

## Building the Device

Decide on the area you want to cover and cut the black plastic to this area. Previous units have been about 1.5 m by 2.5 meters, but any size is possible. If one is going to dry things, put the long axis of the Solar Household Energy Bank running east west, and put the things to be dried on the side toward the sun. If you are not drying things, the orientation doesn't matter.

Put down about 5 cm of loose insulation, as seen below. Straw, weeds, rice husks, leaves, and other things can be used.



**About 5 cm of loose insulation. Here, I started with weeds and corn husks, then added straw to build it up to 5 cm thickness.**

Put the black plastic over this insulation. Some rocks in the corners of the plastic help to hold it down.





**A sheet of black plastic over the insulation.**

Other dark objects can be used instead of the plastic. One of the early builders of one of these devices used some scrap steel left over from a building project that would work better than the black plastic.

Put the objects to be heated directly on the black plastic. In some early tests when buckets of water were heated I put bricks under the buckets. This turned out to be counter productive, using no bricks is both simpler and better, as shown below.





**This photo shows a single bucket of water to be heated and 6 pieces of wood to be dried. Put the objects to be heated on top of the black plastic.**

The top clear layer can be clear or it can be translucent, both types seem to work about the same. If the top layer is thin, it will decay quickly due to ultraviolet radiation and heat, it is better to use thicker plastic, 2-3 mills minimum (0.05 to 0.08 mm) in thickness. UV resistant plastic is available that will last longer, about a year in the tropical sun and up to 4 years in more temperate climates. The photo above shows how one of the longer edges of the top layer is help down permanently with a line of rocks. Then, when putting things in or taking them out of the xxxxx, the plastic can be folded back along this line to get access to the system. Rocks can be temporarily placed in the corners of the black plastic to hold it down on a windy day.



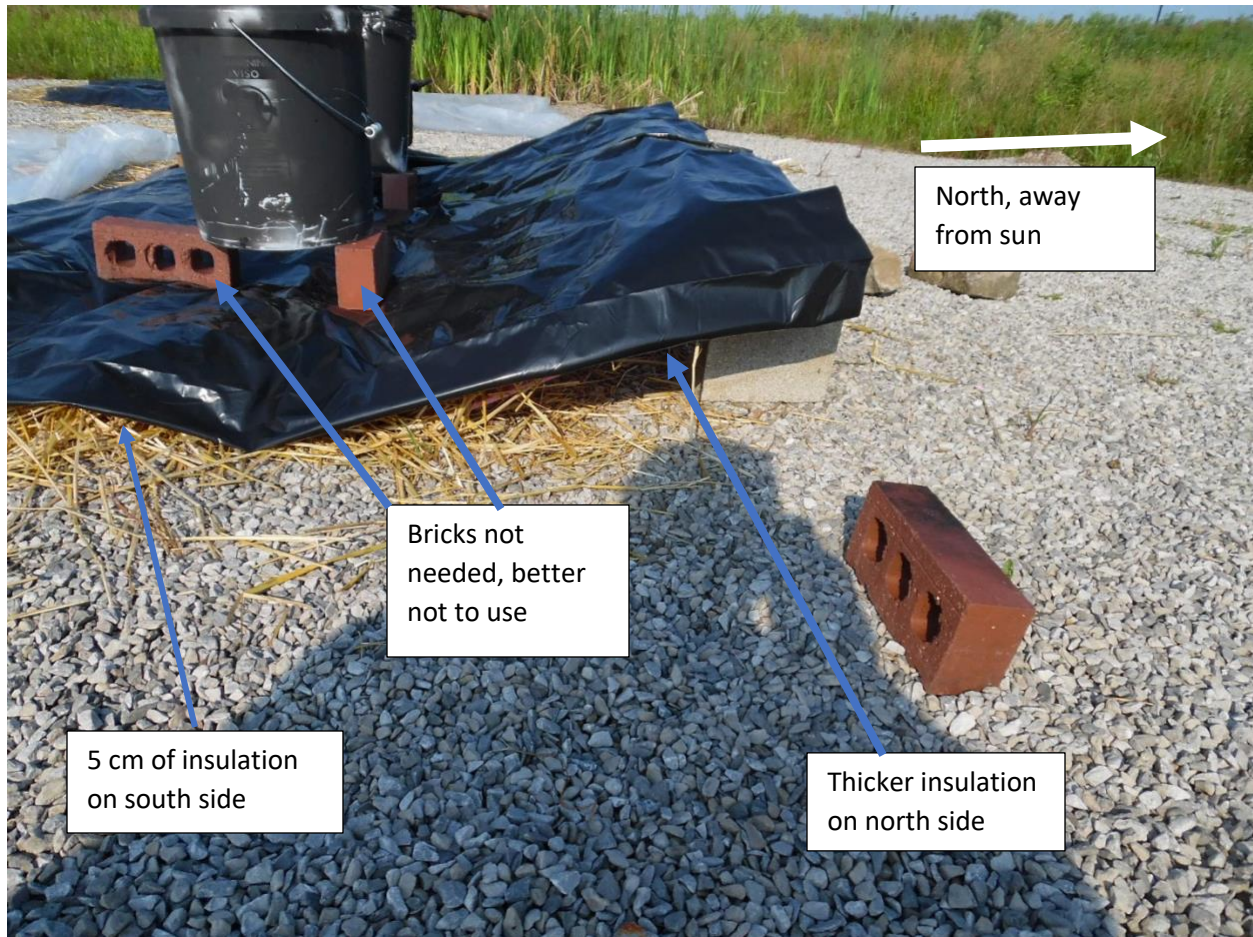


**The system with the clear top layer added. This unit has 6 buckets of water. Typically, 4-6 rocks are used on each long edge, and 3 or so are used on the short edges. This provides a seal around the edges that is good enough to hold in the heat, but loose enough that there is some air circulation to carry away moisture. The plastic is snug on the top of the buckets to prevent much evaporation.**

If you didn't have a bucket you could replace the bucket with light objects that were tall enough to support the top layer of plastic. Bricks or wood could be used. In the background of the photo above is a 20-liter jerry can which is supporting the clear layer.

If you are heating buckets of water, the buckets should not have lids, as in the photo above. This allows direct sunlight down into the buckets and heats them faster. Once the buckets are taken out of the system, if you are not using the hot water right away, the bucket should be covered with something, either a lid or a layer of plastic held tight around the edges of the bucket to prevent evaporation.

If you are not in a tropical latitude it might be better to tilt the side of the unit that is away from the sun. If you are in the northern hemisphere at latitudes greater than the Tropic and Cancer, run the long axis of the unit east west, and tilt the northern half of the unit up  $10^{\circ}$  or so, as seen below.



**This shows a system for the northern hemisphere at higher latitude, with the north side of the collector tilted. In the southern hemisphere, have the south side tilted up. This was an early version of the Solar Household Energy Bank, that used bricks under the buckets. Later tests showed that the system was better without these bricks.**

The full length technical report gives a lot more technical details about the operation of the system. It also gives some short cuts that could be used. For example, it was determined that omitting the black plastic gave somewhat of a performance penalty but not a huge one. The technical report talks about this performance penalty, and possible other short cuts that might be taken.