Build your own sand battery

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Storing energy can be done in many ways, with the chemical storage method of a battery being one of the most common. Another option is a thermal battery, which basically means making something hot, and later extracting that heat again. In this video by [Robert Murray-Smith] the basic concept of a thermal battery that uses sand is demonstrated.

By running a current through a resistive wire that's been buried inside a container with sand, the sand is heated up to about 200 ?C. As [Robert] points out, the maximum temperature of the sand can be a 1000 ?C or more. Because sand doesn't boil like water, the total amount of energy stored in sand is correspondingly higher.

Extracting the thermal energy can be done rather inefficiently using the demonstrated Peltier element. A Stirling engine, or steam generator and turbine, would get a lot more energy out. Either way, the thermal battery itself is made using just plain sand, which makes it an attractive DIY target to tinker with.

Having any kind of shop is pretty great, no matter how large it may be or where it's located. If the shop is in an outbuilding, you get to make more noise. On the other hand, it will probably get pretty darn hot in the summer without some kind of cooling system, especially if you don't have a window for a breeze (or a window A/C unit).

[Curtis in Seattle] built an awesome thermal battery-based cooling system for his shop. The battery part consists of five 55-gallon drums full of tap water that are connected in series and buried a foot underground, about two feet out from the wall. There are two radiators filled with water and strapped to 20″ box fans — one inside the shop, which sends heat from the shop into the water, and another outside that transfers heat out of the water and into the cool night air. Most summer days, the 800-square-foot shop stays at a cool 71?F (21.7?C).

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