



Solar tents and backpacks let you camp in ways that keep you one with nature

## Technology Power plays

New gadgets for everyday use help us get over our serious addiction to dirty energy

|Joseph Wilson

Good cities are all about movement. If you want stasis, go to the suburbs.

Since 2003, the de facto gateway to the western edge of Toronto has been the giant wind turbine run by the Windshare co-op. Its blades churn while the city below bustles with good ideas. When the air is still and the blades stop, the city itself seems more sluggish.

Our one windmill generates 1,000 MWh of electricity in one year, enough to power 200 homes. That seems like a lot, but at that rate it would take 600,000 windmills scattered across the province to supply the 600 million MWh's used by Ontarians each year. The fact is, fossil fuels pack a remarkable amount of energy into a small package.

Electricity is also really hard to store. While electricity flow is pretty constant from our coal-burning behemoths, at the Windshare site, when the wind doesn't blow, the juice doesn't flow. Solar energy has the same drawback, but it is also expensive, requiring an intensive manufacturing process.

These days, however, with green energy on everybody's lips, a fresh influx of money will hopefully coax engineers into making it more feasible. Solar panels, for one, currently operate at around 10 per cent efficiency, meaning that they can convert 10 per cent of the sunlight they receive into electricity. Some photosynthetic bacteria can convert sunlight to usable forms of energy with around 90 per cent efficiency, so there is lots of room for improvement.

Researchers at the University of Toronto have been developing microscopic solar cells made of a plastic compound that work at 30 per cent efficiency. The beauty is that the particles are so small, they can be sprayed onto surfaces where they change infrared solar radiation into electricity. Imagine plugging your camera into a jacket you've sprayed with the material, or charging your cellphone through a bicycle layered with the stuff.

Given the stats on energy usage, the best way to work renewable energy into the market is via gadgets like this, because it gives consumers the power to vote with their dollars. Running low-current devices like cameras, cellphones and even laptops on green technology may be a way to chip away at our voracious appetite for dirty energy.

Larger solar panels have appeared on the sides of tents, bags and bicycles, allowing people to run consumer electronics off the grid. Recently, designers in Japan developed bike lights that run off small wind turbines that spin when you pedal. That principle is behind the wind-powered cellphone invented by students at the Indian Institute of Technology in Delhi, which recharges when you stick its turbine out the window of a fast-moving vehicle.

Laptops require a little more juice than cellphones, but that just means you've got to get your hands on a hand crank, which can generate a lot of electricity for such a little gadget (up to 10V and 350mA). Sidewinder makes a gorgeous cellphone crank that weighs only 2 ounces, but you'll need the adapter for your phone model. Motorola's new PVOT is a surprisingly sleek-looking cellphone with a hand crank built right in.

Nicholas Negroponte, founder of MIT's famed Media Lab, designed a hand crank into his recently released \$100 laptop, a cheap computer designed solely for export to developing countries where electricity is scarce. Similar ideas were profiled in Bruce Mau's Massive Change exhibition, which featured FreePlay Energy's massively popular hand-cranked radios. Check out the amazing FreePlay Portable Energy Source, which can run tons of appliances or jump-start a car battery when you pump it with your foot like those air pumps you take camping.

The last frontier to satisfy computer owners who want to shed their power wires is the fuel cell, whose only by-product is water. Intel, Toshiba and NEC are all racing to turn their bulky prototypes into market-ready versions. Two years ago, IBM debuted a fuel cell version of its ThinkPad notebook, but the cartridges lasted only eight hours and the whole thing weighed almost 5 pounds.

You can bet more and more engineers and scientists are devoting time to this, though, and it'll be exciting to see where we are in 10 years. For now, buy yourself a roll-up solar panel for your PlayStation Portable and feel smug that you're off the grid, if only for a moment. ☺

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