turbines within the walls and roof, and they could power the entire house's lighting, security systems, and wireless communication systems cheaply. The fabrication process developed by WinMEMS allows for hundreds to thousands of these tiny turbines to be constructed on a wafer for the same cost as constructing a single micro-windmill.

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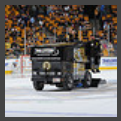
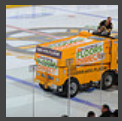
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