

1 **Wireless Power May Cut the Cord for Plug-In Devices, Including Cars**

2 A mobile phone that **charges** in your pocket, a flat-screen TV that needs no **power** cord, a car **fueled** by a **cordless** panel
3 in the floor: In a building just outside Boston, these and other applications of wireless electricity signal a future with fewer
4 snaking cables.

5 WiTricity, a company spun off from research at the Massachusetts Institute of Technology (MIT), **aims** to redefine how
6 people use energy, making it possible to power **devices** without ever **plugging** them into an outlet. In WiTricity's lab,
7 various devices run on power transmitted from electric **coils** through the air. "It is not hard to imagine that in a few years,
8 you go to a coffee shop, sign into a power zone, and charge your phone or laptop," said Richard Martin. "We **predict** this
9 technology **taking off in a similar fashion** to how Wi-Fi got its start a decade or so ago." Martin says the industrial
10 potential for wireless power is huge, **especially concerning** electric **vehicles** and wireless sensors, where harsh
11 environments make it difficult to run wiring. **In addition**, he says wire-free electricity **transmission** is often a more
12 **convenient**, greener alternative to conventional plug-in charging. "Part of this is that there is an obviously big space in the
13 market waiting to be filled," Martin said. WiTricity CEO Eric Giler imagines a future where power devices are **embedded**
14 in the walls and carpets of homes, making for a truly wire-free household. He says with a big enough power supply and
15 small wireless repeaters, one could even power a grocery store or office building.

16 Conventional charging devices use electromagnetic induction to transmit power. Through electromagnetic induction, an
17 electric **current** is sent through a **magnetic field** generated by a power **conductor** to a smaller magnetic field generated by
18 a **receiving** device. "Think of your electric toothbrush," Giler says. "It works very **efficiently**, but the problem is that it can
19 only transmit power wirelessly a few inches." WiTricity devices share energy through magnetic fields as well. However,
20 **unlike** those **generated** by your toothbrush or iPod cable, their devices produce magnetic fields through a process called
21 resonant magnetic coupling, which allows power to be transmitted several meters in **distance**. Resonant coupling can be
22 illustrated by many everyday examples. A child pumps her legs at the resonant frequency of a swing to fly through the air,
23 or an opera singer shatters a wine glass by singing a single note at a frequency that **matches** the acoustic resonance of the
24 glass. WiTricity founder Marin Soljačić **wondered** whether electricity could be passed from a wall outlet to an electronic
25 device in a similar manner after he was awoken late one night in by the beeping of his wife's dying cellphone. He
26 experimented with two electromagnetic resonators vibrating at a specific **frequency** and found they **shared** power through
27 their magnetic fields at distances far greater than their conventional, magnetic induction **counterparts**.

28 Giler says materials such as wood, brick, and concrete are essentially **transparent** to magnetic fields, enabling two
29 WiTricity devices to transfer power through them in **amounts** ranging from a few milliwatts to several kilowatts. As the
30 number of household electronic devices proliferates, so do **concerns** about electromagnetic radiation **exposure** from these
31 devices and the possible health effects. Giler, however, says their technology is safe. While the human body **responds**
32 strongly to electric fields, (the same response that makes it possible to cook the meat of a chicken or steak in a microwave),
33 Giler says humans do not absorb power from the low-level, magnetic field generated by a WiTricity device. "If you are OK
34 living on Earth, then you should be OK with what we are doing here," he says. "Our technology generates less radiation
35 than the Earth's magnetic field and it is one hundred times safer than a cell phone."

36 He says WiTricity is developing wirelessly powered devices **ranging** from an iPhone to **implanted** medical devices and
37 military robots. Both Giler and Martin agree that the electric-vehicle industry will be the first market sector **to benefit**
38 **from** wireless power transmission. "The electric-car industry has **figured out** that people aren't going to use electric
39 vehicles if they have to constantly plug them in," Giler says. "We are trying to make charging your car as **convenient** as
40 fueling it at the pump." In the bumper of an electric BMW, WiTricity has placed a wireless coil that receives power from a
41 resonator embedded in the floor beneath the car. The system can transmit up to 3,300 watts per hour and takes four to six
42 hours to fully charge the vehicle.

43 **Adapted from [National Geographic News](#)**