

Stanford researchers get solar panels to produce electricity without sunlight

Article

The news: Researchers at **Stanford University** have invented a breakthrough solar panel that can generate electricity at night. It's based on **radiative cooling**, in which Earth's surface

rapidly loses heat after the sun sets—a phenomenon that could be game-changing for [sustainability](#).

- According to a recent [study](#), the solar panel can absorb energy from the sun during the day and from dissipating heat at night, [per](#) SciTechDaily.
- The reportedly **inexpensive technology can be incorporated into existing solar cells** to harvest nocturnal energy supplies in remote areas.
- Researchers were able to generate **50 milliwatts per square meter**, which is enough to power a small device like a smartphone or LED light, [per](#) NewScientist. However, they believe there's potential for higher yield.

Here's how it works: Any object that stores heat becomes an energy source as night falls. The process creates a **temperature difference between a surface and the air above**.

On a clear night, the temperature of a solar panel can similarly drop a few degrees below the temperature of the surrounding air in the absence of clouds reflecting the infrared energy back to Earth. The Stanford team designed a **thermoelectric generator** that turns some of the dissipating heat into electricity.

A cool opportunity: Although radiative cooling may seem revolutionary, it's based on physics used by [ancient peoples](#) for refrigeration. Today, radiative cooling technologies are making a comeback that will be crucial for sustainability efforts in the form of **passive air conditioning, renewable energy [reliability](#), and water security**.

- The new solar cells can reportedly not only [extend](#) the lifespan of solar panels, but also **power scores of environmental field sensors** and other IoT devices, **reducing the need for batteries**. In turn, a reduced need for batteries to power devices in remote areas could lead to less environmentally destructive [mineral mining](#).
- With an estimated [770 million people](#) in the world without electric grid access, a nocturnal solar panel upgrade could provide vital lighting produced from renewable energy.
- The technology can help make solar power more reliable, which has been a major stumbling block for renewable energy expansion. Beyond nighttime use, it can also boost solar capacity if the sun is temporarily blocked or if the panels are pointing in the wrong direction.
- There are crucial daytime applications of radiative cooling as well: [SkyCool Systems'](#) technology has applied it to a zero-energy replacement for [air conditioning](#). And [ETH Zurich](#)

researchers have harnessed it to create a zero-energy solution to secure potable water supplies in drought-prone areas.

