



Pinecone | Photo source Pixabay

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A SUNSHADE THAT MOVES WITHOUT USING ELECTRICITY

 SCIENCE & ENVIRONMENT

A new sunshade design could keep buildings cool without using any energy.

At Springwise, we have seen some innovative designs for sunshades. These have included a [folded building façade](#) and a canopy moved by [drones](#). Now, a civil engineering doctoral student at ETH Zurich's [Institute for Building Materials](#) has developed an adjustable shading system that can change shape throughout the day – without using any motors or sensors.

Engineer Chiara Vailati developed a prototype inspired by the design of the pinecone. Vailati studied the way that pinecone scales open and close in response to changes in humidity. The scales of the pinecone consist of two connected layers that contract to different degrees as the humidity decreases. If the humidity decreases, the scales bend and move from a straight to a curved shape.

Vailati's shade is built out of wooden planks that are aligned in parallel. Each wooden plank consists of two layers, each made of different kinds of wood. The fibres in the wood are oriented perpendicular to each other. As the humidity changes throughout the day, the planks open and close as the wood swells and shrinks. In the morning and at night, when the air is humid, the planks are flat and vertical. At midday, when the sun is high and the air is dryer, the planks bend and provide shade. According to Vailati, "I wanted the system to be made of environmentally friendly materials, use very little energy and have low installation and maintenance costs."

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Takeaway:

Vailati's shade design has been patented by ETH Zurich. A commercial version could reduce energy usage by keeping buildings cool in the summer. The shade reduces the amount of heat that enters a building and therefore the need for cooling. Because it does not use any energy itself, similar shades could be a part of energy-neutral buildings. What other energy-free ways might there be to keep buildings cool?