

Smart lighting solution harvests daylight for underground light

BY TIM SANDLE 6 HOURS AGO IN SCIENCE

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Is it possible to develop a 'smart' device that can harvest daylight and then relay this to underground spaces like car parks? Such technology is in progress and it fits with the sustainability drive.



The quest for new forms of lighting, with lower energy costs and a reduced environmental impact, is occupying the time of many physics laboratories around the world. For example, researchers have developed [a new dye for solar cells](#) that allows effective power-conversion efficiency at a low cost. The dye permits solar cells to carry on functioning under low-light conditions, and this promises a new generation of self- and low-powered devices.

[With the daylight harvesting innovation](#), this comes from Nanyang Technological University. Here researchers have taken relatively simple technology to create something novel. The researchers have used a acrylic ball, a single plastic optical fibre (a cable that carries a beam of light from one end to another) together with computer chip-assisted motors.

The device is positioned on the ground. During times of daylight, the acrylic ball functions as the solar concentrator. This leads to parallel rays of sunlight to coalesce to form a sharp focus at the opposite side of the device. The focused sunlight can be harvested into the end of a fibre cable. The collected energy is then transported via the cable, underground. Under the ground, light is emitted from fibre cable to the point it is required.

The computer function can automatically adjust the position of the fibre's collecting end. This acts to optimize the quantity of sunlight received and transported. Mechanical adjustments are made, tracking the Sun as it traverses across the sky.

In terms of the application of the technology, in Singapore there is a desire to go deeper underground to create new spaces. This includes infrastructure and

utilities, as well as shopping malls and car parks. This is fostering a demand for round-the-clock underground lighting and new, greener solutions are being

The research **appears in the journal** *Solar Energy*, where the research is titled "Hybrid daylight harvesting system using static ball lens concentrator and movable optical fiber."