

New water-cooling solar panels could lower the cost of air conditioning by 20%



Most of us have heard of solar water heaters. Now there's a solar water cooler, and the technology may sharply lower the cost of industrial-scale air conditioning and refrigeration.

The new water coolers are panels (for example: [SUNJACK 14W PORTABLE SOLAR CHARGER](#))

that sit atop a roof, and they're made of three components. The first is a plastic layer topped with a silver coating that reflects nearly all incoming sunlight, keeping the panel from heating up in the summer sun. The plastic layer sits atop the second component, a snaking copper tube. Water is piped through the tube, where it sheds heat to the plastic. That heat is then radiated out by the plastic at a wavelength in the middle region of the infrared (IR) spectrum, which is not absorbed by the atmosphere and instead travels all the way to outer space. Finally, the whole panel is encased in a thermally insulating plastic housing that ensures nearly all the heat radiated away comes from the circulating water and not the surrounding air.

Researchers at Stanford University in Palo Alto, California, recently placed three water cooling panels—each 0.37 square meters—atop a building on campus and circulated water through them at a rate of 0.2 liters every minute. They report today in *Nature Energy* that their setup cooled the water as much as 5°C below the ambient temperature over 3 days of testing. They then modeled how their panels would behave if integrated into a typical air conditioning unit for a two-story building in Las Vegas, Nevada. The results: Their setup would lower the building's air conditioning electrical demand by 21% over the summer.

“It’s an excellent paper,” says Ronggui Yang, a mechanical engineer at the University of Colorado in Boulder, who earlier this year reported the development of a plastic film that cools everything it touches up to 10°C. Because the plastic IR-emitting materials are commercially available in large quantities, it shows that the technology has the potential to be scaled up, Yang says. “It shows a promising direction for real world use.”

Aaswath Raman, a physicist and member of the Stanford team, says that since conducting this initial experiment, he and his colleagues formed a startup company called SkyCool Systems in Burlingame, California, to commercialize the technology. The company has scaled up the panels to 1.65 square meters each, and is now conducting a larger field trial in Davis, California. Because cooling systems consume roughly 15% of all electricity and account for 10% of global greenhouse gas emissions, Raman says, the new water coolers could make a dramatic impact on global energy use.