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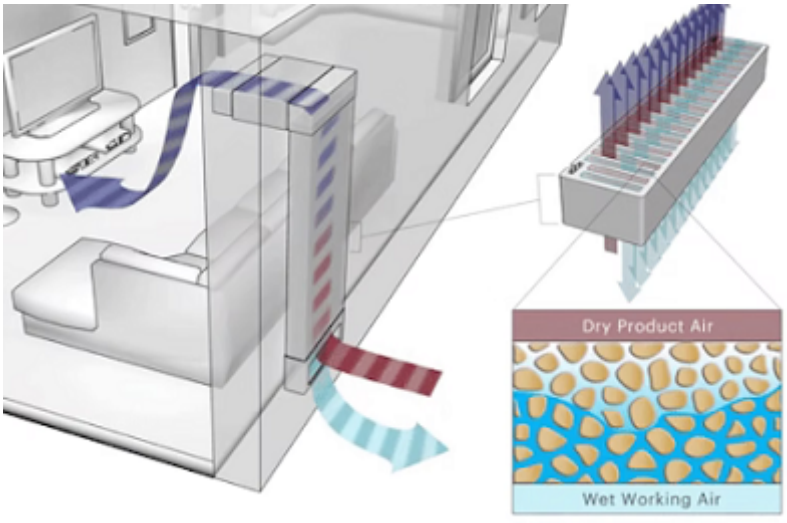
Water powered air conditioner

Credible experts are projecting that the world demand for air conditioning is likely to increase three-fold by the midpoint of this century. As temperatures continue to rise, this is a concern; especially for a team of ambitious researchers from Harvard University's Wiss Institute who are collectively engaged in developing and testing energy-efficient refrigeration systems.

An innovative cooling system without synthetic refrigerants in development, based on water evaporation, uses up to 75% less energy than conventional air-conditioning units. It's based on vapor-compression refrigeration systems according to preliminary data.This was achievable in certain climates and operating conditions in the laboratories of Harvard University's Wyss Institute.

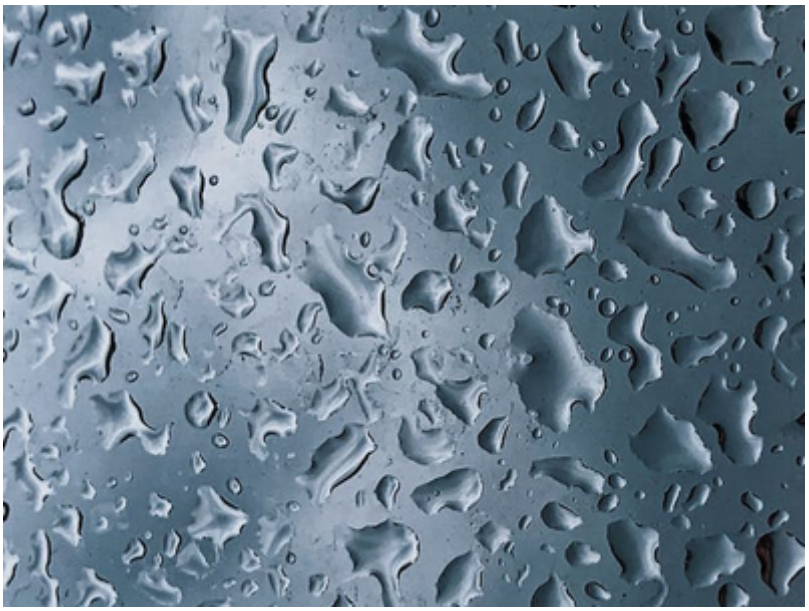


The system, known as cSNAP, works with evaporative cooling technology, developed thanks to the participation of a multidisciplinary team of scientists and designers from Wyss Institute, Harvard University's Graduate School of

Design (GSD) and Harvard's Center for Green Buildings and Cities (HCGBC); in collaboration with Spain-based flooring supplier Gres Aragón-Faveker, which is designing and manufacturing the ceramic tiles for the unique system.

GRES ARAGÓN
SOLUTIONS FOR LIVING

The group of people participating in the project from Gres Aragón-Faveker included Ainhoa Bilbao, Sara Ejarque and SAMCA Group's Director of R&D&I, Miguel Ángel Caballero. Wyss Institute and Harvard University's Graduate School of Design's project team included Joanna Aizenberg, Martin Bechthold, Jack Alvarenga, Jonathan Grinham and Ally Chang.



What is cSNAP? It is a long-lasting, low-cost, low-energy evaporative cooling system that works in hot, humid climates. This eco-friendlier option could replace the air-conditioning units that work with vapor-compression refrigeration systems. This remarkable system is much more economical. How so? Since it only requires water to operate, instead of liquid refrigerants, it could be used in developing countries where the conventional refrigeration systems have been ruled out simply because they are too expensive for them.

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The ceramic tiles are coated in a nanoscale hydrophobic material, which cools the air without raising humidity levels. The innovative, specially designed coated ceramic tile isolates incoming hot air from outgoing wet air, which allows the hot air to be cooled by circulating water without adding unwelcome humidity to the inside of the building. These ceramic tiles are formulated differently from conventional ceramic materials to meet the system requirements. They are designed so that the coating and air flow are distributed across the whole surface so as to maximize their energy efficiency.

Researchers fitted a device to HouseZero, on the Harvard University campus for the purpose of validating their results within real-world conditions; where it was proven to cool the indoor air efficiently and even in extremely hot conditions. The research team continues to work on it. Its evaporative cooling system is being combined with additional innovations that pre-treat and dehumidify the input air, maximizing its cooling capacity even further; facilitating its use in a wide variety of markets and climate zones worldwide.

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