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Transmitting electricity via laser

Converting power to light and back again: The idea of transmitting electricity wirelessly via laser could provide the answer to some thorny problems. We show what research is working on and how much longer we must wait for it.

This idea basically involves an elevator traveling into space and back attached to a cable. But where would it get the power? Probably not via the cable. Stretching 36,000 kilometers into space, it would require hundreds of generating stations and substations to supply the pod with power over such a long distance. That's why experts prefer the idea of using defocused laser light. Lasers on the ground would fire at highly efficient photovoltaic cells on the underside of the space elevator, which would convert the light back into electricity.

Status
Despite regular proofs of concept delivered by various space elevator competitions, there is still a long way to go.

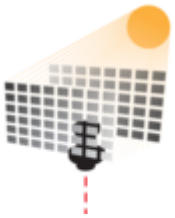
Microdrones require tiny components, which is no problem as far as mechanical parts, electronics, cameras and sensors are concerned. Batteries are a different matter, however. Bound by chemical laws that rule out miniaturization, they last just a few minutes. Experts have therefore come up with the promising idea of using a laser beam to supply airborne microdrones with power as and when they

need it.

Status
It's already working in the lab. Challenges include the need for visual contact and, above all, how to supply power to a broadly dispersed swarm.

Ever since our phones became mobile, we have been faced with the question of where our smart devices will get their next charge. Wouldn't it be handy if we could charge our phone by simply placing it upside down on the conference table or bar counter in front of us? The control software of a laser battery would detect our smartphone and then focus laser light on the photovoltaic module built into the back of the screen until the device was fully charged.

Status
As far as the software and laser technology go, his idea is ready to roll. The same applies to the smartphone casing. The only thing that still needs a slight boost is the efficiency of the elements.



The energy yield of a photovoltaic module nearly doubles outside the Earth's atmosphere. Solar cells in orbit could use the energy they capture to generate a laser beam and direct it at solar farms on Earth. Despite the conversion losses and the fact that the laser light would have to penetrate the atmosphere, this should still offer a substantial benefit over purely terrestrial photovoltaic farms with the same surface area.

Status
Despite various proofs of concept, there is still a long way to go. For one thing, the huge construction that would
be required in space might well depend on our ability to implement the space elevator in our first example.

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