

RADIATION SYSTEM. AIR CONDITIONER AND WATER HEATER INDEPENDENT OF ELECTRICITY

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According to one of the reports from the University of Berkeley, 700 million air conditioners will be installed in the world by 2030, and this figure will reach 1.6 billion by 2050. In terms of electricity consumption and greenhouse gas emissions, this is comparable to the emergence of several new countries in the world.

80% of air conditioners contain R22 freon, which contains hydrofluorocarbons (HFCs). According to scientists, this freon has a destructive effect on the ozone ball and contributes to global warming.

In order to reduce this effect, in 2016, 200 countries from all over the world signed agreements on the replacement of R22 freon with three-component freon 407 and two-component R 410a in the production of air conditioners.

To maximize the effect, researchers are exploring how to use a passive turbocharged cooling technology known as radiation cooling or sky cooling with sunscreen nonmaterials that radiate heat from the rooftops of buildings.

A new study by engineers at the University of Buffalo describes a unique radiation cooling system that:

- does not use toxic substances;
- reduces the temperature inside the test system outdoors in direct sunlight by more than 12 degrees Celsius;
- uses solar energy to heat water up to about 60 degrees Celsius.

The system tested was only 70 centimeters squared and could be extended to cover roofs to reduce society's reliance on fossil fuels for cooling and heating.

The system consists of two mirrors made of 10 very thin layers of silver and silicon dioxide arranged in a "V" shape. These mirrors absorb incident sunlight, converting solar energy from visible and near infrared waves into heat. Mirrors also reflect mid-infrared waves from a "radiator" which then reflects the heat they carry into the sky.

Such a system can store the effects of solar heating and radioactive cooling in one system without the need for electricity. This is an opportunity to preserve the ecosystem and help communities with limited access to electricity.

References:

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