Cheap beads offer alternative solar-heating storage

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A cheap material that can store heat energy collected from the sun during the day that can be released slowly over night has been developed by researchers in the India. The material based on paraffin wax and stearic acid is described in a forthcoming issue of the *International Journal of Renewable Energy Technology* and could help keep homes warm in sunny parts of the world that get very cold at night without burning wood or fossil fuels.

Mechanical engineer Meenakshi Reddy of Sri Venkateswara College of Engineering and Technology, in Chittoor, Andra Pradesh, and colleagues explain how certain materials, known as phase change materials (PCM) can store a large amount of heat in the form of latent heat in a small volume. PCMs have a high heat of fusion and melt/freeze at a certain temperature. Heat is absorbed when the material melts and released when it freezes. Heated in the sun, the mixture of paraffin wax (which melts at about 37 Celsius) and stearic acid (a fat commonly used to make soap) becomes entirely liquid. However, as it solidifies it slowly releases the stored heat. The process is akin to the phase changing heating that occurs in hand-warmers that contain a PCM but in this case the material does not need to be boiled in a pan or heated in a microwave oven to absorb latent heat.

The team has now tested spherical capsules just 38 millimetres in diameter containing a blend of paraffin and stearic acid, which can be floated on the top of water in a tank. Stearic acid is a lot cheaper on the Indian market than paraffin and more readily available. The team found

that costs could be held down without reducing the overall heating efficiency of the capsules by lowering the proportion of paraffin wax.

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