

How to Cool Datacentres with Datacentre Heat

Written by Marco Attard
31 July 2015

IBM researchers plan to use an unlikely material to cool datacentres-- a dessicant similar to silica gel packs found in shoe boxes converting waste heat into cool air, thus making for self-cooling datacentres.



Through a project named THRIVE the researchers are working on a waste heat-powered heat pump. Traditional heat pumps (such as those in refrigerators or AC units) draw warmth from the surroundings to vaporise a refrigerant in an evaporator. The vapor rises into an electrically-powered compressor before it turns into liquid and runs back into the evaporator.

The THRIVE heat pump, on the other hand, features an "absorption heat exchanger" running on heat at temperatures from 60°C, not electricity. The heat exchanger works like a radiator, pulling vapour and compressing it using fins filled with the aforementioned silica gel desiccant. The process uses less electricity than conventional heat pumps (leading to higher cooling or heat output in relation to wattage used), and uses pure water instead of potentially harmful refrigerant as a coolant.

In addition the system can run on renewable heat sources such as solar-thermal systems running at temperatures of up to 90°C.

"Through the extensive use of the adsorption heat pumps we are looking to develop in THRIVE, it could theoretically be possible to reduce the electricity demand for heating and cooling purposes by up to 65% and the consumption of fossil fuels for heat production by up to 18% by 2040," IBM claims.

The project can find applications other than datacentre cooling in the future, such as providing

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air conditioning in homes or offices through the waste heat from datacentres or concentrated photovoltaic plants.

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