

Types of Solar Cooker

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Solar cookers have two jobs to do: –

- a) they must concentrate solar energy onto a food container to heat up the food, and
- b) then they must prevent that heat from escaping.

There are several ways of achieving these two goals. Each has advantages and disadvantages. Four types of solar cooker have evolved over the years, and some hybrids. The four main types are described below:

1) The simplest and cheapest solar cooker is the **Panel Cooker** (right). The shiny panels reflect sunlight onto a black food container that sits inside a transparent 'greenhouse'. In this case, a large glass container is being used. Its job is to prevent heat from the cooking pot escaping too easily to the air. Heat resistant plastic



**CookKit
Panel
Cooker**

bags – like microwave bags, can be used instead of a glass container. This design – the *CookKit* - is widely used in refugee camps, and you can download a template from the internet. Its reflective panels can be made from nothing more expensive than the inside surface of old crisp packets and some discarded cardboard. Even a commercially produced version will cost less than £10 delivered. They are effective enough to boil water and to cook a couple of litres of food if they receive bright sunlight for 4 to 6 hours. Once pointed towards the sun, they need only be moved every two hours or so, and this means the cook can leave them unattended and do other tasks. These could be regarded as the 'slow cookers' of the solar cooking world.



**Box
Oven**

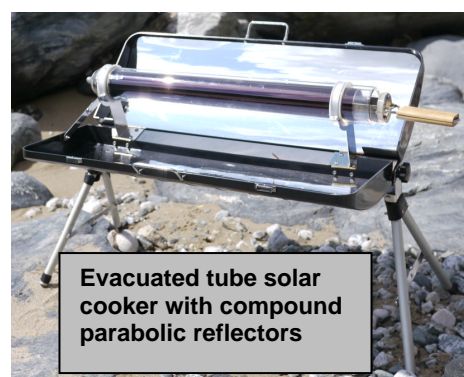
2) Solar **Box Cookers** are a little more complicated, but still relatively cheap to build for yourself. Here (above left) is a picture of a version produced commercially in Portugal. Internal temperatures can exceed 180°C, so you can cook (and brown) bread inside these. Sunlight is reflected from mirrors through the glass lid of the box. The inside of the box and the cooking pot are black, and so they heat up. This heat is retained because the box itself is well insulated. Like panel cookers, these can be left unattended for hours at a time.

3) **Parabolic Cookers**, like the one pictured on the right, are particularly good at focusing all of the available energy onto the cooking container, and this means they can be used to cook (or burn!) food quite quickly. They certainly cannot be left unattended, and must be refocused on the sun every twenty minutes or so as it moves across the sky. Their power output is only constrained by their diameter. A parabolic cooker with a diameter of 2 metres would produce over 2 kW but it would be unwieldy, especially in a strong wind. So



**Parabolic
Cooker**

much power is produced that little attempt is usually made to insulate the cooking vessels used with parabolic cookers.



**Evacuated tube solar
cooker with compound
parabolic reflectors**

4) Evacuated tube cookers (left) rely on a technology first developed for solar water heating. The tube is double walled and made of borosilicate glass. A vacuum between the two tubes prevents heat escaping, and the black coating on the inner tube is 'selective' so it absorbs the maximum amount of light energy while re-emitting very little. The food is placed inside the inner tube, usually in a tray. The parabolic reflectors focus almost all of the sunlight that strikes them onto the cooking tube and they are by far the most efficient solar cookers developed to date. They are less robust than simpler cookers, but allow food to be cooked even under bright but overcast skies.