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Researchers mapped places that most effectively reject heat from the ground.

CREDIT: CARLOS COIMBRA

Researchers Create Passive Cooling Maps

SAN DIEGO—Researchers at the University of California, San Diego have created detailed radiative cooling resource maps to help determine the best climates for large-scale deployment of passive cooling technologies. The researchers said the American Southwest shows great potential, but areas where relative humidity depletes the ability to use this cold reservoir resource show less potential.



EPFL

The technique devised by the research team considerably simplifies the first step in developing turbochargers.

AI Makes Heat Pumps More Efficient

LAUSANNE, SWITZERLAND—A research team at EPFL's Laboratory for Applied Mechanical Design has developed a technique to make conventional heat pumps more efficient and better for the environment. While engineers can use microturbocompressors in the place

of traditional compression systems to minimize heat pump power requirements, problems emerge due to the very small size of the microturbocompressor components. To solve these design problems, researchers used a machine-learning method to develop simple equations for calculating the ideal dimensions of a turbocompressor for a specified heat pump.

Eliminating Mechanical Pumps

RICHLAND, WASH.—Researchers at the Pacific Northwest National Laboratory have introduced an alternative method using a molecular-based pump, which could use 25% less energy than a mechanical pump or compressor. Molecular pumping is free of moving mechanical parts, and if successful, the concept could render mechanical compressors used today in air-conditioning and heat pumps obsolete. The researchers found transporting fluid by switching a porous capacitor on and off like a light switch is more energy efficient.

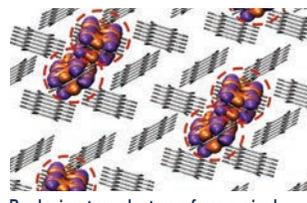
N.Y.C. Zoning To Help Flood-Proof Buildings

NEW YORK CITY—New York City has released zoning recommendations to help flood-proof buildings. The plan

would expand the area where flood-resilient zoning provisions apply and give more flexibility to elevate mechanical, electrical and plumbing equipment to heights above flood-risk areas, including on roofs or in separate structures.

Hydrogen-Powered Boiler In Operation

APELDOORN, THE NETHERLANDS—A Dutch company, BDR Thermo Group, has developed a hydrogen-powered boiler that emits virtually no carbon dioxide. The boiler burns pure hydrogen produced by wind or solar energy. For the first time outside of a laboratory, this setup will be used to fuel a condensing boiler for the central heating system in a residential building.



MIT RESEARCHERS

Producing two electrons from a single photon of light is called "singlet fission."

Increasing Solar Cell Output

CAMBRIDGE, MASS.—MIT researchers have demonstrated a method for getting high-energy photons striking silicon to kick out two electrons instead of one, which could break through the theoretical solar-cell efficiency limit. Conventional silicon cells

have an absolute theoretical maximum efficiency of about 29.1% conversion of solar energy, and the new approach could add several percentage points to that maximum output.

Chicago Overhauls Building Code

CHICAGO—Chicago is overhauling its building code in its first update since 1949. The update will be in line with national standards and allows for a wider range of building materials allowed, seismic requirements, a streamlined permitting process and more. The overhaul will be gradually phased in with the first phase expected to be implemented this fall.

Chip Converts Wasted Heat to Usable Energy

SALT LAKE CITY—About two-thirds of energy annually consumed in the U.S. is wasted as heat. Researchers have discovered how to produce more electricity from heat by creating a silicon chip that could convert more thermal radiation into electricity. The chips could increase the efficiency of solar panels by increasing the amount of electricity from the sun's heat, or power a car's electrical systems by taking the heat from the engine.