



solar cookers



Solar cooker at the Big Green Gathering.

what are they?

They're cookers that use sunlight for fuel. They generally have 3 components:

- Black pot containing what you want to heat – food or water, or you might want to dry something (solar cookers can be solar driers).
- Reflector or set of reflectors that focus sunlight on the pot.
- Insulation to retain the heat.

People have used the sun to heat / dry things for millennia, but only in the last hundred years or so have we had efficient reflectors to cook well using sunlight. Most people think of solar cooking as a technology for the tropics – and it is, but our advisors have been achieving oven temperatures of 250°C in the UK. Solar cooking has been neglected, compared to other renewable technologies, and there are various reasons. In some countries, people tend to favour convenience over sustainability or cost; in others there are cultural barriers – especially where gender roles are specific – i.e. where men don't get involved with cooking, and women don't get involved with machinery / technology.

Types of cooker

Solar cooking can be done via photovoltaics. It's more expensive and there's more to go wrong, but it can be done. There are 4 main types of solar (thermal) cooker:

- Parabolic (have reflectors that look like satellite TV dishes, but with a reflective surface) that focus sunlight onto a single point.
- Box – with 5 insulated sides, and a glass lid. Reflectors around the lid reflect sunlight into the box. It's the closest to a conventional oven.
- Reflective panel – the cheapest, but effective. They're light, and the panels can be folded flat for easy storage and transport.

- Evacuated tube – the most efficient. Like a thermos flask, with 2 walls of pyrex glass with a vacuum between them. A parabolic trough reflects sunlight onto the tube. Light travels through the outer glass, hits the dark area on the inner glass (which has a special surface, making it very light absorbent, but a poor radiator).

There are community-scale solar cookers that can cook for 10 to 50 people, or run a local bakery. Solar cooking can be industrial in scale. The largest are in India, and can provide tens of thousands of meals per day. They use arrays of Scheffler reflectors, up to 16 square metres in area, which track the sun and focus light onto pipes carrying water. The water flashes to steam and is piped to large kitchens.

what are the benefits?

In the tropics, the sun can replace wood as a cooking fuel. Dirty water is a killer in the tropics, and an awful lot of wood is used to boil it. Reducing the need for wood can protect habitat, reduce desertification and carbon emissions, and improve air quality and health.

There's not much to go wrong, so they can last a lifetime. Solar cookers tend to cook for longer and at lower temperatures than a gas or electric stove, and a lot of people say that food cooked this way (as with a slow cooker) tastes better.

Once you have the kit, cooking is free. In parts of Africa, families can sometimes spend close to half their income on cooking fuel.

Provide resilience in case of problems with gas/electricity supply.



4 types of solar cooker, clockwise from top left: parabolic, box, evacuated tube, panel.



what can I do?

Read as much as you can first – Joseph Radabaugh's, *Heaven's Flame* remains an excellent source book. Solar Cookers International is another excellent source of information – especially via their wiki. There's also a Facebook Group dedicated to solar cooking in the UK. Look at what people are cooking with solar, what cookers they use, and ask questions. There are many videos about solar cooking on Youtube.

Getting a solar cooker

You can make your own - there are free plans on the Solar Cooking Wiki. The simplest is the Copenhagen – 4 reflectors and a wooden square base. If buying, the market is rather restricted. There are no manufacturers in the UK (yet). It's best to decide what you expect to cook with it, then do some research or ask one of our advisors whether your plans are realistic. For example, box cookers work during the summer in the UK, but not in the colder months, whereas evacuated tube cookers will cook even when there's snow on the ground, as long as the sun is out.

Safety

Take the same precautions as you would in your own kitchen. The pots, food, and liquids will be hot enough to burn or scald, and glass components will shatter if you drop them. In the lower-powered solar cookers, especially in partially cloudy conditions, make sure the food has been heated, all the way through, to at least 65°C. There's another hazard you don't usually encounter while cooking – dazzling reflected sunlight. Wear sunglasses to protect your eyes.

Integrated cooking

There's an obvious disadvantage with solar cookers – you can't cook with them when it's not sunny. But there are two other technologies that can be used alongside – rocket stoves, and retained heat cookers. Using these technologies together is known as 'integrated cooking', the lowest-impact cooking available. This combination enables you to cook at any time, rain or shine, without fossil fuels. If it's sunny, use the solar cooker. If not, use the rocket stove. To keep your food hot for up to 5 hours, or reduce the wood you need for the rocket stove, or free up the solar cooker for another dish, use the retained heat cooker. Integrated cooking can provide you with

resilience in the face of fuel shortages, electricity blackouts, all the way up to societal collapse. You'll always be able to have hot food and safe water if you have a solar cooker, rocket stove, haybox and access to small amounts of firewood.

Cooking this way requires more thought than fossil fuel cooking – you have to watch the weather, cook outside, light fires, plan ahead, and get things going before you're hungry. But remember that reflective panel cookers and box cookers cook 'low and slow', so your food won't burn. This means that you can put your food into the cooker, and walk away, returning every hour or so to point your cooker at the sun again.

The faster/hotter solar cookers – parabolics and tube cookers – require more attention, a bit more like cooking in a conventional kitchen. Rocket stoves require close attention, and a constant supply of small twigs, but they cook very fast, and you can always complete the process using your retained heat cooker. A good retained heat cooker will keep your food above 65°C for four to five hours, so you can eat when you want to.

resources

- lowimpact.org/solar-cookers for more info, links, courses and books, including:
- Joseph Radabaugh, *Heaven's Flame*
- Lorraine Anderson, *Cooking with Sunshine*
- Jane & Seggy Segaran, *Solar, Haybox & Rocket Stove Cooking*
- solarcookers.org – Solar Cookers International
- solarcooking.fandom.com/wiki – solar cooking wiki
- she-inc.org – solar cooking for development



Jacket spuds courtesy of the sun.

Feel free to upload, print and distribute this sheet as you see fit. 230+ topics on our website, each with introduction, books, courses, products, services, magazines, links, advice, articles, videos and tutorials.

Let's build a sustainable, non-corporate system.

facebook.com/lowimpactorg

Lowimpact.org

twitter.com/lowimpactorg

Registered in England. Company Ltd. by Guarantee no: 420502