

Solar-Powered Desalination

Curious Cat Science and Engineering Blog

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Saudi Arabia meets much of its drinking water needs by removing salt and other minerals from seawater. Now the country plans to use one of its most abundant resources to counter its fresh-water shortage: sunshine.

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KACST's main goal is to reduce the cost of desalinating water. Half of the operating cost of a desalination plant currently comes from energy use, and most current plants run on fossil fuels.

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Reducing cost isn't the only reason that people have dreamed of coupling renewable energy with desalination for decades, says Lisa Henthorne, a director at the International Desalination Association. "Anything we can do to lower this cost over time or reduce the greenhouse gas emissions associated with that power is a good thing," Henthorne says. "This is truly a demonstration in order to work out the bugs, to see if the technologies can work well together."

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Saudi Arabia, the top desalinated water producer in the world, uses 1.5 million barrels of oil per day at its plants, according to Arab News.

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In a concentrated PV system, lenses or mirrors focus sunlight on ultra-efficient solar cells that convert the light into electricity. The idea is to cut costs by using fewer semiconductor solar cell materials. But multiplying the sun's power by hundreds of times creates a lot of heat. "If you don't cool [the device], you end up overheating the circuits and killing them," says Sharon Nunes, vice president of IBM Big Green Innovations. IBM's solution is to use a highly conducting liquid metal—an indium gallium alloy—on the underside of silicon computer chips to ferry heat away. Using this liquid metal, the researchers have been able to concentrate 2,300 times the sun's power onto a one-square-centimeter solar device. That is three times higher than what's possible with current concentrator systems, says Nunes.

Finding good desalination solution could help many other locations (including southern California). But there is still a long way to go.

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