

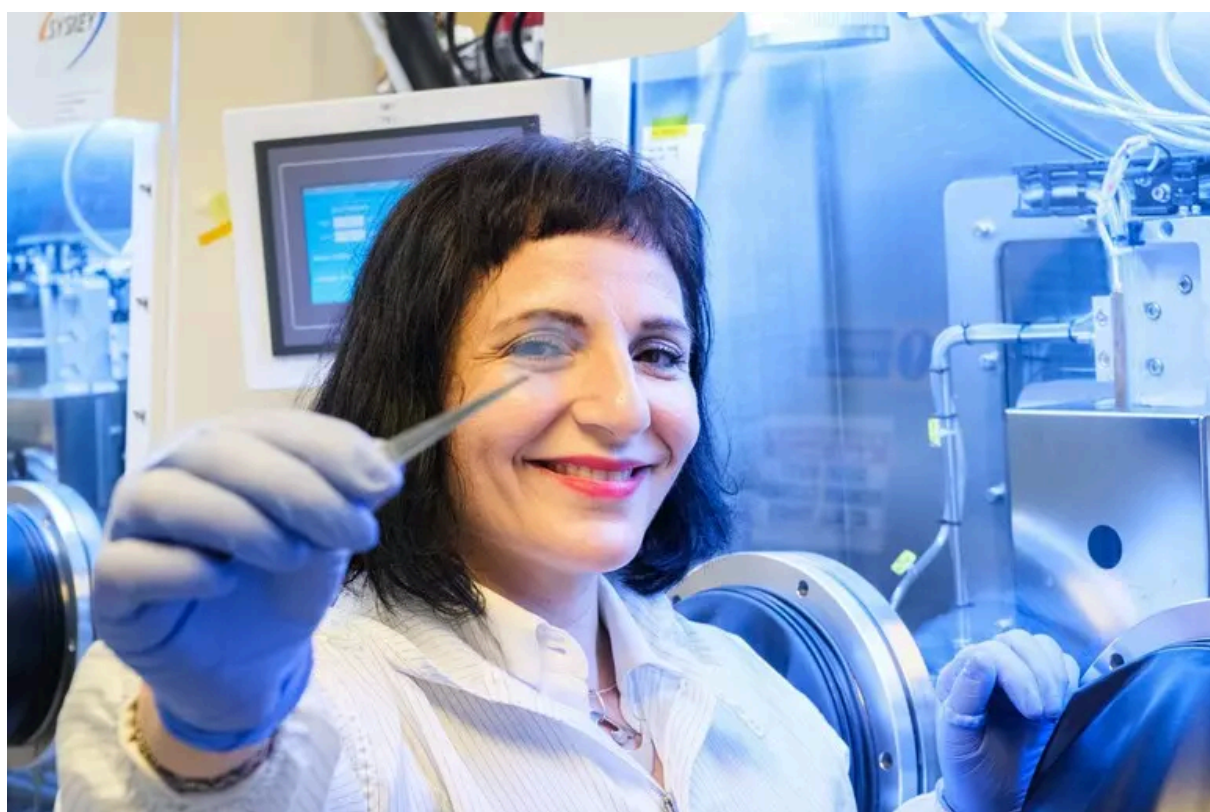
Invisible solar cells turn windows into power generators

Integrable into buildings, vehicles and wearable electronic devices

May 19, 2026, 10:43 AM

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Condividi



↑ Annalisa Bruno looks through an ultrathin perovskite solar cell measuring just 10 nanometers. (Source: Nanyang Technological University) - ALL RIGHTS RESERVED

Create nearly **invisible solar cells** that can be integrated into **buildings, vehicles, and wearable electronics**, transforming any surface—from windows to displays—into **power generators** without altering their appearance.

Made from **perovskite** , they are about 10,000 times thinner than a human hair and about 50 times thinner than conventional perovskite solar cells.

Described in the journal ACS Energy Letters, the innovative technology has achieved some of the highest **energy conversion** efficiencies **ever** recorded for this type of ultrathin device and was developed by Nanyang Technological University in Singapore under the leadership of Annalisa Bruno, a pioneer in the field of perovskite solar cells. Furthermore, unlike traditional silicon solar cells, the **new devices** are able to **generate electricity** even in and diffuse **sunlight and are therefore particularly suitable for vertical surfaces** or in conditions of **frequent cloud cover** .

The new cells are composed of several layers, including a semiconductor layer that absorbs sunlight and converts it into electricity. To create them, the team used a **method compatible with industry and large-scale production** , known as **thermal evaporation** , which allows for the depositing of very thin and uniform perovskite layers over large surfaces, avoiding the use of toxic solvents, reducing defects in solar cells, and improving the ability to convert light into electricity. Furthermore, by controlling the layer **thickness, both opaque and semi-transparent devices can be created.**

"A semi-transparent cell with a 60-nanometer perovskite layer," explains Luke White, first author of the study, "allowed about 41% of visible light to pass through, converting sunlight into electricity with an efficiency of 7.6%." **Preliminary estimates** suggest that an **installation on a large glass-fronted** building could theoretically **generate several hundred megawatt-hours** of electricity per **year** , equivalent to the **annual** electricity consumption of about **100 four-room** apartments .

"Buildings," Bruno concludes, "account for about 40% of global energy consumption, so low-impact technologies that cover building surfaces and convert them into energy sources could make a difference in **reducing the carbon footprint** ."