PHASE CHANGE MATERIALS (PCMs) can be filled with a gel-like PCM that undergoes temperature changes. They melt as herders work up a sweat walking to mountain pastures, then when the herders stop moving, the pent-up heat is slowly released, keeping them warm as they watch their herds. A German solar energy company is now testing PCMs for storing the sun’s energy using only one third of the space required by current storage systems. PCMs are currently used almost exclusively in research and innovation fields but experts predict that their annual sales will grow to $130 million by 2020. Not bad for a technology based on the properties of water and yak butter.

Efficient: Mudbrick walls take a long time to heat up and long before they become hot enough to warm the building, the sun has set and the walls cool again during the night. To be effective, though, they have to be very thick. A 15cm thick layer of PCM, on the other hand, can absorb the same amount of heat as a 2cm thick layer of concrete making it infinitely easier and cheaper to work with.

Cavities within a building’s walls can be filled with a gel-like PCM which starts to melt at 20°C to 30°C but, crucially, does not get any hotter. It simply undergoes the phase change from solid to liquid while storing the incoming heat energy. When temperatures drop the PCM freezes again, releasing the stored energy into the cool night air and recharging itself ready for the next day’s heat.

The heat energy that PCMs store can be harnessed rather than lost back into the atmosphere. In western China, PCMs made from yak butter are woven into clothing. They melt as herders work up a sweat walking to mountain pastures, then when the herders stop moving, the pent-up heat is slowly released, keeping them warm as they watch their herds.

**KATRINA STOKES**

A CREEK running through Cornerstone College is allowing students to get a close look at water issues in South Australia. The school’s Year 8 to 12 students take advantage of the creek, named Purtinga Creek, and use it as part of their everyday studies in a range of subjects including geography, biology and outdoor education. The creek runs through the school property and into Mt Barker Creek, the Bremer River and finally Lake Alexandrina. Students monitor the creek as well as the adjacent wetland ponds, which filter runoff from the freeway and residential areas. Sustainability education co-ordinator Mary Butler said while the difficulty of study increases from Year 8 to 12, all students learn about the importance of water as a resource. Ms Butler said students of all ages learn about ecosystems and the need to protect river systems such as the River Murray. “Initially the study would be quite local and then expand to include studies from other countries,” she said. In addition to her classroom work, Year 11 student Maddie Sarre, 16, volunteers with the River Murray Youth Council. The group of high-school students meet on a regular basis in Murray Bridge to discuss environmental initiatives. These initiatives included water monitoring and revegetating, that they can implement.

Maddie said a healthy environment for future generations was important. She said the River Murray was important for both Australia’s wildlife as well as its people. “So much of our water comes from the river,” she said.

“The River Murray needs a certain amount of water to be healthy and it is under a lot of stress because everyone wants the water, and there isn’t enough,” she said. Her classmate, Alice Woodward, 16, agreed. “Without water we would not have wetlands or the wonderful ecosystem that has formed in or on the banks of the River Murray,” she said.

“The River Murray most of the people in Australia would not have water.

**DID YOU KNOW?**

- Phase Change Materials (PCMs) store energy when they melt and release it when they freeze.
- Many different substances are already used as PCMs, including water, beeswax and yak butter.
- In the United States, the University of Washington in Seattle is being built with PCMs in the walls and ceiling panels and is predicted to use 90 per cent less energy for heating and cooling than conventional buildings.
- For further reading, see the Australian PCM R&D and manufacturing company at www.ppaustralia.com.au.