

# Solar Cooking Basics

## Curriculum



Introductory Manual

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## Introduction

Cooking food with free, decentralized and non-emitting solar energy helps break the cycle of poverty.

Women, children and community members breathe cleaner air, save trees and soil, save money for food and education, and stay safe from violence. Solar cooking improves the quality of life and allows you to adapt to a changing world.

Up to 1.3 billion USD = Total potential cash saved by reducing CO<sub>2</sub> emissions with solar cookers.

Solar cooking helps to reduce social, economic, high iron environmental costs such as black soot, and fossil fuel emissions that affect all human beings and all current environments.

## History of Solar Cooking

*In addition to the general information below, specific information is available for each country. To see the history of solar cooking by country, first [Choose to A country](#) .*



The Moreau solar heat furnace, one of the many mirrors designed to collect the warmth of the sun in a great Surface and focus it in one place to do a useful job.



Associated Press Photo by William Hillig in 1962

A strange antecedent of the current solar cooking movement is the story of what Buti and Perlin call "the MiroBurning IR "(1980, Chapter 3). The Greeks, the Romans and the Chinese all explored the use of curved mirrors, which they said could concentrate the rays of the sun so as to detonate almost all the burning objects.

It is interesting to note that the use they perceived for this aircraft was military-could they focus the mirror on fire, for example, on an enemy warship? Hot mirrors were also used for less dollar purposes, such as that the lighting of altar lights and torches for sacrificial parades, but almost no other applied use was found. The idea, which is now seen in the concentration of solar cooker, is today used in countless regions of the world.

A more direct route to solar cooking is the result of intensive efforts to harness the sun for horticulture. Although found in Roman times in wealthy households, it was only in the sixteenth century (Buti and Perlin, pp. 41) that glass became common and cheap enough to be used for horticulture. Global travel and trade have led to the transport of tropical plants and fruits to the northern countries, which has led to a desire for these products, which could not be grown in northern climates. First the Dutch and the Flemish, then the French and the English built greenhouses for this purpose, heated only by the sun. A substrate horticultural activity concentrated on tropical flora and food crops, all high under glass, in huge greenhouses. Using South exposure and insulation as needed, the greenhouse movement later inspired the use of "conserve random "or" rooms of sunshine" in the houses.

The principle of the greenhouse, the so-called "Solar Heat Trap", was used in what is considered the very first attempt to use solar energy to cook. Many Scientists of the time knew the use of glass to trap heat, but Horace de Saussure, a Franco-Swiss scientist, wondered why this phenomenon generally understood had not led to a user's Extra N. In 1767, he built a miniature greenhouse with five cans of glass \* One in the other, placed on a black plateau. The fruits placed in the deepest box cook well-and a new technology is born (Buti and Perlin, p. 55). De Saussure continued his experimentation, using other materials, adding insulation, cooking at

different altitudes. This European scientist, exploring solar energy almost 250 years ago, is widely regarded as the Pre Era of the movement of solar cooking. Others followed his example, including the British Sir John Herschel and the American Samuel Pierpont Langley, who later led the Smithsonian, who both conducted experiments with the hot box, Precursor of today's cooking box. .

A French mathematician named Augustin Mouchot, working almost a century later, was eager to ensure that the learning of the past was not lost. He was more interested in practical application than in the number of ground devices, interesting but not very useful areas that appeared, using the newly discovered potential of the sun (whistles, watercrafts, talking statues, etc.). He started a search to use the energy of the sun in a sufficiently efficient way. He boiled water for steam engines, a company that has not succeeded. His second project was more successful. He combined the idea of thermal trap with that of the burning mirror, creating an efficient solar cooker from a box which later modified by the addition of reflective mirrors. Eventually he created an efficient steam engine, but it was too big to be practical. He turned to the challenge of cooking and has developed a number of solar cookers, pumps and even electricity. However, his work was short-circuited by the advent of improved coal extraction methods and, therefore, by the use of Carburant Less expensive. His work has also been caught up by the replacement of cheap fuels, making the use of solar energy useless and therefore inconvenient at the moment.

At the end of the nineteenth century, Aubrey Eneas, an American formed the first solar energy company. He had built a giant parabolic reflector in the Southwest of the United States. Frank Shuman founded the Sun Power Company in Cairo to promote a water pumping system powered by solar power, then a parabolic concentrator generating electricity. Other solar innovations have followed: engines and motors, water heaters, photovoltaic lighting and even crematoriums. However, throughout history as in Greece and in Rome progress has been repeatedly interrupted by fluctuations in the availability or low cost of alternative fuels.

In recent decades wealth of billions has been created with polluted fuels and destroying our planet. The sun can provide ways to live with income of renewable energy that will give a better future for our planet and health. It continues to indicate that countless previous experiences of decrease in fuel resources was then forced to rediscover previous knowledge about solar energy. Hoping this new generation will practice clean energy usage for a better future. We should have been practicing clean renewable energy available to all human being but creating wealth seems to be our priority.

At the beginning of the years 1900, a number of Buildings designed to take advantage of solar energy were built using the principles of the thermal trap, but they were quickly forgotten and then resumed in the 1930s when several office buildings the double-glazed glass helps with the heat retention. The Second World War took place, but after the war, the need for housing exploded, resulting in new attempts, including solar collectors on the rooftops.

The Solar cooking movement began seriously in the middle of the century, with some isolated attempts to arouse an interest in technology. At the end of the years 50, [Maria Telkes](#) , MIT scientist Worked on solar cooking her interest led her to build a classic built-in oven, an insulated plywood case with an inclined top of two layers of glass and four large flared reflectors. The design is used, in infinite variation, until today. [George Praise](#) , former director of the Institute of Industrial Research at the University of Denver, [Colorado](#) was also a pioneer of the Solar technology, including solar cooking. In the years 1950, he experimented with a model of [Parabolic Solar Cooker](#) The name "Umbroiler" because of its structure in the form of an umbrella. He marketed the design, but it was a commercial failure for the time.

After this period, the years of the second half of the 20th century show a number of individuals and groups experimenting, demonstrating the potential realizing small and large projects using solar cooking appliances. From 1955, a group of individuals in Phoenix organized in Association for Applied Solar Energy and held its first Conference: the [American Solar Energy Society](#) and its international counterpart, the International Solar Energy Society. In the 70's, the growing scarcity of fuelwood and other energy shortages coupled with the expansion of the population in [China](#) and in [India](#) , encouraged government research on alternatives. The first seminar on solar Cooking was organized in 1981. The oil shortage of that time was the source for study of potential of solar energy, with considerable experience in Europe and the United States, as well as in Asia. The [ULOG Group](#) In [Switzerland](#) And [EG Solar](#) In [Germany](#) , and that [Solar Cookers International](#) In the United States, originated in the years 1980.

A woman from Arizona, [Barbara Kerr](#) , along with other colleagues, also has continued to develop models of solar cookers and test their effectiveness. She experimented with various materials and promoted the technology. In 1980, [Barbara Kerr](#) and a neighbor, [Sherry Cole](#), designed a "kit" of cardboard cooker that could be largely built by a customer and that was very much appreciated by those who had bought one. This work of these two women has inspired the formation of [Solar Cookers International](#) . A few years later, the organization, again with the technical assistance of Barbara Kerr, was the first to introduce another type of cooking apparatus, the panel cooker, a hybrid between the box and the parabolic. This invention was a decisive step forward because it was less expensive. Now solar cookers are affordable to meet the needs of the poorest inhabitants of the world.

It could be said that the foundation of [Solar Cookers International](#), On July 11, 1987, was the beginning of an effort to connect the promoters of solar cooking everywhere in the sense of networking, because its intention was largely educational and networking. Coincidentally, the United Nations has declared that day the world's population had reached five billion people (only 13 years after reaching 4 billion). The new organization said that at least one billion people could benefit from knowing how to cook with the sun. Obviously, the organization has been forced to steadily increase its targets, while the world's population has continued to grow at more than six billion in 2004, which means that today the target group exceeds the two Billiards.

It is interesting to note that before the creation of [SCI](#) In 1987, a major demonstration of solar-powered cooking was carried out in the highlands of Bolivia, a region where Wood was already Rare. Two organizations, at the time Pillsbury Corporation and a non-governmental organization called Meals for Millions, jointly sponsored cooking demonstrations and later taught the villagers how to build cookers with Local materials. In 1988, Pillsbury, in cooperation with Foster Parents (now [Save the Children](#) sponsored a project similar to [Guatemala](#) . These projects it appeared are one of the first nation-to-nation projects, initiating a long series of projects of this type worldwide, which continue to develop today.

Since then, [Many other organizations](#) were created to sponsor projects and promote solar cooking activity. Their work, as known by the written documentation, is detailed in the following chapters. This vignette is only a small part of the story, even unknown to supporters of solar cooking, the many men and women who have glimpsed the potential of the sun to cook food and have tried over the centuries to disseminate this knowledge oo others who can benefit from it.

### **Solar Cooking Basics**

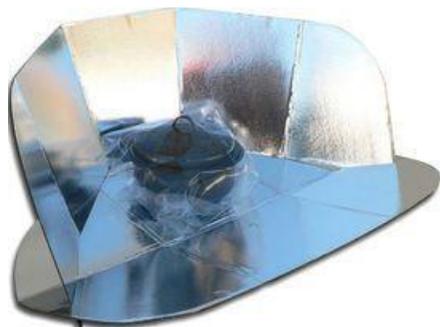
According to the [Place where you live](#) and how you cook, solar cooking can save you time, effort and fuel. It is also a fun way to prepare your meals. All foods can be cooked in a type of solar cooker.

Solar cooking is often associated with slow cooker or slower cooking. [Cooking times](#) are usually twice as long as conventional cooking methods, but slower cooking also has advantages. Less water is used than conventional cooking and foods retain more flavor and nutrients, instead of being steamed or boiled. These slow solar cookers do not need to stir food during cooking. By placing the solar cooker a little ahead of the current position of the sun on its passage through the sky, the cookers and cookers can be left unattended.

[The parabolic solar cooker](#) offers another approach to solar cooking by being able to achieve higher temperatures compared to the box solar cookers and panels, but they require more attention during cooking to avoid overheating of the food. They must be redirected to the sun every fifteen minutes or so. This can be done automatically if they are equipped with a [Solar monitoring](#) . They are also able to fry and grill the food, which cannot be done by the box and panel solar cookers.

For the regions of the world facing the [Deforestation](#) and limited access to [Drinking water](#) , solar cooking turns out to be an element precious [or the solution](#). It offers an alternative without [Smoke or](#) boiling water in open fires, and safe for cooking.

## Buying or Building a solar oven?



Solar Cookers International Panel Solar Cooker - [CookIt](#).

If you want to try solar cooking for the first time, you may be wondering if you need to [Build your own Solar cooker](#) or [Buy one from a manufacturer](#) . Both options have advantages:

1. Building your own solar cooker can be a fun and profitable way to start.
2. Buying a solar oven is simple and YOU will often receive a higher quality solar cooker than you could build yourself.

If you want to build a cooker, go to the [Construction of a solar cooker](#) to choose a model that suits you. You will find information comparing the [Pros and cons](#) of each style of Solar Cooker.

If you want to buy a solar cooker, see the list of manufacturers and sellers on the SCI page: [Buy a solar cooker](#) . Commercial solar cookers are generally durable and efficient and offer new users an easy way to experience solar cooking. Solar Cookers are manufactured worldwide; consider potential shipping costs when choosing a model.

## How Do Solar Cookers Work?

Most solar cookers operate according to the basic principle: sunlight is converted to thermal energy. Most of the [Panel Solar Cookers](#) Base and [Box Solar Cookers](#) Can reach 150 °c (300 °f). The captured solar radiation crosses a greenhouse enclosure containing a dark-colored pot. By reaching the dark surface, the solar radiation is converted into heat, which is not allowed to escape the enclosure and the Temperatures are reached. The same principle is often encountered by drivers who return in a hot car parked in the sun.

Below you will find the basic science for [Panel Solar Cookers and Box Solar Cookers](#). Another type of solar cooker is a [Parabolic Solar Cooker](#) . They usually require more frequent

reorientation to the sun, but cook more quickly at higher temperatures and can fry food. [Vacuum Tube Solar Cookers](#) use a highly insulated double-walled glass tube for the baking chamber and do not require large reflectors.

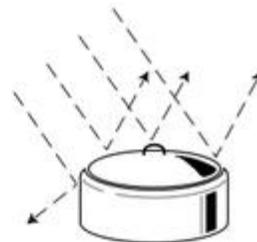


### Fuel: sunlight

Sunlight is the fuel. A solar cooker needs an outdoor spot that is sunny for several hours and protected from strong wind, and where food will be safe. Solar cookers don't work at night or on cloudy days.

### Convert sunlight to heat energy

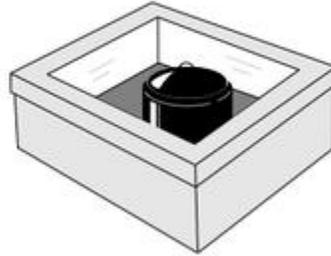
Dark surfaces get very hot in sunlight, whereas light surfaces don't. Food cooks best in dark, shallow, thin metal pots with dark, tight-fitting lids to hold in heat and moisture.



A solar cooker needs a sunny outdoor location for several hours, protection from strong winds and **clean/safe cooking conditions** in places where the food will be healthy. Solar Cookers do not work at night or in cloudy weather, but during the best **sun conditions**. **Some solar cookers can cook foods** under intermittent clouds.

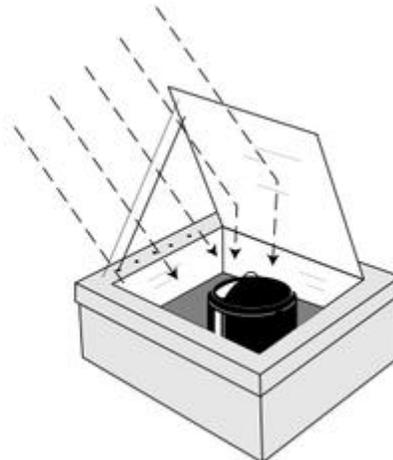
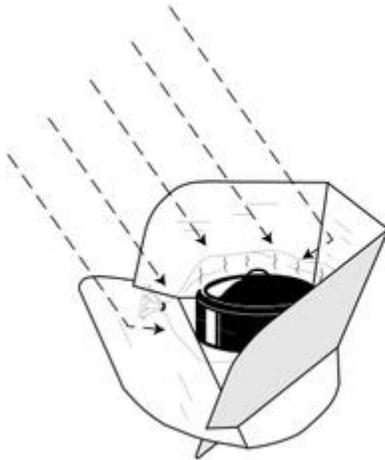
## Retain heat

A transparent heat trap around the dark pot lets in sunlight, but keeps in the heat. This is a clear, heat-resistant plastic bag or large inverted glass bowl (panel cookers) or an insulated box with a glass or plastic window (box cookers).



## Capture extra sunlight

One or more shiny surfaces reflect extra sunlight onto the pot, increasing its heat potential.



- [The Parabolic Solar Cookers](#) Use a bowl-shaped reflector to concentrate the light more directly on the pot, usually from the bottom, and generally do not require a greenhouse to hold the heat. They can also fry and grill the elements.



[SolSource](#) is an example of [Parabolic Solar Cooker](#) presented with a cooking utensil. The light is concentrated at the bottom of the pan.



[The institutional solar Cooking](#) Can use many large reflectors [Parabolic](#) For general Steam and cook daily for thousands of people. Many of these systems are used in [India](#) . This example was built with the technology of [Solar Bridge](#) .

### **Converting solar light into thermal energy**

In its simplest form, light/heat conversion occurs when photons (light particles) moving through the light waves interact with molecules that move in a substance. Rays emitted by the sun have a lot of energy in them. When they hit the material, whether solid or liquid, all this energy makes the molecules of this matter vibrate. [This activity generates heat and cook.](#)

Dark surfaces become very hot in the sun, unlike clear surfaces. Also food cooks better in [Pots that are](#) thin, shallow, dark metal with well-fitting lids. There are many other containers that can also be used in a solar oven.

## Keep the Heat

A glazing (transparent heat trap) around the dark pot or over the cooker opening allows the sunlight to penetrate and prevents the heat from escaping. The glazing is resistant to heat, for example, oven bag, inverted bowl, sheet of glass, sheet of plastic, etc.

Sun rays pass through the glazing into the cooking chamber (solar cooker) via relatively short wavelengths. The sun ray is absorbed by the dark colors of the pots and converted to a heat ray which has a longer wavelength and does not easily escape out of the cooking chamber. This explains why cars left in the sun, especially those with a dark interior, will become very hot even on days when the temperature is low.

Parabolic Solar Cookers do not usually require a thermal trap, as the reflector's light is tightly concentrated on the pot. They bake at higher temperatures, but require more frequent reorientation with the Sun than box or panel solar cookers

## Capturing additional solar energy

Shiny surfaces (reflectors) reflect the extra sunlight on the pot, increasing its thermal potential. Mirrors, aluminum foil, Mylar, mirror-finish metals, chrome-plated vinyl and other shiny materials have all been used with success for solar cooking, depending on the type of cooker and the environment in which it will be used.

## Types of Solar Cookers

The most common types of solar cooker are:

[Panel Solar Cookers](#), [Box Solar Cookers](#), and [Parabolic Solar Cookers](#). Hundreds or even thousands of variants of these basic types exist. PANEL, BOX, PARABOLIC, VACUUM TUBES,

In addition, several large-scale solar cooking systems have been developed to meet the institutional use in places around the world: INSTITUTIONAL SOLAR COOKERS

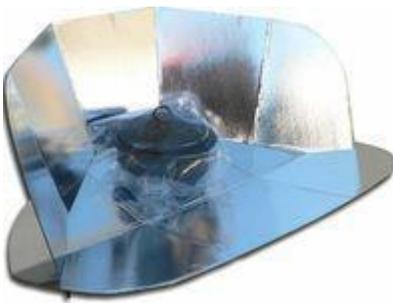
## Box Solar Cookers



[ALL American Sun Oven stove Solar](#)

Box Solar Cookers cook food at moderate to high temperatures and often accept more than one pot. They usually cook food of many varieties between one and three hours of time. All over the world, they are the most common. There are several hundred thousand in India only.

## Panel Solar Cookers



[Cookit Cooker panel](#)

Roche Cooker – other MODELS

Panel Solar Cookers incorporate box and parabolic concentrator units. They are simple and relatively inexpensive to buy or produce. The [Cookit](#) Of Solar cookers International is the solar cooker most used.

## Parabolic Stoves



COUPLE OF OTHER MODELS

The [Cooker Dish AlSol 14](#) Shows how the pan is supported to receive the light focused from the bottom of the reflector.

[The parabolic solar cooker](#) uses a bowl-shaped reflector to concentrate light more directly on the pot, usually from the bottom, and generally does not require Greenhouse to hold the heat. The parabolic name refers to the shape of the curve of the reflector section.

They require a more frequent reorientation to the sun, possibly every 10 minutes, but they bake more rapidly food at higher temperatures than other solar cookers, often reaching more than 200 °c (400 °f). They also have the ability to fry food. In general, parabolic solar cookers will have to be stirred more than box or panel solar cookers to avoid burning food at the bottom of the pot. They are particularly useful for large-scale institutional cuisine.

## Vacuum Tube Solar Cookers



[SLICK SM70](#)

[Vacuum Tube Solar Cookers](#) use a double glass tube wall for the baking chamber. The space between the glasses is created in the form of a vacuum, offering excellent heat retention. Although vacuum tubes are effective, glass technology somewhat limits the size of the glass tube opening.

## Solar Cooking Tips and Tricks . . .

### Main Article: Cooking instructions and tips

The golden rule for solar cooking is to prepare your food early and not worry about overcooking **for box and panel solar cookers**. Most people who start solar cooking will use a panel solar panel cooker or a **box solar cooker**. These solar cookers are sun-oriented and generally do not need to be turned to follow the sun during a period of solar cooking for 3 to 4 hours. Less water is added to the recipes than baking with more conventional ovens.

Once you have chosen a cooker, you will need to find suitable cookware. The enameled metal pans (thin-walled) work well. They warm up quickly. Cast iron pans also work and are usually preheated in the solar oven before cooking. The advantage of heavier pots is that they will help maintain a regular cooking temperature if the sun is sometimes blocked by clouds. Many solar cooks use the enamel pots. Because dark pots work best in the solar cooker, it is important to remember to use a non-toxic paint for the outer surface of the pot if you choose to **paint** your own pots.

### Pots for Solar Cooking



The best pots for solar cooking are those made of thin and dark metal with a lid. Most times when people have trouble cooking in a solar oven, we often find that they use pans in finishes that reflected **the sunlight away from the pot** instead of absorbing it. Unless you are cooking with a parabolic solar oven where the light is focused on the bottom of the pot, it is very important to use dark colored pots that absorb the sunlight and turn it into heat.

Light colored pots **can** also work **but generally do not work as well as dark colored**. The **pot** lids can be dark or clear. **Dark lids are better if your food to be cooked is light colored**.

It is important to always cook with the lid in place so that the moisture of the food does not **escape and condense on the** plastic bag or other [Glazing](#).

The material from which the pot is manufactured will also affect the speed with which it will warm up and its ability to retain the heat. Here are a few things to keep in mind:

- Pots made of **thin** materials heat faster than thicker pots
- Metal pots heat faster than ceramics or earthenware
- **Ceramics and earthenware are** slow to heat initially, but will hold the heat better than the thinner metals. The cast iron should only be used in good solar cooking conditions as it requires strong sunshine to obtain the best results.

It is generally not recommended to use a sheet to wrap food in solar cooking; however, temporary pots or lids can be formed from a **paint (non-toxic paint)** layer in the absence of other equipment. Foods packaged in a conventional way under unpainted aluminum foil **bake very slowly. if not at all**, because the glossy film, especially in several layers, insulates the food from sunlight and warmth. **The food won't cook.**

## Glass Jars



Solar cooking food in jars to put in solar ovens

Solar Cooking with glass jars

Glass jars make good pots although they cook better if they are darkened rather than left clear. In addition, the darkening of the outside of the food containers will protect some of the B vitamins. When you [Paint Jars](#), you can apply a strip of tape from top to bottom before painting. When the paint is dry **remove the tape** to leave a transparent strip of glass clean for visual inspection to the **inside of the jar**.

When you use jars for baking, **make a hole in the lid** of any canned jar, such as mayonnaise jars, peanut butter jars, etc., to prevent steam buildup. **Be careful! Non vented jars can explode!**

## Earthenware Pots

Some clay pots with slow cooking does not cook well at first, although dark-colored earthenware pots that are wood fired and/or have glazing, work very well. Perhaps the poor performance of some earthenware is due to the fact that liquids are soaked into the earthenware and can evaporate outside. Perhaps it is due to the thickness and porous nature of the poorly cooked terracotta walls. Unglazed earthenware pots can be saturated with food oil, grease or natural resin that closes the pores and changes the surface. The oil will heat well and this could be part of what improves cooking in low-cooking terracotta pots. The Light-colored terracotta must be darkened outside only, perhaps by rubbing a black food, a non-toxic black powder or soot from clean wood in the oil layer. Despite this, some forms of low-fire terracotta can be difficult to use for **some solar box cookers**.

## Reflector Material



Aluminum foil

Standard kitchen aluminum foil can work well as **Reflective material** for solar cooking. It can be stuck with white **paste** or [Wheat dough](#). Some folds may result from the bonding process. In addition, although the surface **of the aluminum foil** is not hot to touch in the sun, there will be differences in the rate of expansion between the sheet and **the material unto which it is glued**. This can cause wrinkles. As a general rule, a slight folding of the sheet does not create a problem for cooking.

Solar cooker design continues to evolve and offers better cooking efficiency. There is an increased interest in finding more low cost reflective materials in order to better reorient the sunlight. Polished Metal surfaces **have** been tried and, although effective, tend to be costly solutions. Metallized polyester Film properly glued to plastic Coroplast sheets are an even more

economical approach for users who want to create their own reflectors. [Michelle Dean](#) , professor and researcher in solar energy at [Brazil](#) , explains one of these approaches in the [Realization of the petals of the solar cooker with Mylar and D.](#)

## Components of Solar Cookers

### Glazing



Two transparent Pyrex bowls can be assembled to enclose the pot, creating an effective greenhouse enclosure.



Two Pyrex bowls, or one with a Pyrex tray, are an excellent greenhouse enclosure for [Panel Solar Cookers](#) . This example worked well, even without a cover on the Porcelain cooking bowl.

**Glazing** is the term used in this article and in the solar industry to describe the glass or plastic coatings used in a cooker or solar collector. (In other industries, glazing may concern only glass products.)

The glazing creates a [Greenhouse effect](#) "trapping" solar energy and increases the efficiency of cooking.

Glazing partially blocks the sunlight, but the overall efficiency of solar cooking increases with use of glazing, especially in windy weather. Thicker glazing blocks usually more sunlight than the thin. In theory and in most situations, two layers of glazing work better than one in most solar cooking applications. A single layer of glazing will perform and is much simpler to construct.

Pyrex bowls (of assorted sizes) are transparent and work well as a glazing. There is little refraction of the light, because the rays can penetrate directly unto the black pots. In 2018, [Alan Bigelow](#) , Scientific Director of [SCI](#) , led the protocol test [PEP](#) on the solar panel cooker [CookKit](#) , comparing two types of greenhouse enclosures. Alan found that the use of the double-hulled Pyrex enclosure was 25% more effective in generating heat than the use of a [Plastic Roasting Bag](#) . [More information...](#)

John Roche, retired 3M research and design engineer and solar expert, states that the effectiveness of the sun is reduced approximately 15% for every layer of glazing.



*Sport solar oven*

Acrylic has good uv stability for use in the sunshine. It also has lower softening and melting temperatures. The Sport solar oven adds a sheet of UV stabilized polyester to the molded acrylic lid to provide for excellent insulation for the oven.

Plastic oven roasting bags have been widely used to create a greenhouse enclosure for the [Panel Solar Cookers](#). However, they are much less effective than the Pyrex bowl approach. Their advantages include, inexpensive to buy and easy to use. They are also difficult to clean if they are contaminated with spilled food, especially in areas where the water supply is limited. There is a problem of removing plastic bags, which do not decompose when discarded.

**The cumulative cost of continuously replacing plastic oven roasting bags is more costly than a Pyrex bowl and/or some commercial solar cooker models that can last for 10+ years. The average life of oven roasting bags of fifteen uses was previously documented by SCI.**

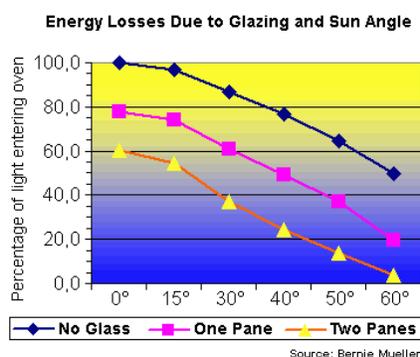
## Are plastic bags always harmful to the environment when they are not burned?

### Considerations

Different aspects of a 'greenhouse' must be taken into account. Take these points into account:

1. **Proposed design:** Cooker, hotplate or dish? A box cooker is normally closed with a glass lid. The parabolic solar cookers sometimes operate without glazings, but the glazing improves the performance considerably. The panel solar cookers are well served by domes.
2. **Material:** Glass can withstand high temperatures, not all plastics can.
3. **Size:** Does the intended pan fit in the glazing without touching the sides? How easy can the glazing be stored? A plastic bag can be bent, the glass cannot.
4. **Availability:** If you want to build more stoves or replace a damaged solar cooker, can the glazing be easily obtained?
5. **Cost:** Always a challenge. Solar cooking and a small budget go together for wide spread acceptance.
6. **Robustness:** Glass can break when used, transported or stored. Plastic is more flexible than glass. High temperature oven roasting bags are a practical product. In [Refugee situations](#), it can be difficult to get water to wash the bags if food has spread over them. Long term use of oven roasting bags can be very expensive.
7. **Life Cycle:** Discarded plastic bags can be distasteful in the environment and they can be

### Glass Plates



For the box cookers, the transparent glass, simple standard thickness (2.5 mm), proved to be very satisfactory. Thinner glass is less prone to cracking heat than thicker panes, probably because it heats more rapidly and evenly, reducing thermal stresses. The flat glass is very heavy and was only satisfactory when it was soaked. Some Solar Cooker designers choose simple glazing for portable models with a second Temporary option in bad weather. Permanent double glazing is often chosen for all-season solar cooking, which is probably ideal when materials are available.

Glass, although fragile, is generally available in major metropolitan areas around the world, while tempered glass and synthetic glazing are specialty materials requiring unique supply lines. The glass does not degrade in the sun. If it is protected from thermal stresses and shocks, it is more durable long-term than most plastic glazing, even those that are treated against degradation by ultraviolet rays. Glass is excellent as long as it does not break.

Glass with small iron content allows more radiation to penetrate the box and makes a hotter oven but is not essential. One-way glazing was found to reduce the function of a baking oven. Recycled automotive glass, especially flat parts of the side windows of the vans, has been used successfully, but even parts that seem clear can be tinted to some extent to reduce heat in the vehicle or to add safety glass. Both tinted glass and all the added materials block the solar radiation.

Glass can be tempered if desired, although the cost of hardening is so high that occasional replacement of the glass may be less costly in the long term for the artisanal Solar Cooker. Glass with simple thermal cracks can be held in place by a silicone sealant or a non-toxic glue or a narrow band of tape.

### **Plastic Plates**



Transparent plastic double wall polycarbonate glazing, Seattle 2009 Mike and Martha Port used similar material as pictured above in Nicaragua. The underside of the material (warmth of the oven) expanded the lower level more quickly while the topside of the material expanded at a slower rate. This resulted in significant open gaps at the corners defeating the performance of the oven. (The wood pictured above may

be present captured inside of a metal ring attached to the side wall of the solar cooker might overcome the warping. Double wall glazing is much more effective!

### Polyester film

Prasanta the [Solar Cooker Workgroup Sliedrecht NL](#) , reported in 2014 having successfully tested a polyester glazing material for use as an alternative to glazing. He has featured in various weather conditions. The contact cement was used to attach the material to the wooden frames. Because the glue was not UV-resistant, the exposed glue areas were painted white with the edge of the frame. The polyester film is as follows: It is almost weightless, it is cheaper and less fragile than glass, and the mounting of the material and its transport are simple. Two rolls of 10 kg each will be 150 transparent windows of 65 X 65 cm and 4 mm thick, sufficient to make 75 double-glazed solar cookers..

## Cookers to Panels

A [Panel Solar Cooker](#) Typical differs from a [Box Solar Cooker](#) in two aspects:

1. The enclosed space is much smaller (usually it is a bag around the pot or a sheet of plastic wrapped in a circle on which the pot rests -
2. It allows the light to enter not only from the top, but from all sides (this is well suited for the use of panel reflectors).



Alternate covers of [Sharon Cousins](#).

[Sharon Cousins](#) , who cooks in northern Idaho at 47 degrees north, on a ridge exposed to the southwest swept by prevailing winds, has developed several rigid covers that are not likely to be damaged with use as a solar cooker. One of her favorites is a one-gallon transparent Pyrex bowl/casserole for the bottom and a large transparent acrylic bowl for the opening. These are large enough to hold her black one gallon painted enamel jar, a round granite roaster, and various other pots. This works much better under cold or windy conditions than an oven bag. It also gives easy access to food, which is particularly useful if foods are improved by stirring them from time to time (for example, rice to milk) or if food will be added later during cooking. The most difficult ones began to soften.



Daniel Joseph's glass baking box.

Daniel Joseph, a soldier stationed in Kuwait, experimented with a [CooKit](#) and a larger glass enclosure. The glass box offers a good view of the pot, well supported on a grate. Can an explanation of how he made the glass box be added? I suspect this used extruded right angle metal which he cut to size with beads of silicone caulking insulating the metal from the glass and the interior of the cooker.

### **Cooking directly in glass containers**

Sometimes a glass container is used without a pot. The food inside is heated directly by the sun.

Juan Urrutia Sanz has several recommendations when using glass bottles or containers:

1. You can Cook Foods of all colors except the green pepper, which becomes colorless and hard.
2. The black-skinned fish is simply cooked by exposing the skin to the sun. For frozen fillets – place the fish in a net suspended in a jar or other small container secured by the lid. It

is not necessary to cut the net. After three quarters of an hour in the sun around noon, the fish is cooked.

3. With light colored food, add such things as: paprika, food coloring, laurel leaves, red peppers . . .
4. You should always cook with a little liquid, at least one layer of water at the bottom of the jar. Glass containers can be of all sizes, from smallest for single portions to large, and you can cook several in containers at once. The lids must be black or painted black. I do ~~it does~~ not recommend corks, rubber or other materials that degrade in the sun or heat.
5. In general, follow the same guidelines as other pots for solar cooking, such as the size of parts, etc.

### Pot Cooking Chamber



Glass jar inside another glass pot baking chamber

If you place a Pyrex bowl, which is larger than the pot underneath, there will be a good chance that the **condensed** moisture can run downwards. This could damage the base of a cardboard solar oven. Consider placing a flat glass dish under the pot (**not pictured**).



Dr. [Steven Jones](#) Used a black jar in a Pyrex dish instead of a bag Plastic.

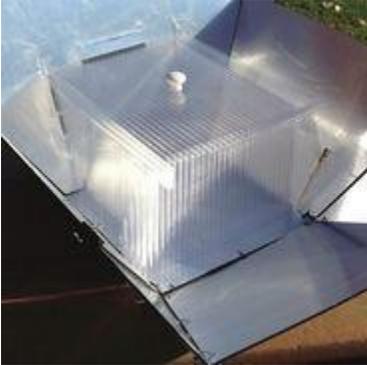


Two bowls can be assembled to enclose the jar.



Two Pyrex bowls containing a porcelain cooking bowl without lid

[Roger Haines](#) Tested a flexible sheet of polycarbonate wrapped in a cylinder shape for a baking enclosure. It requires a round baking pot with a substantial lip that sits at the top of the enclosure. It reports good results.



Polycarbonate cooking box for the [Panel Solar Cookers](#) .



Haines Polycarbonate Wrap with a clear Cover allows sun under the pot.



Polycarbonate Bakery Cover



bags which are much more expensive. The thickness of the plastic film does not significantly affect the heating of the solar cooker but can affect its life span.



*Sun Scoop Lite*

Transparent polypropylene food containers that are food grade # 5 recyclable can usually withstand the temperatures of a pot like any autoclave bag, and offer UV benefits. (More and more countries are prohibiting the production and use of any kind of plastic bag because they are an environmental problem. Kenya, China, France, Rwanda and Italy are some of the first countries who have banned use of plastic bags. Polypropylene containers can be round, square, rectangular, high or short, as long as they fit perfectly with the Pot. The more clarity of the container will affect the efficiency of the cooking, the clearer the better.

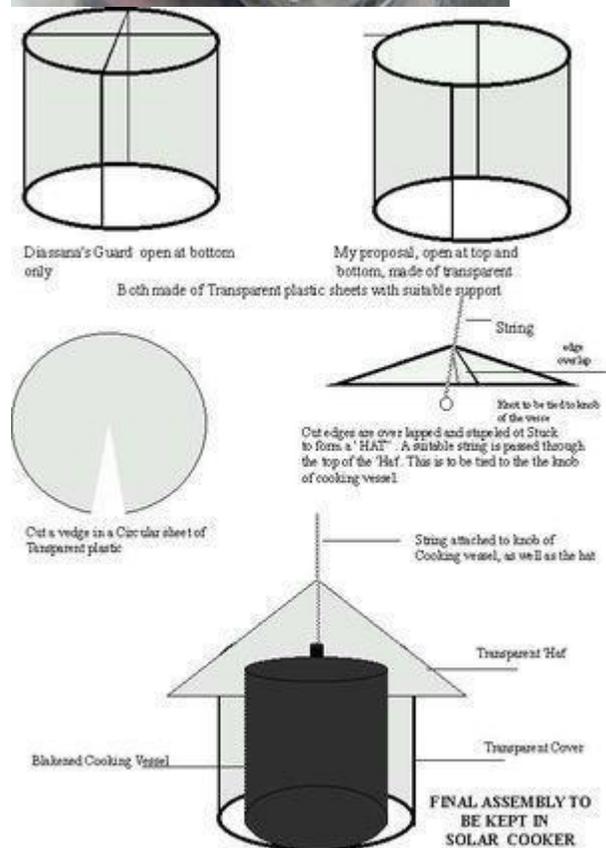
### **Are plastic bags dangerous For the environment?**

The production of plastic bags consumes almost no energy, because the chemical changes of the oil to these plastics are minor molecular changes. The amount of fossil fuel (oil) required for producing a plastic bag is a tiny fraction of that consumed when someone prepares a meal with paraffin (kerosene). All plastics do not emit harmful fumes when heated or burned, only those that contain chlorides, fluorides or iodide-based additives, such as PVC pipes and styrenes (styrofoam) when oxygen is insufficient. Others, including all plastic bags used in solar cooking (polyethylene, Polypropylenes and Polyesters), are all simple hydrocarbons which, heated or burned, emit only minute amounts of carbon dioxide and water (vapour). Once the bags are worn, they can be safely burned, like the Paraffine or wood. They can also be reused. For example, in the context of solar cooking projects sponsored by [Solar Cookers International](#) in [the refugee camps of](#) East Africa, refugees used traditional weaving techniques to make baskets, hangers, braids, ropes and other useful objects.

### **Plastic Bags Accessories**

Good plastic bags can be difficult to replace. Small frames can be made that hold the plastic bag around the pot/jar to insulate it, but prevent the bag from touching the hot pot, so that the bag does not heat up as much and lasts longer. A Cadre designed by M. [Gnibouwa Diassana](#), From Mali, by twisting a rigid electrical wire, keeps the plastic bag away from the pot when baking in a solar oven [CookIt](#) .

Dr. [Dale Andreatta](#), **mechanical**, and Stephen Yen, an electrical engineering student, indicate that Perfluoroalcoxy fluorocarbon (PFA) could also be a good alternative. Although expensive, PFA can withstand temperatures above 250 °c and is UV stabilized.



Another option, proposed By [Steve Harrigan](#) is to use a container made of the same polypropylene as the baking bags.

[Polypropylene container alternative to plastic bags for solar cooking.](#)



## Search Required

To what extent does an enclosure improve the cooking capacity of a panel cooker?

**Use of a solar cooker with a "bare" pot is like using an oven with the door open.** The food will warm up, but the fact that the pot is surrounded by a warm air cover is much more efficient. A saucepan can exchange heat in three ways: by radiation, by convection and by conduction. Inside a greenhouse or oven, the air helps to transfer heat into the pan. The three effects work in parallel to transfer heat into the pan. In operation without enclosure, the pan must be heated only by radiation, while convection and conduction eliminate heat.

#### How much does double glazing improve cooking?

It depends on the transparency of the glazing and the insulation properties. In general, double glazing is better than **single** glazing, but it is also more complex and more expensive than **single** glazing. Although double glazing is better, **the real question is whether the improvement justifies additional costs and complexity.**

Inexpensive alternatives to double glazing can be:

- Use a larger reflector to increase the amount of sunlight;
- Decrease the size of the enclosure. This decreases the outer surface (which is exposed to cold air) and therefore the amount of heat loss. For example: If you replace a glass dome of 36 cm in diameter by a 30 cm, the outer surface decreases of 30%. The outer surface of a 50x50x30cm cooker decreases by almost 10% if you are 25 cm in height instead of 30.

[Greenhouse effect](#) In: [Materials](#)

## Insulation



Participants in a workshop organized by [The core of Bolivia](#) pack wool in their [Box Solar Cookers](#) to serve as an insulator.

Material	Thermal Conductivity W/m C
Air	0.03
Foam, Polyurethane	0.03
Fiberglass	0.04
Corkboard	0.04
Wool Felt	0.05
Cotton	0.06
Sawdust	0.06
Paper	0.18
Wood	0.1-0.2
Sand	0.3
Plaster	0.5
Glass	0.8
Dry Soil	1
concrete	1.04

Thermal inductivity of various materials

[Box Solar Cookers](#) often use insulation in their wall cavities. However, studies have shown that this insulation may not be as important as you might think, because more heat is lost through the [Glazing](#) . If the glazing is well insulated (double layer) then insulation in the walls is all the more beneficial.

Insulation in solar cookers with the construction of an inner box inside of an outer box is usually achieved by lining the walls of the boxes with aluminum foil. If you have limited quantities of aluminum foil, the priorities are as follows: 1) cover the interior space of the oven, inside walls and the inner top of the lid around the glazing and the reflector (or reflectors), 2) cover the inside of the outer box.

For additional insulation, pack with a light weight, clean, non-toxic substance. Such bulk insulation is packaged without tightening as it insulates better if it is fairly airy. Yet it is tight enough not to settle down with time, leaving an empty space at the top. Also, with loose packaging, the sides of the oven are not forced to bulge and misshape the solar cooker. A deflector between boxes foiled or not, helps to insulate, partly by preventing sedimentation and partly by blocking the convective flow of air. Sheets of cardboard or other materials used to separate the insulation space inside each wall, are set roughly in the middle of the space. Coatings on both sides of the deflectors is best but not necessary. According to the work of Dr [Ed Pejack](#), an inclined deflector adds to the structural resistance, but is not significantly better for insulation than perpendicular insulation.

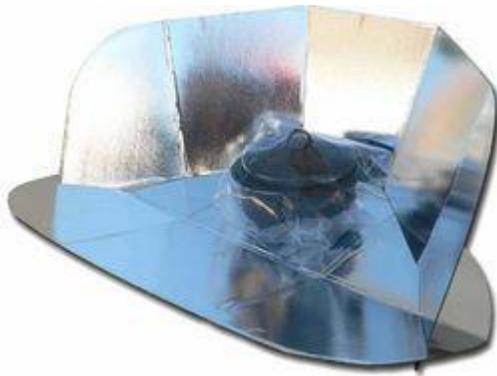
## Solar Cooker Designs

Designers and [Manufacturers](#) Have adopted various approaches to create solar cookers. The most commonly used were the [Box Solar Cookers](#) And [The Panel Solar Cookers](#) . They work well for slow cooking, are generally less expensive than other styles and are fairly easy to [build](#) for most people. Variants of these designs have generally been used to introduce solar cooking in deforested developing countries [since](#) 1950. [Models](#) [made of](#) high quality are available for purchase from suppliers in many [Countries](#)

[The parabolic solar cooker](#) are also used for a long time, mainly in Europe and Asia. They bake at higher temperatures and usually require a more complicated manufacturing. A number of models are available from the [Manufacturers](#) . They can be used in series to create steam for [Institutional kitchens](#) feeding thousands of people a day.

[Vacuum Tube Solar Cookers](#) Are compact, cook efficiently, [and cook smaller amounts of food](#). Several models are commercially available. Other variations of solar cookers are also included in the subcategories listed below.

### Designs



The [CookIt](#) is - a [Solar Panel Cooker](#) - is very simple.

#### Benefits

- Inexpensive to build or buy, and can generally be collapsed for storage or transportation
- Slow cooking keeps the flavors and nutrients and requires little or no reorientation to the sun

**Disadvantages**

- Generally reaches Temperatures ranging from 110 to 140 °c (230 to 284 °f) and cannot fry food
- Craft units are difficult to protect

Article principal: [Solar Panel Cooker Designs](#)

**Solar Box Cooker**

The "[Minimum](#)" Box Solar Cooker is a popular [Design](#) which can be easily built using cardboard boxes.

**Benefits**

- Some big enough to cook with several [Pots](#) , also perfect for cooking and slow cooking
- Can be built with simple materials
- Several high quality commercial designs also available

**Disadvantages**

- The front wall of the “box” casts shadow (decreases sunshine) -entering the cooking chamber unless the unit is tilted
- Cannot fry food. The cooking temperature is between 135 and 200 °c (275-392 °f)

## Design of Parabolic Solar Cooker



The [SolSource](#) is an effective [Parabolic Solar Cooker](#)

### Benefits

- Cooking times are similar to those of a traditional cooker
- High temperatures allow frying and broiling food, usually between 120 and 230 °c (248 to 446 °f)

### Disadvantages

- Requires periodic reorientation, often every fifteen minutes, which can be carried out with a device of mechanical [Solar monitoring](#)
- Generally more expensive than panel or box solar cookers and requires more storage space.

## Design of Vacuum Tube Solar Cooker



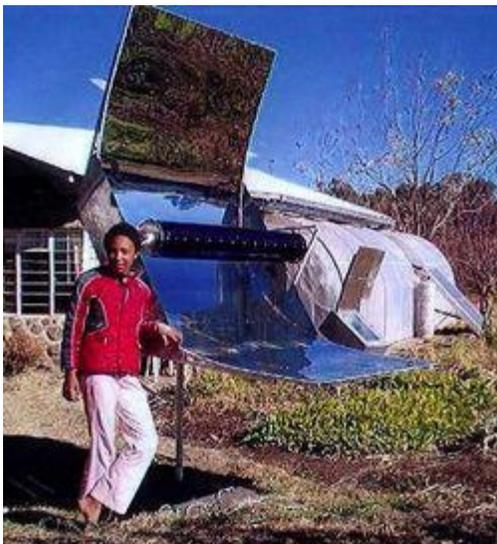
The [SLiCK SM70](#) is an example of a [Vacuum Tube Solar Cooker](#).

### Benefits

- Usually compact and can cook quite efficiently with relatively small reflectors
- Contemporary designs have an aesthetic appeal

### Disadvantages

- The baking chamber requires careful handling to avoid thermal shocks and breakage of the glass tube
- Glass technology limits the size of the opening of the baking chamber somewhat



A [Parabolic bread oven](#) Feeds A [Solar Bakery](#) Managed by the [Bethel community and business development Centre](#) in [Lesotho](#) .

### Benefits

- The curved trough reflector is effective for gathering and concentrating sunlight along a straight focal line
- Works well with the baking chambers to [Vacuum tubes](#) To create a compact packaging that is easy to store

### Disadvantages

- The design of the chute does not focus the sunlight on a standard pot
- Not particularly well suited for building home enthusiasts

Article principal: [Solar Trough Cooker Designs](#)

## Other Solar Cooker Designs



The [Ground Concentrator Air GoSol](#)

### Benefits

- Mirror reflectors are flat panels, not requiring the complex curved shape of parabolic solar cookers, they can nevertheless reach typical temperatures of parabolic solar cookers
- Metal frames to hold the mirrors can be assembled by workers with basic welding skills

### Disadvantages

- Due to the relatively large size and geometry of some models, they usually need to be redirected by hand or by a mixing system and of [Followed](#) Mechanical.
- May require more floor space than other solar cookers



*Fresnel Solar Cooker Design*

[The Solar Cooker Heliac](#) Uses a Fresnel lens with a wide focus, ensuring efficiency and safety.

#### **Benefits**

- High temperatures can be Boiling and frying when cooking
- Easy to build on site with flat lenses, avoiding complicated convex structures
- The structures of the structures containing the lenses can be produced with resources local

#### **Disadvantages**

- Highly concentrated solar radiation with a spot focus can produce burns
- They may require more storage space than other solar solar cookers



#### **[Solar Rice Cooker](#)**

There is a wide variety of models of solar cookers, many of which are very simple to build from inexpensive and easy to obtain materials. Some can be built in less than an hour for less than 5 USD. Start with choosing a type of cooker design according to your needs. The table below lists the strengths and weaknesses of the most common types and shows some popular cooks of each type. Under each table are several types of this cooker. You can also Buy a solar oven from various companies.

## Data collection

**Data collection** is an integral part of the [Promotion of solar cooking](#) . In 2017, [Solar Cookers International](#) provided the following checklist to help plan new projects.

### **Data collection Part I: A necessity, not an option**

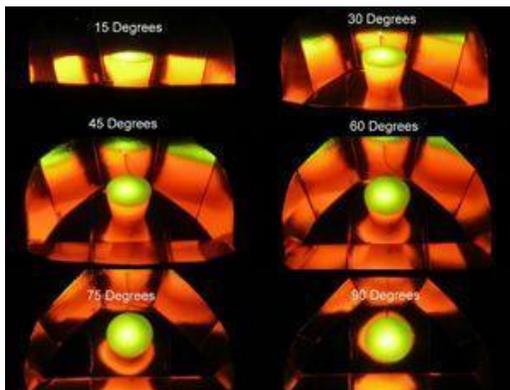
1. Include data sharing as part of the project partner selection process. Communicate clearly that data collection and sharing is expected, not optional.
2. Include a detailed plan for the analysis of the data. Who will collect the data? Where? When? How often?
3. Were the costs of data collection and project evaluation included in the project budget and grant applications?
4. Data quality control: Who will follow up if some of the respondents ' responses do not appear to be clear?
5. Solar Cookers International recommends using the [SCI Adoption & Impact Survey](#) Developed by the global network. It is consistent with the surveys used by homes and international organizations.
6. SCI recommends conducting the baseline survey before commencing the intervention. We recommend conducting the post-intervention survey one year after the start of solar cooking by the group.
7. Add data to [There](#) .
  - **April 2017:** Share your best practices with [info@solarcookers.org](mailto:info@solarcookers.org) .

### **Data Collection Part II: Successful solar cooking projects**

1. With the survey on the adoption and impact of solar cooking, we recommend conducting the basic survey (before People start cooking with solar energy) and post-distribution issues one year after the start of solar cooking.
2. Make sure that the data is added to the SCI-card of the solar cooker's distribution.
3. Include evaluation costs in the initial project budget and grant applications.
4. Include an agreement on data sharing as part of the initial selection of participation in the project. (participants must understand that this is an expectation for participation in the project)

5. Include regular meeting times in project design so that project participants solve problems, develop community and share data.
6. Make sure the surveyor understands the questions and the expected answers.
7. Gather individual success stories and facts and figures. Include requests for photographs and/or videos and/or quotes within the framework of the grant agreement (and the budget) with the organization implementation with a specific number and due date.
8. Make sure there is a data analysis plan (who does? Where? When? is included in the budget) and data quality control (a way to track whether Some responses do not appear to be clear or may have been communicated incorrectly).
9. Make sure there is a way to understand the local fuel measurement units (such as harvest waste bags) in universal terms (Like kg).
10. Consider the format in which the responses to the survey are recorded. Excel spreadsheets would be much easier for data analysis, but so far I have only been able to receive answers in Microsoft Word format. Take into account the time it takes to transfer data from Word to Excel if this is the case. If possible, use the Google Form version of the survey (but this requires an Internet connection at a given time).

## Testing



[Reciprocal photo Test to measure the performance of a solar cooker](#) (photo Earthbound Technology)

**Different methods of test are available to compare solar cookers. However, all members of the solar cooking community do not agree on the best way to test the variations and how to report the results.**

Some advocate a standardized test with standard measures calibrated to report absolute results. Others advocate a less technological approach that measures only the difference between recreational solar cooking or solar cooker variations during side-by-side testing.

There are also discussions about what to test and how to evaluate the solar cookers. is a cooker that cooks very fast, but must be **refocused frequently** to follow the sun better than a cooker that cooks slowly, but that usually does not need to be redirected to the sun? Many factors other than raw cooking power influence the suitability of a solar cooker **in** relation to another.

## Progression of Testing of Solar Cookers

- New: July 2018: ISO standards for laboratory testing protocols for solar cookers are now published** -The International Standardization Organization (ISO), a World Federation of national Standards bodies, has published ISO 19867-1:2018-harmonized laboratory testing protocols - Part 1: Standard test sequence for emissions and perform Security and sustainability. These standard tests can provide product specifications useful to designers and consumers. These standards will help stimulate the market for clean cooking homes by encouraging manufacturers to ~~pre~~-Produce high quality homes and provide expectations to guide consumers in product selection. Tests for solar cookers are included in these standards, for example, the ASAE S 580.1 protocol for testing and reporting Performance of solar cookers is the normative reference for the measurement of power (in Watts). The Solar Cooker Performance assessment (PEP) process is consistent with the laboratory test protocols published by the SIO 19867-1:2018. For more information on the importance of the work of the ISO/TC 285 Technical Committee, see [Improve health with new standards for cleaner cooking homes](#) .
- May 2018: [Solar Cookers International](#)** (SCI) now offers a service to measure the standardized firing power of solar cookers (in watts) in test centers in Nepal, California and New York in the USA. SCI's Performance Evaluation Process (PEP) uses a test station that automates the ASAE S 580.1 protocol to test and report the performance of solar cookers. The ASAE S 580.1 protocol is in harmony with ISO/TC 285 standardization in the field of clean fireplaces and clean cooking solutions. The test results provide a unique measure of thermal performance, so that customers can compare different concepts when choosing a solar cooker. The Power Specification Standard of Cooking for solar

cookers is similar to the specification of miles per gallon (or kilometers per liter) for automobiles, which helps guide selection by the consumer. With this test service now available, SCI wants to promote and develop partnerships with projects using solar cookers tested according to SCI's PEP. SCI has published some of the preliminary results of its pilot study of 2017 on the [page Web](#) of [SCI PEP](#) . SCI will display the official PEP results as soon as they appear during the 2018 Test season. SCI invites manufacturers to have testing completed of their solar cookers, even during the design and prototyping phases, to reduce the number of costly redevelopments. Please contact SCI at [info@solarcookers.org](mailto:info@solarcookers.org) to test your solar cooker. To learn more about the SCI test program, listen to an [Interview](#) with the Director and representative of SCI Science to the United Nations, [Alan Bigelow](#) , Ph.D.

- February 2018: Performance evaluation process presented in Public Private Alliance Foundation Newsletter** -The process of evaluating performances (PEP) of Solar Cookers International was featured in the February 9, 2018 issue of the Public Private Alliance Foundation Newsletter. The PPAF states that "PEP provides public responsibility to manufacturers and provides individuals, government agencies, etc. the information they need to select the appropriate solar cooking appliances-available so far in New York, California and Nepal. "



International Organization for Standardization

- October 2017: ISO meets in Nepal from 30 October to 3 November 2017:** The ISO process for clean cooking fireplaces will be held in Katmandu. Solar cooker manufacturers, particularly in the 29 participating member countries, should contact the [Delegates of Your Country](#)
- August 2017: The Process of Evaluating Performance (PEP) focuses on solar cooking power in watts** -The results of the preliminary tests of the [SCI](#) indicate that the average standard cooking power of a [Box Solar Cooker](#) is 56 watts. For a [Parabolic Solar Cooker](#) , it is 289 watts and for a [Panel Solar Cooker](#) , 39 watts.
- 03 Aug 2017, Thursday (7pm EDT, 23:00 GMT/UTC): Performance evaluation Webinar for solar Cookers** -La [International Solar energy Company](#) , ISES, joins [Solar Cookers International](#) To present the latest developments in the performance assessment (PEP) process for solar cookers, to help provide the information and for manufacturers to



comply with a public liability standard.  
(Performance Evaluation Process)

Testing station

- June 2017: Solar Cookers International (SCI) launches solar cooker testing centers in California and New York** -This pilot project aims to verify the repeatability, reliability and reproducibility of test station results, regardless of location. SCI's pilot testing centers are located at different latitudes and at different altitudes. Both locations also experience weather condition differences. The solar cooker, the cookware and the test instrument are the same in both places. This pilot project consists of testing sets of three types of solar cookers: reflective panel cookers, **box cooker** and parabolic reflectors. PEP results provide a measured firing power in watts, which is only one of many ways to evaluate the performance of solar cookers. In June, the Meteorological conditions In the SCI pilot test centers are well adapted to the solar cooker test according to the ASABE S 580.1 protocol for testing and signaling the performance of solar cookers. **This protocol requires that the ambient temperature varies between 20 and 35 °c (68 and 95 °f). This temperature variance is generally available in the two pilot test centers of SCI between the Spring Equinox (Spring equinox) and the Autumn Equinox (autumn).** The Olympics Test within the required temperature range should also be clear days with constant solar energy. SCI invites others to join this solar cooker test pilot project to validate the reproducibility of PEP testing. Using the same instrumentation, the results have a consistent format for comparing the data.
- March 2014: The World solar cooking sector acquires a delegate to participate in the establishment of stove standards and clean cooking solutions** - [Paul Funk](#) Of the USDA Agricultural Research Service and a former board member of the [Solar Cookers International](#) been approved as a delegate by the community of the International Organization for Standardization (ISO). Paul was delegated to the plenary meeting 285 of the Committee technical of ISO held in Nairobi, [Kenya](#), February 10 to 14, 2014. He joined wood stove experts from 11 countries and 4 liaison groups (the World Bank and UNICEF) for a week of meetings NS techniques in order to develop standards for testing clean cooking fireplaces. Dr. Funk obtained a PhD in analyzing solar cookers, and then wrote a test standard for solar cookers (ASAE S-581). He taught Mechanical Engineering and is now a scientist at the USDA Agricultural Research Service. He says, "My goals must be modest. As a representative of the [United States](#), I have to support the consensus position of the American National Standards Institute, not my own opinions. I

hope, however, to exert a small influence to prevent solar cookers from being excluded or poorly evaluated by the standard of clean stove testing. "

## Absolute Tests

- The performance of the stoves varies considerably and the performance of a specific stove is often different in the laboratory and in the field. The tests enable those responsible for the implementation to assess the performances and fuel emissions. Decisions to implement and improve the design and performance of stoves.
- **Boil water Test (WBT)**
- The SOR test Water Utilization is a laboratory test that evaluates the performance of the stove while performing a standard task (boiling and simmering) in a controlled environment to study the heat transfer and combustion efficiency of the stove. ILS are the easiest, fastest and cheapest to drive, but reveal the technical performance of a stove, not necessarily what it can achieve in real households. **Controlled Cooking Test (CCT)**
- The controlled cooking test is a field test that measures the performance of the solar cooker-compared to traditional cooking methods when a cook prepares a local meal. The CTC is designed to assess the performance of the stove in a controlled environment using local fuels, pots and practice. It reveals what is possible in households in ideal conditions, but not necessarily what is actually achieved in households during their daily use. [CCT Test Protocol](#)

## Cooking Performance Test (KPT)

- The cooking performance test is a field test used to evaluate the performance of the stove under real conditions. It is designed to assess the real impacts on household fuel consumption and ease of use. LEs KPT are usually carried out as part of a real diffusion effort with real populations cooking normally, and give the best indication of the actual changes. The KPT is a reference test, with parameters that judgment must be considered as part of the process of designing the solar cooker.

## Follow the Sun

It is not normally necessary to turn the [Box Solar Cookers](#) and the [Panel Solar Cookers](#) to follow the sun, unless you cook beans or a large amount of food, or if you are cooking a day when sunlight is not optimal. It may be beneficial to reorient them to the sun every three or four hours. However, the [Parabolic Solar Cookers](#) require a much more frequent reorientation with

the sun, e.g. once every 15 – 20 minutes as well as stirring food frequently. If sun monitoring is necessary, some of the ideas below will be used for this purpose.

When **considering** tracking systems, it may be useful to determine the annual movement of the sun at various locations. In addition to the annual scope, this useful tool also provides real-time sun information for a specific location. [Suncalc.org](http://Suncalc.org)

The following table presents a good concept regarding sun angles and where one lives. The latitude of the following example is unknown.

Figures shown in degrees from vertical

Jan	Feb	Mar	Apr	May	Jun
26°	34°	42°	50°	58°	66°
Jul	Aug	Sep	Oct	Nov	Dec
58°	50°	42°	34°	26°	18°



[Example of](#) Image of [Calculator D' Solar angle](#) - *Solar Electricity Handbook 2016*

The 2016 edition of the Solar Electricity Handbook also offers a convenient visual tool for calculating the position of the sun in virtually every city in the world. It can be found at: [Solar Angle Calculator](#)

## Solar Cooker Group

With the meet up platform, we can create meeting groups located around the world. You can create a solar cooking community near you. Use it to find other solar chefs, share tips, ideas and have fun!

## Where is solar cooking possible?

A Successful solar cooking depends on the access to the sun and good climate conditions. Although solar cooking is possible in most countries, it is more convenient for people living in generally dry climates and sunny for at least six months a year. The latitudes between Equator and 40 ° are generally the best. However, Solar Cooking at high latitude is possible even in winter with solar cookers that have good reception of sun light at low angles of sun and good insulation to hold the heat in the cooking chamber. The continued development of more efficient models continues to push the practicality towards higher latitudes.

The darker regions on the next map tend to have longer cooking seasons.



Larger image available [Here](#)

### Countries with high potential

Solar Cookers International has compiled a list of Twenty countries with the greatest potential for solar cooking . Following - are 25 countries listed. It is assumed the additional five are numbers 21-25, but may not rank 21-25? The criteria for this classification include average annual sunshine, scarcity of combustible cooking and the size of the population. Of the approximately 500 million people who have abundant sunshine and are suffering from fuel shortages, 85% of them live in only 10 countries.

1. [India](#)
2. [China](#)
3. [Pakistan](#)
4. [Ethiopia](#)
5. [Nigeria](#)
6. [Uganda](#)
7. [Sudan](#)
8. [Afghanistan](#)
9. [Tanzania](#)
10. [South Africa](#)
11. [Niger](#)

12. [Somalia](#)
13. [Brazil](#)
14. [Kenya](#)
15. [Nepal](#)
16. [Mozambique](#)
17. [Burkina Faso](#)
18. [Madagascar](#)
19. [Malawi](#)
20. [Zimbabwe](#)
21. [The United States of America](#)
22. [Sri Lanka](#)
23. [Eritrea](#)
24. [Dominican Republic](#)
25. [Zambia](#)
  
26. Haiti

## Why Solar Cooking Is Important



National Geographic explains the case of solar cooking.

Solar cooking is the easiest, safest and most convenient way to cook elements (food) without consuming fuel or reheating the kitchen. Many people choose to cook solar for these reasons. For hundreds of millions of people in the world who cook with wood or dung and that travel miles to pick up the wood, or spend a large part of their meager income in fuel, solar cooking is a clean and economical alternative.

For millions of people who do not have access to drinking water and who fall ill or die each year from waterborne preventable diseases, The pasteurization of water via solar energy is a vital skill. The World Health Organization reports that in 23 countries, 10 per cent of deaths are due to two environmental risk factors: unsanitary water, inadequate sanitation and hygiene; and Household air pollution Due to the use of solid fuels for cooking. <sup>[1]</sup>

## Benefits of Solar Cooking for households

### Health and nutrition



- Moderate cooking temperatures in simple solar cookers help preserve nutrients.
- Those who would otherwise do not have the means to buy fuel can cook nutritious foods, such as legumes and many whole grains, which require hours of cooking.
- Sometimes many families have to exchange rare foods for cooking fuels. Solar cooking can help them keep more food **and** improve their nutrition.
- Smoke from fires and smoldering coals irritate the lungs and eyes and can cause disease. The solar cooker is smoke-free.
- Smoke from the fires for cooking is a major cause of global warming.
- Cooking fires are dangerous, especially for children, and can easily spread if they are not contained, causing damage to buildings, gardens, etc. Solar Cookers are without fire.
- Millions of people regularly walk for miles to pick up Wood for cooking fires. Tedious fuel travel can cause injury and expose people to the dangers of animals and criminals. Solar cooking reduces these loads, risks and frees up time for other activities. In the Iridimi refugee camp in Chad The Need to leave the camp to pick up firewood was reduced by 86% thanks to the introduction of tens of thousands of solar cookers (model CooKit).
- With good sunshine, the solar cooker can be used to cook food or Pasteurizing Water In case of emergency when other fuels and energy sources are not be available.

### See Also

- [Children are safer with solar cookers](#) - Review Committee [Cooks](#) Solar and staff Team
- [Solar Cooking and health](#)
- [Health and safety](#)

### Economy



Each group of food products costs the same price as the pile of charcoal indicated in the middle. By using a solar oven, a family can use the money saved on the fuel to buy more food.

- In the world, of countless poverty-stricken families spend at least 25% of their income on cooking fuels. Sunlight -"fuel" for solar cookers - is free and abundant. The money saved can be used for food, education, health care, etc.
- Solar Cooker companies can provide additional income. Opportunities include manufacturing, sale and repair of solar cookers as well as solar cooker companies, such as restaurants and bakeries.
- Even residents of developed countries can save a lot of money on the costs of cooking and air conditioning. See Cost savings of solar cooking .

## Convenience



*Women pick up firewood for the kitchen.*

- With solar cooking, the food does not need to be stirred and can simply be placed in a solar oven and left to cook unattended for several hours (without burning) while other

activities are being pursued. In the right circumstances, it is possible to **place a brick or a soapstone in the solar cooker** in the morning and go home late in the afternoon **or early evening** for a hot meal ready to eat. **Well insulated solar cookers will keep food hot into the late afternoon and/or early evening without use of bricks or soapstone.**

- [The pots](#) used for solar cooking are easy to clean.
- **Time is saved** - a valuable fact for **persons** who have to travel many kilometers to fetch **firewood**.
- Many solar cookers are portable, allowing solar cooking on sites or during outdoor activities such as picnics, trekking or camping.
- Solar cookers can be used to pasteurize water making it safe to drink. (**included in health benefits below**)

## Other household uses for solar cookers

Article principal: [Non-culinary uses](#)



[Solar Canning](#)

- Heat water for household chores.
- ~~Keep~~ [Preserve \("Can"\) fruits and tomatoes](#) .
- [Disinfect dishes and utensils](#) .
- Kill insects in grains, ~~in~~ **and** other dry staple foods **and in soil**.
- [Treatment of solar Food](#)

## Health Benefits

- [The pollution](#) of the [Air from household cooking fires](#) often leads to respiratory diseases **resulting in** more than seven million deaths a year. The solar cooker is smoke-free.
- Waterborne preventable diseases account for 80% of diseases and deaths in developing countries. Solar cookers can be used at household level to [Pasteurize Water and milk](#) , making them safe to drink. Pasteurization uses about half of the fuel that would have been used for sterilization.
- Many solar cookers can be used to [Disinfect Dry Medical Supplies](#) such as medical devices, bandages and other fabric materials, as well as to heat compresses.

## Environmental benefits

Article principal: [Environmental benefits of Solar cooking](#)

- Two billion people depend on wood and charcoal for cooking fuels. Solar Cooking lessens **these** basic needs **and helps** preserve the declining forests.
- Cooking fires fueled by biomass and oil pollute the air and contribute to global warming. Solar cookers are pollution-free and, when used in large numbers, can help to curb Global warming and gradation. See [The overall gradation](#) .
- The kitchens stay fresh while the solar food cooks outdoors. This reduces the load on **air conditioning** and refrigerators during the summer months, saving fossil fuels (and reducing public utility bills).

## Business Benefits

### Solar Cooker Business Opportunities

- [Manufacture and sale of solar cooker](#)
- Solar Cooker Repair
- Solar products companies such as the [Restaurants, Bakeries or Catering](#)

*Article principal:* [Business development](#) at solarcooker.org

### Other commercial uses

- Cleaning dishes and utensils
- Boil the straw Ritz for making paper
- Honey Wax Extract
- Dying fabrics
- Pasteurizing The Potting soil
- Remove the husks from the rice grain

## Benefits for Governments

- Reduce imports and subsidies for biomass and fossil fuels.
- When forests disappear and many people suffer from fuel shortages, solar cookers reduce the need for firewood by 30% to 50% for families.
- Electricity companies that are struggling to meet demand in heavy usage hours due to the intensive use of stoves and air conditioners can reduce this demand by promoting the use of solar cookers.

## Benefits for the humanitarian, development and relief organizations

- Address the fuel shortages of clients affecting local health, nutrition and education.

- [Health and safety](#)
- [Comments regarding use of Solar Cookers](#)
- [Introduction to solar Cooking](#)
- [Solar Cooking Projects that are more important](#)
- [Promote Solar Cooking](#)
- [Pasteurization for Safe Water](#)
- [United Nations Millennium Development Goals](#)
- [Where is Solar Cooking possible?](#)

## Solar Cooker Plans



There is a wide variety of models of solar cookers, some of which are very simple to build from inexpensive and easy to obtain materials. Many quality materials are not readily available. Some can be built in less than an hour for less than \$5 USD. Start with choose a type of cooker design according to your needs.

## Cooking Tips and Tricks

### Guidelines by type of food

**Dried and cooked cereals** (barley, maize, millet, oats, quinoa, [Rice](#), wheat) 2 hours. Start with the usual amount of water. Next time, adjust to your taste. If the conditions in your sky are less than ideal, you may have better luck if you preheat the water and grain separately, as suggested for pasta. This is especially useful if the grain is very slow to soften

**Vegetables** -Do not add water. Artichokes: 2 1/2 hours; Asparagus: ½ to 1h; Other fresh green vegetables: 1-1 1/2 hour. If they are cooked for longer, they will taste good but lose their beautiful green color and can become mushy. Beans-dried: 3-5 hours. Usual amount of water may be soaked in advance; beets, carrots, potatoes and other root vegetables: 3 hours. Cabbage, Eggplant: 1 1/2 hour if cut. Eggplant becomes brownish, like an apple cut, but the flavor is good; Corn: 1 to 1 1/2 hour. Corn grains fade slightly if exposed to the sun longer. The **pot** holds the moisture and protects the grains naturally. A clean black sock can be placed on a corn cob for a faster cooking time. Squash, zucchini: 1 hour will turn into mush if it stays longer.

Martha Port's experience indicates there is enough water in all fresh (not dried) vegetables, fruits and meats for them to cook in their own natural juices. No water is necessary for them to cook. Adding water simply requires more energy to heat the water before cooking of the food can start. Adding no water is one reason solar cooking is so-o-o flavorful. Only add water to things that require rehydration (rice, pasta, grains, dried food, etc.)

**Eggs - Do not add** water. Two hours for hard yellows, the whites can become brownish, but the flavor is the same.

**Meat - Do not add** water. If they are cooked for longer, they become softer. Fish: 1-2 hours; Chicken: 2 hours cut, 3 hours whole; Beef, pork, etc.: 2 hours cut, 3 to 5 hours for large pieces; Turkey, best to cook up into quarters or smaller pieces.

**Pasta** -Heat the water in a saucepan. Put the dry pasta with a small amount of cooking oil in another saucepan and heat both pots until the water is almost boiling. Add hot pasta to hot water, stir and cook about 10 more minutes.

**Baking** – Best time is in the middle of the day (9h or 10h - 14h or 15h) breads: whole loaves 3 hours; Cakes: 1 hour and a half; Cookies: 1 to 1 1/2 hour and should not be covered. The sun makes wonderful fresh garlic bread.

**Sauces and gravies with flour** -Heat the juice and flour separately, with or without a little oil in the flour. Then combine and Stir. It will be ready soon.

**Roasting nuts** -Cook uncovered. Almonds: 1 hour, peanuts: 2 hours.

**CARAMELIZATION of sugar** -Sugar can be caramelized in a saucepan in the solar cookers. It's done at lower temperatures than on a conventional cooker. Basically, browning (in a cooker) starts at 140 °c (284 °f). Once the temperature begins to exceed 149 °c (300 °f), the sugar begins to burn.

## General terms of Use

- After a bit of experience, you will see how easily you can adapt your cooking and baking via solar cookers. The use of the solar cooker can effectively reduce the total amount of effort in preparing meals. Outdoor cooking in summer also allows you to eliminate the extra heat in your home. With solar cooking, you start your meals early in the day and then you relax. At lunch or later in the afternoon or evening, when you are tired after a day of work, the sun will have prepared your food.
- The solar cooking of foods in solar cookers is done in dark colored pots/containers with lids. Lids are used to minimize the condensation of water in the solar cooker especially under the lid from the cooking process. Each bead of condensed water reflects sun out of the cooking chamber and minimizes the process of cooking. There are a few exceptions to use of a lid, such as roasting nuts, biscuits, open cheese sandwiches, etc. Cookware can be black, dark green, dark blue, etc. There are many types of finishes. A common good choice for home solar cooking utensils is the black spotted granite. (The 9 inch round roaster makes a nice round loaf.) Be sure to use hot pads when removing pans from the oven; the pot will be very hot!

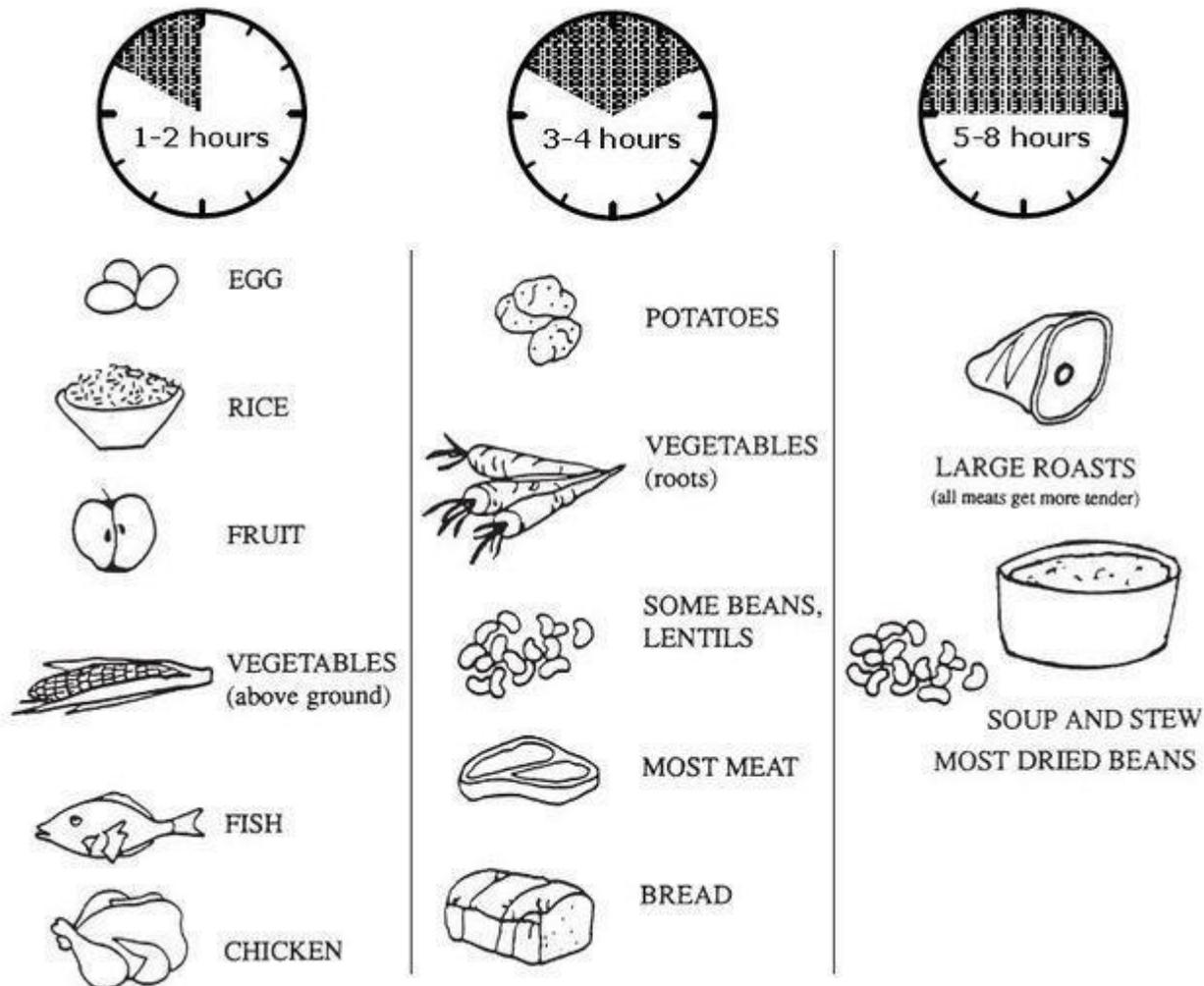


9" spotted black granite round roaster – an inexpensive roaster of 3 liters

- Thinner walls on your pots or containers will cook food faster on the front end. Thick walls will retain heat longer for late afternoon or evening meals.
- If this is your first attempt at solar cooking, start with something easy, like chicken, Rice in small quantities, zucchini or quick bread such as banana bread. Do not wrap the food in aluminum foil; just put it in a dark covered pot without adding water.
- When cooking fresh fish, you can judge when the fish is cooked well.
- For best results, do not overcook green vegetables
- Biscuits, cakes and bread can become too dry if cooked too long.
- Use pots or pans covered with black good fitting lids. With rare exceptions (e.g. biscuits), the lid remains in the pot while cooking. Dark baking molds can be purchased in ~~by~~ pairs, so that one can be flipped on upside down for a cover. Secure with binding pliers.
- The golden rule of solar cooking is as follows: **Get the food early, and don't watch anything (no peeking until at least an hour).**
- You do not need to stir the foods during cooking. However, it is OK to check the food after an hour if you replace the lid quickly. If you are cooking an exceptionally large mass of something very thick, it may be helpful to stir at least once **after** the appearance of obvious signs of steam, in order to move the middle colder medium. This would move the cooler center food towards the side of the pan and the warmer food against the sides to the middle.

- Place the hard-to-cook or larger items at the back of the solar cooker, where they will receive more direct sunlight. When using more than one saucepan, place the easy-to-cook food at the front of the cooker.
- The solar oven will be hot! Use pot holders when removing lids or pots.
- To keep the food warm after sunset, to maximize heat retention, cover the solar cooker with a blanket or jacket.
- If you are unable to cook early in the morning or late afternoon, cook midday to save firewood and fuel.
- Use to warm food before eating breakfast or dinner.
- Many meals can be cooked without repositioning your solar cooker and you will learn from experience. Just position the solar cooker so that, halfway through the cooking, the sun is right in front of the cooker.
- With a lot of food, or in less sunny days, it is helpful to reposition the oven once or twice.
- To bake cakes, preheat the solar cooker for 15 minutes to ½ hour before adding food.
- If you bake a large amount of food, it cooks more rapidly if it is divided between two or three small pots instead of one large pot.
- Several small non-covered bowls can be placed in a large covered pot to cook – e.g. baked custard.
- ~~The~~ Leftovers are easily heated in the solar oven.
- Most recipes take slightly less liquid when cooked in a solar oven.
- The cooking time depends on the temperature of the food (is it refrigerated, frozen, fresh butchered, or air temperature?) as it is placed in the oven, as well as the brightness of the day.
- Food is well preserved in the solar oven without burning or drying out.
- Most recipes asking for a higher temperature will go well if you give them more time.

Here are some typical cooking times for 4 pounds (2 kilograms) of food on a sunny day:



## Altitude adjustment

The temperature of the boiling water decreases as the altitude rises. For example, the boiling water temperature is only 95 °c (203 °f) at 2,000 meters.

## Co2balance



**Co2balance** Working with local social groups in East Africa to replace the use of open-air fires for cooking with solar powered solar cookers or low-energy cooking ovens. Solar kilns, currently imported into Africa will be manufactured in Kenya from early 2008, while our energy-efficient homes are fully manufactured in East Africa.

While our solar ovens do not consume fuel and are fully powered by the power of the sun, our high-efficiency stoves require fuel, but they are about 75% more efficient than an open fire. Solar cookers heat at about 180 degrees Celsius and are used for sterilization of water and cooking.

The choice of distributing a solar-powered cooker or building a high-efficiency stove is done by our project managers in the field, depending on factors such as the immediate environment of the host family and the custom Local.

In addition to reducing greenhouse gas emissions, the reduction in firewood requirements and the burning of waste will lead to a corresponding reduction in the time spent collecting the material. The users of our new Technologies also benefit from considerable co-benefits, such as reduced costs and significantly improved health and safety environment. This is another example of CO<sub>2</sub> balance looking for projects with a wide variety of additional benefits for the host community, including health, finance, social and environment. In this way, we can maximize the project's accomplishments beyond the simple carbon-saving.

The CarbonZero™ brand and internationally registered trademark is wholly owned by CO2balance and provided under license to organizations working with us. It provides a clear statement to your customers that the product you are buying meets this simple test and is indeed CarbonZero.

The assessment methodology of our Greenhouse Gas Audits to establish the carbon footprint follows the reporting principles and guidelines provided by the Greenhouse Gas Protocol published by the World Business Council for Sustainable Development and the World Resources Institute (WBCSD/WRI Protocol). In line with the WBCSD/WRI Protocol, CO2balance uses the following procedure to undertake a Greenhouse Gas Emissions Assessment:

- Establishment of the assessment boundaries (including the selection of: greenhouse gases, project boundaries and operational boundaries).
- Collection of client data.
- Evaluation of data quality and of client data sources.
- Calculation of emissions using appropriate conversion factors.
- Determination of suitable recommendations for future action.

Where appropriate our carbon foot printing and offset process follows the protocols of the international standards PAS2050 or PAS2060.

## [How to Reduce Waste for Zero Waste Week 2018](#)

Posted by [co2ilona](#) on <https://co2balance.wordpress.com/>

As we come to the end of **Zero Waste Week 2018**, what have you done to minimize waste in your life?

This can be wasted food, throwing away plastic packaging to landfill, unworn clothes in your wardrobe, wasting water and energy. The one we hear the most about in the media is plastic waste. Plastic waste in the form of plastic bags, toothbrushes, disposable water bottles, straws and much more is polluting the earth and its oceans.

Plastic pollution is so bad because it takes the longest to decompose. Plastic waste can take up to 1000 years to decompose in landfill. Although recycling is the best option, still many plastics used in packaging all around the world are not currently recycled.

Whether we are talking about greenhouse gas emissions or waste pollution, there are steps everyone can take to reduce both. For waste, try to cut down on your spending on food and clothes, only buy what is necessary. Donate any excess clothes you don't use to charity. Take shorter showers to save water and fill washing machines and dishwashers full. Avoid buying things with too much plastic packaging or check whether it can be recycled before purchasing.

To reduce your greenhouse gas pollution, substitute cars for public transport or car share on your commute. Cycle and walk more. Source products locally and turn down domestic appliances in your home such as cooking, heating and water to the minimum.

These are all ways that will minimize your waste and carbon footprint on the environment.

*Greenhouse gases* are a group of compounds that are able to trap heat (longwave radiation) in the atmosphere, keeping the Earth's surface warmer than it would be if they were not present.<sup>1</sup> These *gases* are the fundamental cause of the *greenhouse* effect.<sup>2</sup> Increases in the amount of *greenhouse gases* in the atmosphere...

## Solar Cooking Recipes

There are many solar cooking recipes available online.

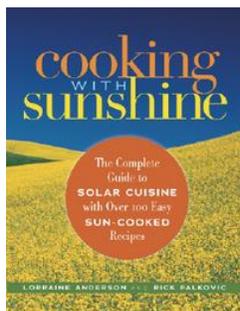
- <http://solarcooking.wikia.com/wiki/Recipes>
- <https://www.solarovens.org/recipes/>
- <https://www.sunoven.com/sun-cooking-usa/how-to-use/recipes/>

Search online for solar cooking recipes. There are many options.

### Books about Solar Cooking

- **Cooking With the Sun**

*The complete guide to solar Cooking with 150 easy recipes cooked in the sun*



by Lorraine Anderson and Rick Palkovic

*Cooking With the Sun* provides everything you need to cook, including:

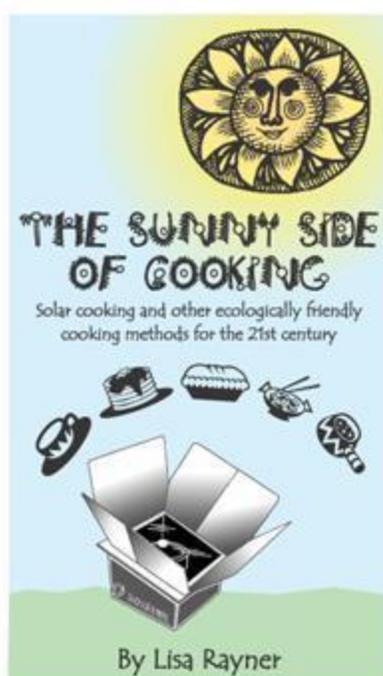
- Clear explanations on the functioning of solar cooking and its advantages compared to traditional methods

- Instructions for building your own U-shaped Solar Cooker - inexpensive and easy to find materials, and information on where to buy a ready-to-use solar cooker
- A selection of fun and easy to use recipes to get started
- A wide variety of recipes for Main courses, accompaniments and desserts for vegetarian and omnivore diets
- Creative menu ideas for special diets, tastes and opportunities

"... I've been cooking with the sun for years and cooking with sunshine is taking away the mystery and brings to the reader the delightful character and adventure of solar cooking." - [Mary Frank](#), Artist and defender of the solar kitchen

- **The Sunny Side of the Kitchen**

*Solar cooking and other eco-friendly cooking methods for the 21st century*



By [Lisa Rayner](#)

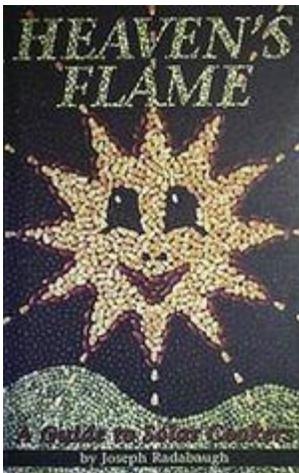
The Sunny Side of cooking is a practical and easy-to-follow guide for beginners and experienced cooks. Includes:

- How to choose the right solar cooker for you according to **Your** Climate and **Your** Needs
- How the different types of solar cookers work
- How to use a solar oven for cooking, steaming, simmering, sautéing, grilling, and much more
- More than 100 vegetarian solar recipes and culinary tips
- The **Only** Solar Cookbook that explains in detail how to cook tofu, seitan and tempeh

- How to cook pancakes, flat breads and tortillas, pancakes, polenta, muffins, yeast breads and Pastries
- How to adapt the recipes of the slow cooker to a solar cooker
- Adapt **Your** Favorite recipes to a solar oven
- How to store food in a solar oven using **USDA Safe Canning Guidelines**
- 

"Beautifully detailed and informative- I highly recommend it to beginners as well as experienced cooks who can find variations and additional uses. Its recipes make water to the mouth by reading - [Barbara Kerr](#), Pioneer of Solar Cooking Copyright (c) 2007

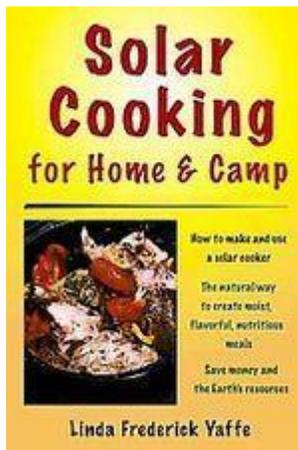
## The Flame from the Sky



By [Joseph Radabaugh](#)

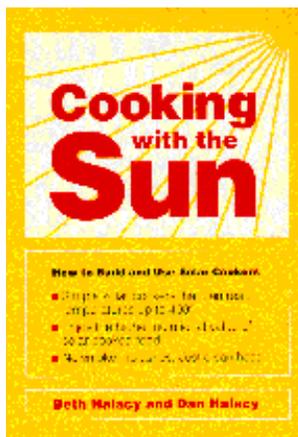
This excellent book of 144 pages offers a complete introduction to the world of solar cooking; including a large section of questions and answers, a long chapter detailing plans for a high performance cardboard cooker, and detailed cooking instructions.

- **Solar cooking for home and camp**



This book gives clear **and easy** instructions on how to make a solar cooker using two cardboard boxes coated with aluminum foil and a few other simple materials readily available. Yaffe then completes the book with a number of recipes like mushroom quiche and stuffed zucchini that you can cook in your own solar oven.

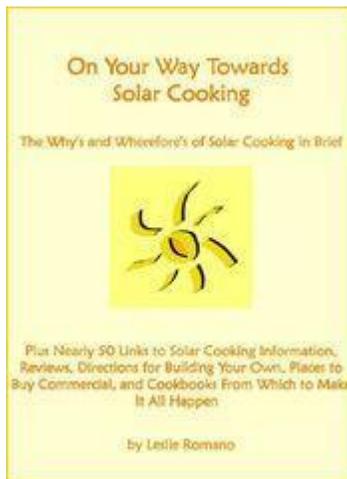
- **Cooking With the Sun: How to build and use solar cooker**



by Beth and Dan Halacy

A book of 115 pages with plans for the construction of a multi-reflector baking box in plywood, a unique cardboard reflector box cooker and a parabolic cardboard cooker. Contains 62 pages of receipts Your American and international.

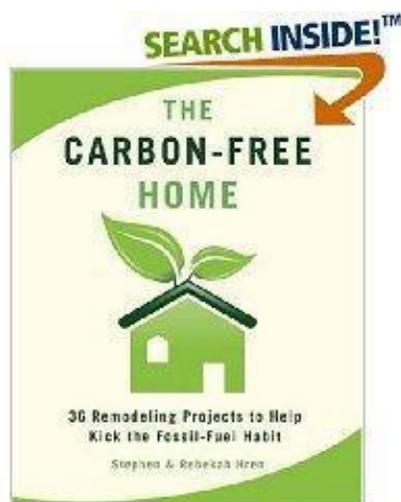
- **On the way to solar cooking: the Why and How of Solar Cooking in Brief**



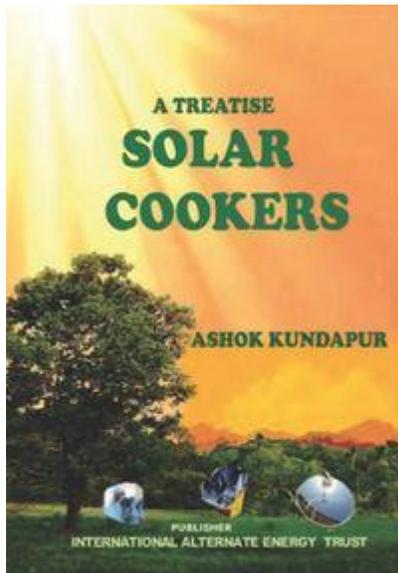
*More than 50 links to information about solar cooking, notices, instructions to create your own site, commercial spaces and cookbooks so that everything is possible by Leslie Romano*

Once you discover the significant advantage of cooking other than on an industrial stove in an electrified kitchen, you can no longer stop! Become more prepared and more self-sufficient through solar cooking. This e-book will allow you to Start.

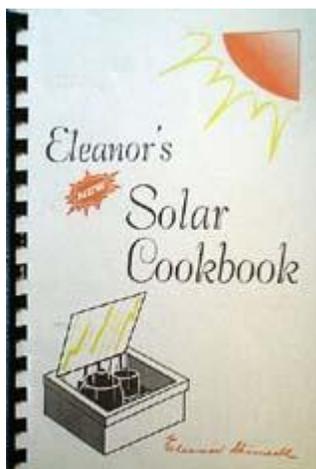
- **The carbon-free house: 36 redevelopment projects to help reduce the consumption of fossil fuels**



Mixture **of** practical solutions and great DIY projects, this book provides readers with essential information on how to renovate their habits and get closer to a carbon-free existence.

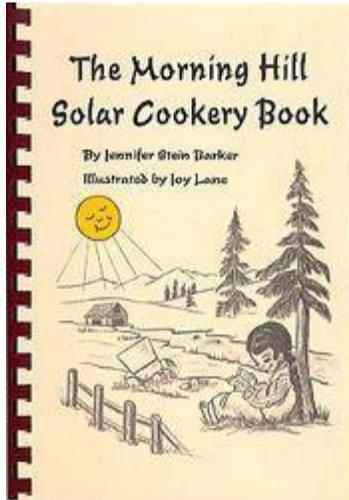


Ashok Kundapur traces the history of development and types of solar cookers. The twelve chapters deal with history, technology, indirect cooking, heat retention, building boards and approaches in the design of trends. [Details and purchase information...](#)



by Eleanor Shimeall

A book of 93 pages containing more traditional American dishes. Includes a section on the [Implementation](#) and [Keeps](#) In a solar cooker.

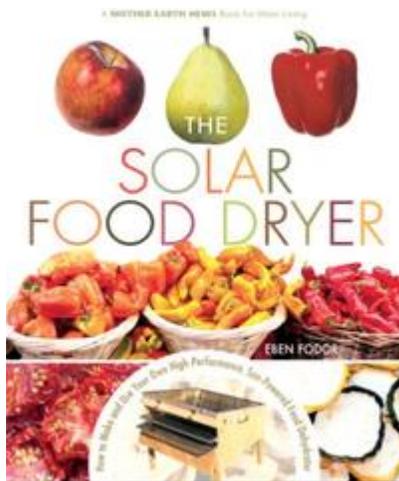


by Jennifer Barker

The Morning Hill Solar Cookbook is your source for recipes, cooking techniques and tips of all kinds for solar and conventional cuisine in the kitchen. Whatever your type of solar cooker, you can use the Recipes from this book to produce hearty and healthy vegetarian dishes that will appeal to all tastes.

## Books on Solar Drying of food

- **The Solar Food Dryer**



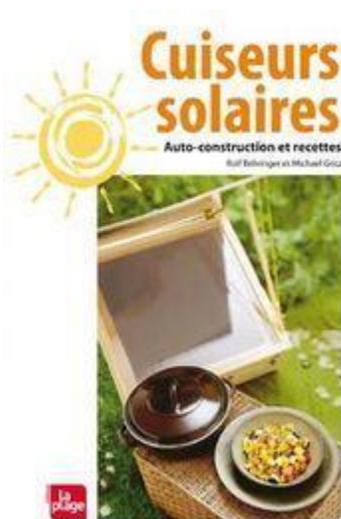
By Eben Fodor

The Solar Food Dryer describes how to use solar energy to preserve your summer's harvest. With your own dryer solar energy, you can quickly and efficiently dry all your extra vegetables, fruits and garden herbs in the sun and enjoy their benefits all year round! Solar dryers work

very well in many conditions, working effectively in almost every climate where you can grow fruits and vegetables.

## Solar Cooking Books in French

- **Cuiseurs solaires (Solar Cooker)**



By [Rolf Behringer](#) And [Michael Götz](#)

This book by Rolf Behringer and Michael Götz summarize everything we know about the four types of solar cookers - having 18 years of experience. The spectrum is an introduction to examples of groups and projects using solar cuisine in our latitudes and projects in the south. And most importantly, the book helps you practice: A detailed chapter how to manufacture for yourself your four solar (the standard wood model of the SOLEMYO catalog) vegetarian Cookbook Publisher's Beach) to start your experiences!

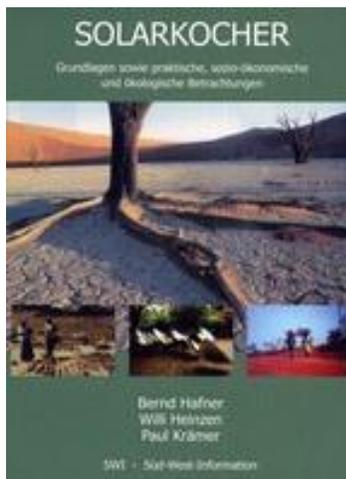
A new French-language solar cookbook entitled [Of Sun on My Plate](#) is available in [Bolivia Inti-South Sun](#) . Fifty recipes, ranging from appetizers to main courses to desserts, are well presented in this book with color images. Many of the recipes also include tips for cooking with fuel-efficient wood burning stoves and heat-holding solar cookers.

## Solar Books in German

- Solarkoch and Information Book



!



Solar cooker, basics, as well as practical, socio-economic and ecological considerations de Bernd Hafner, Willi Heating, et Paul Krämer.

## Solar Books in Espanol

- **Flavor Solar Cuisine (Solar Flavor)**

The full text of the [Book Of Flavor Solar Cuisine](#) Of [Fenix Group](#) Shows how to cook Nicaraguan food in a solar oven. ( [English Version](#) Also available.)

### Books by Bernardo Sosa



#### Solar Cooker, alternative energética durable mathematical model et physical construction

Presents Trabajo muestra el Dearrollo de cocinas solares with base en Concentradores Parabólicos Compuestos (CPC) in several dimensions. The purpose of the borders of goods and services is established in order to have characteristics characterized by adaptive capacities and different latitudes; Económicas, Haciendo on Dispositivo accesssible a toda población y; Ergonomica, which has the luck and quality of service, the quality of the sea, reliable and durable for the user. These Machines are a semi-rigid model for coca-dimensional soles, as well as technologies for manufacturing, manufacturing and preparing simulators, allowing a determination or control of solar energy.

<https://www.morebooks.de/store/es/book/cocina-solar,-alternativa-energ%C3%A9tica-sustentable/isbn/978-3-8484-5153-1>

#### Chemical Products alternative Description, implementation and propulsion

-This invention Concerns a set of perspectives for the design, implementation and manufacture of coconut products, processing and modeling and mixing of materials for the body. Uses the Óptica Anidólica. For example, the UT methods are described to evaluate the quality of Coco products, based on factors of production, rendering and consumption. Además, describes itself as a case of implementation of customs and security rights in an Indonesian community in Mexico, the implementation of this application is a strategy for the conservation of natural resources; Así también se metodologías Evidencian for transmission and prophylaxis of technical solens and drug transport Technologies alternatives, as manuals and bilingual training. Finally, it is intended that exemplary for future research and reference in usage of alternatives technologies.

<https://www.morebooks.de/store/es/book/ciencias-solares:-alternativa-energ%C3%A9tica-para-el-medio-rural/isbn/978-3-659-08595-6>

## Health and safety



When used correctly, solar cookers can cook all types of food, including meat, cereals, legumes, vegetables and fruit. As with any cooking method, however, be sure when cooking in the sun, that food safety is maintained, especially for meats, legumes and cereals.

Safety problems when using solar cookers for cooking and The pasteurization of water are summarized in the sections below. Some are based on common sense to protect the user, and others require careful monitoring of the temperature so that cooked food can be safely consumed.

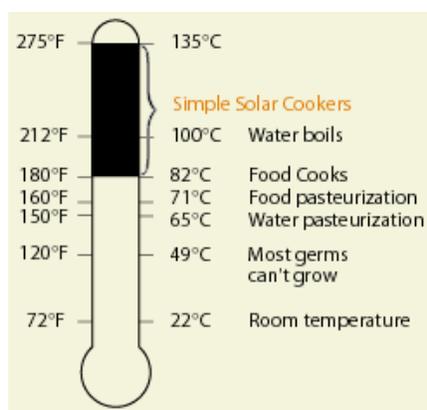
]

### Safe cooking Temperatures

#### Water Pasteurization

Harmful **water** microbes, including bacteria and viruses that live in water, are killed when they are heated to 65 ° C (149 ° F) for ten minute duration. This is called water pasteurization.

**(Food or water or both?) Water 10 minute duration at 149F**



### Food Safety

Foods cook at 82 °c (180 °f) at 91 °c (196 °f) and are free of pathogenic organisms when fully cooked. Common cooking temperatures in solar cookers are at ~~of~~ 82 °c (180 °f) – or higher. In most box and reflective panel solar cookers (in good solar conditions) food will cook in temperature variances of 82 °c (180 °f) to 149°c (300 °f). (Please note: these temperatures will not be noticed immediately on an oven thermometer when the food is placed in the solar cooker. Sunshine raises the temperature of the solar cooker and then slowly raises the temperature of the food.) Solar cooked foods retain moisture, and nutrients and seldom burn or scorch food. Some parabolic solar cookers can cook at much higher temperatures and introduce chances of scorching or burning.

With all cooking methods, some bacteria produce heat-resistant spores that germinate after cooking food. Therefore, cooked foods must be stored at temperatures above 52 °c (126 °f). **If cooked foods fall to temperatures between 52 °c (126 °f) and 10 °c (50 °f) for a period of time, these bacteria may spoil food and cause food poisoning.** Foods that remain in this temperature category for more than four hours must be heated again at cooking temperatures before consumption. (Even after warming up, there is always a risk of illness. If you are not sure, you have to throw away the food as opposed to being sick.)

### **Frozen and uncooked food**

With regard to solar cookers, it has been carefully documented that it is recommended to place raw foods that are chilled or frozen, even chicken or other meats, in a solar cooker in the **early** morning hours before the sun begins to cook it. Refrigerated foods placed in a cooker remain cold enough until the sun begins to heat the cooker. Once the full sun is on the oven, food heating is done fast enough to avoid any risk of food poisoning. Uncooked grains, beans and other raw dried foods can also be placed in an oven in advance. These two methods facilitate remote cooking. **It is generally dangerous to let food thaw at air/room temperature. It will stay too long in the dangerous temperature zone as raw food.**

## Important Considerations when cooking solar

- Solar cookers require direct sunlight to function properly. The shadows, the clouds and the air temperature limit their effectiveness, unless the solar cooker has incorporated a certain thermal mass (Insulation) to help maintain the cooking temperature for brief cloudy periods. The solar cooker should be used in places where shadows are not a problem.
- In most parts of the world, there are a few months when simple solar cookers have limited utility, due to the low intensity of solar radiation. In general, you can cook in the sun when the length of your shadow on the ground is shorter than your height. This indicates that the sun is high enough in the sky to cook. Some solar cookers with high rear reflectors and/or good quality insulation are however effective enough to be used year-round.
- You can usually cook two meals a day in the sun - a midday meal and an evening meal. You usually cannot cook early in the morning or late afternoon and after sunset. The sun is the most intense between 10:00 and 14:00, at which time the breads and pastries should be cooked if possible.
- And of course, always wash your hands before and after handling food and use clean utensils and pans.

## Eye Safety

Vision Specialists have found that people exposed to direct or reflected light for long periods of time, such as seamen and fishermen, were at risk for increased development of cataracts caused by receiving excessive amounts of UV rays. Most users of panel or box solar cookers do not spend significant hours of time in the sun this is not a problem. The intensity of sunlight reflected by many of these types of solar cookers is slightly lower than that of direct sunlight. Full reflection via mirrors is an exception to this statement.

Some curved concentrator (parabolic) stoves are more of a concern; they are designed to multiply the available solar radiation. And given the higher temperatures reached, it is often necessary to stir the food, which leads to more time spent near the cooker. Most of the best models parabolic solar cookers have their focal point inside the dish rather than projecting the sunlight outside the dish where it could get in touch with the cooks. With a little common sense and the use of “polarized” or “Glacier” sun the parabolic solar cooker can be used and appreciated safely.

## Panel and box solar cookers

- When inserting or removing food:
  - 1) place your body between the sun and the solar cooker, thus creating a shadow over the reflector area, or
  - 2) Rotate the solar cooker away from the sun briefly.

## Curved Concentrator Cookers

- If available, opt for a solar cooker with a **low** focal point. (i.e. under the edge of ~~the~~ a cooker)
- When possible, opt for a cooker with a device (such as a rod on which the pan hangs or a "swivel arm" on which the pot rests) to allow access to the pot without having to look at the reflected sunshine
- Use the solar cooker in a fenced area to prevent unwanted access.
- Alternatively, the solar cooker can be lifted on a platform or used on a roof if possible.

## All types of Stoves

- **Don't look at the reflections of the Sun.**
- If the children are nearby, tell them not to look at the reflection.
- Wear sunglasses if available.

## Solar cooking Frequently Asked questions

If you can't find the answer to your question below, Use the search field above to explore other pages on the site. You can also email us at [webmaster@solarcooking.org](mailto:webmaster@solarcooking.org) .

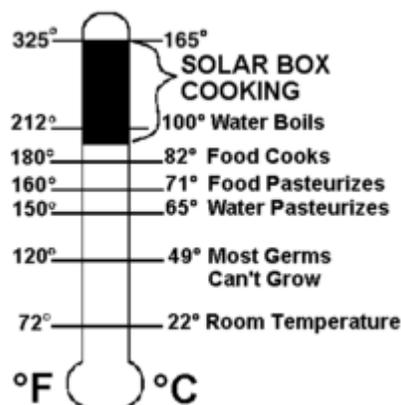
## Troubleshooting

### Why is my solar cooker not working?

Here are some common reasons:

- Make sure you start cooking early enough in the day.
- Most often when we hear about people having trouble using a solar, we find that they use pots with shiny finishes and/or light colors that reflect the light instead of absorbing it. You have to use a black pots/jar with a dark lid. The lid is necessary. If you have built a solar oven make sure the cooking chamber is not too high above the height of your pots. It is best- to make the solar cooker slightly higher than the largest pot you plan to use.
- You cook on a sunny day, but there is a lot of mist To judge the quality of a day of solar cooking, consider the color of the sky. If it's blue, you have a good day. If it's white, then you'll have more trouble cooking.
-

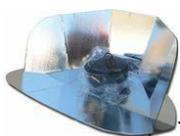
## Is my cooker hot enough to cook?



New solar cooks often report that they test the temperature of their solar cooker when they are empty and see only temperatures around 120 ° C (248 ° F). They wonder if it is warm enough to cook when ~~the~~ many recipes-require 175 ° C (350 ° F) or even 230 ° C (450 ° F). Remember all food is cooking at 82 ° c (180 °f). These lower temperatures provide wonderfully blended flavors and retains more vitamins and minerals in your food. Remember that water cannot exceed 100 ° c (212 °f) unless it is in a Pressure cooker . **If you are cooking food containing water or being rehydrated, ~~they~~ the water in the food cannot report getting hotter than 100 ° c (212 °f).**

Conventional cookbooks require higher temperatures to reduce cooking time and browning. The food takes longer to cook in most solar ovens and does not brown as much in a solar cooker as would happen in a conventional oven. Consider Chinese steamed rolls – they are pure white but fully cooked without any browning.

## Is there a way to speed up the time needed to cook ?



The [CookKit](#)

The cooking speed and temperature vary considerably depending on the type of solar cooker used.

- [The Parabolic Solar Cookers](#) usually reach the highest temperatures, cook quickly and bake/broil.
- [Panel Solar Cookers](#) heat at lower temperatures **and take** longer periods of time to cook, the same way as a slow electric cooker **or “crock pot”**.
- [The Box Solar Cookers](#) are Located somewhere in the middle.

Almost all solar cookers operate **better** when the sun is high in the sky. The hours between 10 a.m. and 2 p.m. are usually the best. Foods started at 9a.m. or 10a.m. in the morning (**have increasing solar energy**) cook much faster than foods that start at 1:00 p.m. or 2:00 p.m. (**have decreasing solar energy**). **Cook easier to cook foods in the afternoon hours.**

If you make a [Solar Cooker](#) , the cooking speed can be increased by adding **reflectors** or larger reflectors on the box. (If you do this, you may need to readjust the **solar cooker** to the sun more frequently to prevent **the side** reflectors from casting shadows on the stove window.)

When using a **solar cooker** [Cooking](#) such as the [CookKit](#) , you can speed up the cooking of certain things. Make sure that the front reflectors are properly adjusted to direct the maximum light on the **pot**. When using a panel cooker, the [plastic bag](#) that insulates the pot must be sealed to avoid heat loss that can lead to slower cooking of food. [Solar Cooking Netherlands-KoZon](#) Indicates that an increase in the temperatures can be obtained by placing the **pot**/jar in two plastic bags. Regardless of the type of cooker, use a dark-colored pan-black, with a good lid for maximum efficiency.

Smaller amounts of food cook faster than large ones. With the box cookers, the food cooks more quickly if they are divided into several small pots instead of having them all in **one large** pot. See the [Solar Cooking for large groups](#) .

Another way to speed up cooking is to [Preheat](#) the solar oven

## **What happens if the clouds pass in front of the sun while I cook?**

Your food will continue to cook as long as you have 20 minutes of sunshine per hour (using a cooker). It is not advisable to cook unattended meat when the cloud cover is important. If you can be sure that the sky will stay clear, you can put any type of food in the morning, face the oven to the South and the food will be cooked at the end of the day.

If the cloud cover of much more than 25 to 30% moves and seems to stay, you have to save the food by moving them to another type of cooker or by placing them in a [Heat-holding stove](#) (retained heat cooker).

## **Basic information**

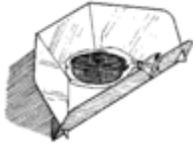
### **What are the basic types of solar cooker?**



### [Box Solar Cookers](#)

This type of cooker has the advantage of slowly and consistently cooking large quantities of food. The variations include the inclination of the face towards the sun and the reflectors.

### Panel Cookers



In this design, various flat panels concentrate the sun's rays on a pot/jar in a plastic bag or under a glass bowl. The advantage of this design is that they can be built in an hour for almost nothing or very small cost. In Kenya, these are manufactured by Solar cookers International for 5 USD each. There are many other groups that manufacture stoves to Panels. The CookKit is one model.

### [Parabolic Stoves](#)



These are usually concave discs that focus light on the bottom of a pot/jar. The advantage is that food cooks **faster** - roughly as fast as on a conventional stove. The downside is that they are complicated to make, made from materials that generally cost more, and they often have to be **refocused** ~~returned~~ to follow the sun.

### Other types of design :

- [Design of institutional Solar cooker](#)
- [Fresnel Solar Cooker Design](#)
- [Solar Wall Cooker Design](#)
- [Hybrid Solar Cooker Design](#)
- [Solar stoves on the ground](#)
- [ph Range Designotovoltaïques](#)
- [Design of conical Solar cooker](#)

## Who made the first solar cooker?

The first solar cooker we knew was invented by Horace de Saussure, a Naturalist Swiss experimenting from 1767.

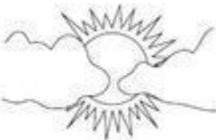
## Where are the most used solar cookers?

According to some survey more than 500,000 solar cookers are used in [India](#) And in [China](#) . There were also tens of thousands of stoves used by the [Refugees](#) Of [Darfur in Chad Camps](#) . We know of solar cooking projects in most countries in the world. Check out our [Country](#)

[resources by country](#) To get information on the use of solar cookers in each country on the SCI website.

High temperatures are not necessary for cooking. Your solar cooker will cook very well as long as it reaches temperatures of 82 °c (180 °f) or higher. Higher temperatures cook larger quantities, cook faster and allow baking on marginal days.

## How long does it take to prepare a meal?

	Faster Cooking	Slower Cooking
Time of year and day:		
Amount of sun:		
Amount of wind:		
Thickness of pot:		
Amount and size of food:		
Amount of water:		

As a general rule, you can expect foods in a panel solar cooker, such as a CookKit or a single reflector box oven, to take about **2** times more time than in a conventional oven.

Cooking with a parabolic oven is very similar to cooking on a burner of a conventional stove including potentials of scorching or burning the food. Check out our [Index of food](#) to get more specific instructions for each type of food.

## Can you fry or cook food on a hot plate?

Some people place a grill (thick solid iron plate) in a Sport solar oven to preheat. They then place a steak on the hot grill to “grill” their steak. Parabolic will perform the same and will fry food or prepare Flat Breads Like Tortillas.

## Do you have to turn the Cooker to follow the sun?

Stoves with a rear reflector do not need to be rotated unless you cook beans for up to 5 hours. Panel Solar Cookers should be rotated more often than ~~to~~ boxes, as they have side reflectors that can make shadows on ~~mask~~ the pot. Of course, turning these solar cookers more often to follow the sun would result in faster cooking. Parabolic solar cookers require the greatest amount of attention required by the cook. Parabolics must be rotated every 10 to 30 minutes, depending on the focal length.

## Can you cook pasta in a solar cooker?

To prevent pasta from becoming saggy, use two pans and heat dry pasta with oil in a saucepan. Heat the liquid with herbs in another. When the water is near a boiling point, add the heated dry pasta to the liquid. Return it to the solar cooker for approximately 10-15 minutes. Drain the liquid when the pasta is soft. If you are using a sauce, heat it in the solar cooker and pour it over the cooked pasta when the meal is served.

## If the solar ovens are so good, why aren't we all using them?

There are a lot of factors at work here.

First and foremost, the vast majority of the world's population does not even know that it is possible to cook with the sun. When they find out, there is almost universal enthusiasm, especially in areas where cooking fuel is in short supply and smoky fires are a heavy burden.

Many factors need to be put in place to allow the world to use solar fuel on a continuous basis. The most appreciated successful projects were those where the needs were greatest with the most favorable weather conditions and where the proponents of solar cooking have adopted a long-term approach to the transition.

**Additional factors impacting successful projects include Education, Funding, Distribution, and Money making free enterprise...**

## If you're building a cardboard oven, won't it catch fire?

Paper burns at 233 ° C (451 ° F). Most cardboard solar cookers do not get that hot.

## How much of the year can you cook?



In the tropics and in the southern United States, you can cook all year round depending on the weather. In more remote areas beyond the tropics, effective solar cooking is better with use of reflectors and good insulation.

## What foods should I try first in my new cooker?

A good first food to try is a small amount of Rice, because it is quite easy to cook and its cooking is very different from that of raw foods. Chicken or fish is also easy to cook including cake, squash, humbugger and hot dog.

Apples are another easy first project. Just dice or slice baking apples to put them in your pot. Add a little sweetener and seasonings of your choice and put them in your solar cooker, until they are tender you'll find yourself with something between baked apples and thick applesauce.

## Do solar cookers work at high altitudes?

Yes. In fact, you can cook faster at high Altitude. The solar radiation is usually much higher at high altitude because of the thinning of the atmosphere that does not filter as much sunlight as when cooking at sea level. Therefore, at the highest altitude, the food is warmed up faster, so you save time there. Cooking some foods may take a little longer because the water boils at a lower temperature at high altitude.

## Where can I buy a solar oven?

Solar cookers can be purchased from companies in many [Countries of the world](#) :

[Manufacturers and sellers](#) on SCI website

## I intend to do a scientific project on solar cooking. What should I study?

If you're planning a science project, Solar Cookers International wants you to know that your research can help expand global knowledge about solar cooking and be a big help to people all over the world. You must know that it is easy to build a high performance solar oven if you have access to numerous options of modern materials. However, more than a 3 billion people in the world, who could really benefit from a solar cooker, do not have access to such materials. This

means that your research will be very useful if they focus on simplifying the design of stoves or on the use of low-tech local materials.

*Article principal:* [Solar cooking in developing countries](#)

## Can you cook for large groups with solar cookers?

*Article principal:* [Kitchen for large groups](#)

## What are the challenges in getting people to change the way they cook?



**In the above photo:** Each group of items costs 40 Kenyan shillings (about \$US 0.50) , as well as the pile of charcoal indicated at the center. By using a solar oven and not needing to buy as much fuel, a family can use the money saved to buy more food.

The work of the proponents of solar cooking is not to "encourage people to change the way they cook." People will often change themselves, if they can clearly see their advantage. This is not to say that we make no effort to explain the benefits, demonstrate the benefits and encourage people to practice, improve and make the most of their solar cookers.

*Article principal:* [Promotion of Solar Cooking](#)

## How can we make money by manufacturing and selling solar cookers?

*Article principal:* [Business development](#)

## What resources are available online?

You will find the largest collection of information about solar cooking on the [Solar Cookers International Network Wiki](#). You can also participate in [Online Discussion Groups](#).

## Components of Solar Cooker

*Article principal:* [Materials](#)

### Do I have to build an oven with plywood or cardboard to be good quality?



The [Easy Lid Cooker](#) is a very good cardboard solar cooker.

Unless you need a cooker that can stay out even in the rain, you'll get along well with a cardboard cooker. The carton is much easier to work with and holds the heat as well. Some people we know use the same [Box Solar Cooker](#) made from cardboard for more than ten years. **You can make the cardboard cooker more durable by painting it, [Waterproofing](#).**

### Would a mirror be a better reflector?

Mirrors indeed are more reflective. However, the extra gain is probably not worth the increased cost and fragility associated with the use of a mirror. Remember also that the light that bounces on a mirror must travel through the glass sheet of the mirror as well as the glazing of the solar cooker (glazings on solar cookers will be one or two additional layers) The sunlight will be losing strength through each layer.

*Article principal:* [Reflective material](#) on SCI wiki

### Does it help to paint the walls in black?

Should the walls of a [Solar Cooker](#) be foiled to reflect the sunlight on the pan (or on the floor of the solar cooker) or is it better to paint the walls black?—A recent test showed that, in small solar cookers, painting black walls gives a 20% higher cooking power. As per Dick Wareham, on a study at the University of Pretoria in the Republic of South Africa indicated there was not much difference whether the walls inside the solar cooker were reflective or black.

## What type of paint should I use?

In the Developed countries, you can buy black spray paint that says "non-toxic dry" on the label. Otherwise, the black tempera paint works, but you have to be careful not to wash it when you wash the pot/jar. In Uganda, solar cook report that they use aluminum pans blackened on the outside by fire. This works well by rubbing the fat of an animal on the outside of the pot and holding it with pliers over the smoke/heat of a fire.

Article principal: [Painting](#)

## Is an “Oven Bag” better than plastic for the window of a baking device?



A large unopened baking bag can be glued over the glass on the opening of a Solar Cooker . With Reflective Panel solar cookers a black pot is placed inside the “Oven Bag” and no other Glazing is necessary.

It has been reported that Glass offers a performance about 10% higher than that of plastic. Glass has insulating qualities. And there are reasons to believe that in windy conditions, glass is preferable because it does not flex ~~slam~~ in the wind and drain the heat from the stove. Plastic, however, is often recommended as it is much less fragile and easier to carry and works very well. Plastic glazing must be replaced periodically because they are degraded by UV rays. An excellent plastic film easy to get is the one used to make baking bags – “Oven Bags”. These are for sale in grocery stores and cost more than US \$1 per bag in the grocery stores. Plexiglas works as well also.

Article principal: [Glazing](#)

## What kind of pot works best?



Inexpensive black granite pans can be ordered online from solar cooker manufacturers. Aluminum with black on the exterior works well. Other materials can work also with dark colors.

Ideally you want to use a dark, thin wall-and shallow saucepan, slightly larger than the food you will be cooking cast iron pans will work fine when you start to cook early, but extra solar energy is used to heat the pan and food. Cast iron will not work well in marginal conditions. Some of the new hiking pots and pans are black at the inside and outside, have waterproof lids and work very well in solar cookers.

*Article principal:* [Cooking Pots](#)

## What is the best insulation to use?

If you want, you can insulate the walls of an oven with different substances. Natural substances such as cotton, wool, feathers or even crumpled newspapers work well. Fiberglass or polystyrene are generally not recommended because they emit foul-smelling gases when they heat up.

*Article principal:* [Isolation](#)

## Can I use high-tech materials to make a more efficient solar cooker?



The GoSun Grill uses high-tech materials to use solar cooking in developed countries. *Photo credit: [GoSun](#)*

You may find that the creation of a high-Yield using fancy materials will make solar cooking more appealing to the people of developed countries.. Solar cooking and drying clothes outside on a line are less costly and use solar energy to compensate for some of this high energy consumption. Millions of poor people throughout the world continue to cook over a smoky fire every day. They must walk many hours each day to have access to wood and therefore have to devote half of their income to the kitchen fuel. These people could never afford an oven made of high-tech materials. We encourage the use of micro enterprise to pay for a solar cooker from the savings of not having to purchase other kitchen fuels.

So it's up to you to decide which population you want to serve. You can work on the creation of solar cooking - most practical for the inhabitants of developed countries in order to help them in the greener future. You can also study how to develop the demand, production, availability and distribution of low cost solar cookers locally for residents of developing countries

## Other uses

*Article principal: [Non-culinary uses](#)*

### Can you sterilize the water in a solar oven?

Yes. In all three types of solar cookers, water can be pasteurized. Pasteurization occurs at 65 ° C (150 ° F). This treatment kills all germs that cause disease in humans, but does not waste the energy needed to bring the water to a boil.- Pasteurization can be documented with a WAPI – a simple device that indicates when water has risen to 65 ° C (150 ° F)

*Article principal: [Pasteurization of water](#)*

### Do you use a solar cooker for canning?

Yes, but for fruit only! **Do not put vegetables or meat in a solar cooking box to can them as these foods must be canned under pressure!**

The most important solar cooking projects in the world were selected either because they have an impact on a large number of people for [Promoting solar Cooking](#) , or demonstrate new ways in which solar cooking is used to [Generate incomes](#) . They illustrate how solar cooking contributes to the realization of the [United Nations Sustainable Development goals](#) .

## Africa

- Togo



Sale of Solar Cookers in a local market. *Photo credit:* [Solar Cooking KoZon](#)

- Mali

**Continued success of solar cooking activities in Mali** -En 2014, [Solar Cooking KoZon a](#) Granted to [Togo Tilé](#) , a solar cooking company led by Sandra Coulibaly. Use an initial grant of 13,300 €. Two years later, it was an established company with 30 employees, five outlets across the country and a monthly business volume average of 9,000 euros. Helping the environment is an important message presented during sales demonstrations and in schools and universities. For Togo Tilé, a contribution to the environment is not limited to the sale of the product, because they continue to support and follow their clients. **Lesson Learned:** A Proven help model is a message of help to the environment and long-term follow-up of customers after sales.

- **Uganda**



The store [Solar Connect Association](#) In Mbarara, in [Uganda](#).

**Self-sufficient and profitable, a thriving solar cooker company in Uganda** The [Association Solar Connect](#) , under the direction of [Kawesa Mukasa](#) , announced in July 2017 having sold more than 250 solar cookers on a monthly basis, 100 [Hay Baskets](#) and 250 [Fuels. Stoves](#) To [Efficient Wood](#) In [Uganda](#) . These results and the profits they generated allowed the company to self-finance. With the help of [Solar Cooking KoZon](#) , their approach consisted of hiring local employees and engaging Long-term in the areas in which they work.

- **Tanzania**



Public Service exchange Program [Solar Circle](#) In [Tanzania](#)

**Solar Circle uses the barter system to distribute 3000 solar cookers in Tanzania** -The NGO [Solar Circle](#) Learned from his solar cooking program in Masasi, in the south of the [Tanzania](#) That people will work hard to win a sola cooker. The group has created a barter system with community leaders. The community chooses a service project and the beneficiaries organize

and oversee the effort. Participants win a solar oven for their involvement. At the beginning of 2013, the program had distributed more than 3,000 solar cookers and built 40 homes for sick, elderly, widowed or handicapped people.

- **Madagascar**



With the help of the [Swiss ADES Foundation](#) , women receive [Solar Cooker](#) Made locally

- **Zambia**



New Workshop participants [SHEP](#) and trainers

**Solar cooking "Avon ladies" in Zambia** -The project [Solar Health and Education](#) (SHEP) was launched in 2007 to fund solar cooking workshops in rural areas of [Zambia](#) . The team, led by [Alison Curtis](#) , developed a system to appoint a local manager to the workshop to follow up with a group of participants to help and encourage the use of new solar **cookers**. In 2012, the solar team had ten excellent leaders who took turns to disseminate solar information by settling in lounges, events, recreation classes and clinics. [Learn more about SHEP Leadership training](#) . **Lesson Learned:** Create a team of teachers Well-trained premises.

- **Darfur Refugees in Chad**



Solar cooker project for women in Darfur

**The Solar Cooker project is helping to improve the lives of Darfur refugees living in [Chad](#) -** More than 50 000 people in four [Refugee camps in the](#) In eastern Chad have used [CooKits](#) Designed by [Solar Cookers International](#) . The project, which started in 2006, was led by [Chad Solar](#) And by the British NGO [CORD](#). The project improved the security and survival of women in refugee camps. Previously, refugees were confronted with dangerous and difficult movements to pick up rare firewood. Two of the most important projects are in the [Touloum refugee camp](#) and the [Iridimi refugee camp](#) . **Lesson Learned:** Find solutions for situations of extreme needs with simple and inexpensive technology.

- **Sudanese in Kenya**



Refugees from [Sudan](#) are trained by [Solar Cookers International](#) To the use of their new Solar stoves [CooKit](#) .

**A refugee camp in [Kenya](#) Was the first to receive a large-scale solar cooking project** -The [Kakuma refugee Camp](#) was created in 1972 when the refugees first arrived in Kakuma. The

introduction of solar cooking in the camp was the first and largest refugee project of Solar Cookers International , which began in January 1995. Kakuma had a large refugee renewal, but in 2004 the camp had tripled nearly 90 000 refugees. Although rapid growth has posed problems to help anyone who wanted to cook, SCI finally served more than 15,000 families. This project was one of the first to use the Solar panels CookIt to introduce solar cooking. The program also extended the technology of solar cookers to schools, especially to primary schools, including demonstrations, poems, songs and plays. **Lesson Learned:** Creative thinking has developed a simple solar cooker capable of serving a population of rapidly growing displaced families.

## Asia

- India



Shirdi Row of CApteurs

**The institutional solar cooking is growing in [India](#)** -Completed in 2010, the world's largest solar cooking facility, designed by [Gadhia Solar Energy Systems Pvt. Ltd](#) , worked at the temple of Shirdi, where a lunch cooked with solar energy is ~~IVR to~~ more than 50,000 people a day. The solar steam-firing system consists of seventy thirteen [Scheffler Reflectors](#) Mounted on the roof of sixteen square meters each. The dishes concentrate the sunlight on the receptors containing water, thus generating steam that is sent to the kitchen for cooking. [Learn more about the Shirdi project](#) . **Lesson Learned:** Solar cooking can be used successfully on the [Institutional Plan](#) replace large quantities of conventional cooking fuel.



**The world's largest solar cooking course takes place in India** -On January 12, 2016, 5,760 college students from more than thirty schools met for the Maha Suryakumbh organized by [Keshav Srushti](#) . Held at MIT College in Aurangabad, [India](#) , the students prepared a simple meal

and learned to use a simple [Solar panel Cooker](#) . The event is awaiting accreditation by the Guinness Book of Records. [Ajay Chandak](#) Indicates that the government's five-year plan Indian SOS for the period from 2012 to 2016 provides that 30 000 million INR (about 600 000 000 USD) are planned for the teaching of solar cooking in 500 000 schools. **Lesson Learned:** An enlightened government is able to ensure that the introduction to solar cooking is done at a high level.

## Latino- America

- **Bolivia and Peru**



Local villagers in [Bolivia](#) Proudly display their [Solar Box Cookers](#) Recently completed using their new Carpentry skills.

**[Bolivia](#) and the [Peru](#) Have benefited from successful solar cooking programs** -The French NGO [Bolivia Inti-South Sun](#) and the Bolivian NGO [CEDESOL](#) (in collaboration with the Bolivian company have trained thousands of Bolivians and Peruvians are building and using [Solar Cooker](#) and [Economical wood Stoves](#) . Bolivia reported in 2011 to have distributed more than 20 000 ecological devices since 2000.

- Haiti
- Notre Dame University Haiti, Hinche develop a course: Sustainable Energy Solar cooking in fall 2018. The participating contributors are: PPAF, KDCK, SCI, PHP, Solar education Project



- Mexico



Workshop participants receive their [Cooker Solar HotPot](#) The [Mexico](#) .

**The introduction of the HotPot solar cooker to the [Mexico](#) - [Solar Household Energy](#) (SHE),** took several years to develop a [Panel Solar Cooker](#) Called [HotPot](#) , a variation of [Solar Cookers International's CookIt](#) . In 2003, SHE received a grant from the World Bank's Development Market to build a HotPot promotion project in [Mexico, in](#) Collaboration with the Mexican Conservatory of Nature, the Mexican Fondo for Nature Conservation (FMCN). In July 2004, 2 000 HotPots had been manufactured and shipped by truck to eight local conservation NGOs who had agreed to participate in the HotPot distribution initiative. Ot. Solar Household Energy can be the world leader in the promotion of solar cooking. [The history of the HotPot project.](#)  
**Lesson Learned: Quality Solar CookersÉ are appreciated. However, the demand may not be met without significant financial support.**

- Chile



The restaurant [Delights of the Sun](#) In Villaseca, [Chile](#)

**The [Chile, the](#) Solar Restaurant generated profits** -The restaurant [Delights of the Sun](#) , renowned for its excellent cuisine, has become a tourist destination for the village of Villaseca,

[Chile](#) . Started in 2000 with an initial capacity of sixteen seats, the solar restaurant can accommodate 120 people since 2013. The dry and Central Valley receives more than 300 days of sunshine per year. Like similar areas, traditional fuel sources are increasingly scarce and expensive. Tourists like to watch solar cooking at work. [Visit the restaurant Delicias del Sol](#) .  
**Lesson Learned:** A Solai Baking Company Well managed can succeed.

## United Nations Sustainable Development Goals

On 25 September 2015, the 193 countries of the United Nations General Assembly adopted the "Sustainable development Program for the year 2030", which included the **United Nations Sustainable Development goals** (ODD). These 17 objectives were designed to take advantage of the progress made by [Millennium Development Goals of the United Nations](#) By providing an updated framework for the global community to "recognize that ending poverty must go hand-to-hand with a range of social needs, including education, health, social protection and opportunities of employment, while tackling climate change and environmental protection. <sup>[1]</sup>

As in the case of the millennium For development, solar cooking can play a key role in achieving each of the 17 Sustainable Development Goals:

- Reduce the need for fuel, save time for families by offering individuals, primarily women, the opportunity to focus on education and income-generating activities to improve their lives, their families and their community.
- Allow families to spend money, which would otherwise be necessary to buy fuel, food and other essential products.
- Requires only clean and renewable energy from the sun to prepare Meals. Solar cooking does not emit any harmful toxin, which keeps the air clean at home, prevents health problems related to exposure to smoke and does not contribute to climate change.

Find out below how Solar Cooking contributes to each of the 17 sustainable development goals.

## The role of solar thermal cooking



### Goal 1: Ending poverty in all its forms everywhere

Access to free solar energy by providing solar technologies For nearly 3 billion people who cook [Make drinking water](#) Burning fuels in open fires, which will help end poverty Energy. Up to 40% of the household energy budget is used to heat water. The reduction in the amount of biomass collected and the energy purchased through free and non-emission solar thermal energy enhances resilience, especially for the poor and vulnerable situations. Because access to energy for all is the key to development, policies Encouraging innovation in solar technologies will help put an end to poverty in all its forms, everywhere.



### Goal 2: Ending hunger, ensuring food security and improving nutrition and promoting sustainable agriculture

Nutritious foods, such as legumes and legumes, require large amounts of organic Rare or costly mass or fossil fuels for cooking. With free solar thermal energy for cooking, families can continue to cook Nutritious foods, thus ending malnutrition. Because all AL Traditional aliments can be cooked in solar cookers, they strengthen resilience in the face of extreme volatility in food prices. Because access to solar energy reduces the demand for biomass and Fossil fuels, the quality of land, soil and water are improved.



### **Goal 3: Ensure a healthy life and promote the well-being of all at all ages**

Women and their young children are most vulnerable to household air pollution, the leading cause of illness: more than malaria, HIV/AIDS and diarrhea diseases. Solar thermal cookers reduce exposure to Household air pollution, resulting in 7 million of premature deaths each year, including 50% of deaths due to pneumonia in children less than five years of age. Since solar thermal cookers do not produce flames, the RISQEU disfigurement or death by burning caused by cooking fires is severely reduced, especially in women and children.

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### **Objective 4: ensuring inclusive and equitable quality education and promoting opportunities throughout life**

Released from the tedious tasks of collecting biomass for cooking fires through solar cooking, vulnerable people, including people with disabilities, indigenous peoples and children, more time to study and spend with family.

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### **Objective 5: Ensuring gender equality and empowering all women and girls**

In many cultures, the tedious task of providing kitchen fuel is the responsibility of women and girls. By traveling away from the safety of their homes and communities to collect fuel from the

Biomasses, women and children are often attacked, raped or killed by collecting fuel for their households. The use of solar thermal cookers reduces the exposure of women and children to violence. Using solar energy free to cook, women and children can earn up to 5 hours a day for other activities, such as education and community involvement.

Give them the power of leadership in their communities. This is first important for many Necessary societal reforms.

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### **Objective 6: Ensuring the availability and sustainable management of water and sanitation for all**

Sustainable drinking water management will depend on the decentralized pasteurization of the Local water resources. Solar thermal cookers allow safe drinking of water, fighting water scarcity and reducing diarrheal diseases.

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### **Objective 7: Ensuring access to affordable, reliable, sustainable and fashionable energy for all**

Solar energy is a real modern energy: it does not need to be collected or bought and is available on all continents, in all regions. It does not require any supply chain and no infrastructure of delivery. Solar thermal energy has the highest energy efficiency of all energy sources.

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### **Objective 8: promoting sustained, inclusive and sustainable economic growth, full productive employment and DEC workENT for all**

By cooking with free solar energy, the costs of the domestic fuel formerly used for cooking and pasteurizing water can be redirected to other family needs. With less need to collect COMBustibles from biomass and less market travel to buy fuels, women gain time to educate themselves, leading to productive employment and decent work.



### **Objective 9: Building a terminated infrastructure promotes an inclusive and sustainable industrialization and encourages innovation**

Solar technologies reduce the need for energy infrastructure by providing access to decentralized energy. Many thermal cooking technologies can be made in an affordable way from materials of local or regional origin. Solar cooking technology is accessible to local innovators, facilitating small business access and promoting human well-being and economic development. Because solar thermal energy is available for everything is inclusive. Solar energy is a sustainable energy source, increasing energy stability and resilience.



### **Goal 10: Reduce inequality within and between countries**

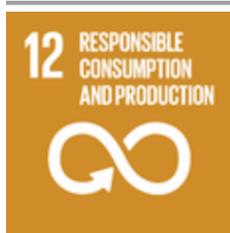
Free solar energy is proportionately higher for the lower 40% of the world's population, which will benefit most from increased access to decentralize and free energy. Solar energy is accessible to all during the season(s) where solar energy is available, irrespective of age, gender, disability, ethnic origin, origin, religion or economic or other status.

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### **Goal 11: Making cities and human settlements inclusive, secure, resilient and durable**

Solar energy can be captured for domestic and institutional uses in urban areas where biomass fuels are not available, reducing dependence on costly and unsustainable fossil fuels for baking and pasteurization of water. Access to solar energy sources reduces competition for energy, reducing human conflicts in high-density environments.



### **Objective 12: Ensure consumption and production patterns sustainable It**

A sufficient amount of solar energy reaches the surface of the earth every hour to feed all human activity for one year. Because free and non-emitting solar energy has a natural and equitable distribution chain, the environmental costs of fuel production and transportation to markets are reduced. Decentralized use solar energy can contribute to sustainable models of household energy consumption and production, reduced Market distortions.



### **Objective 13: Taking urgent action to combat climate change and its impacts**

The use of free and non-emitting solar energy reduces the production of forcing agents related to climate change, such as greenhouse gases and black carbon produced by fossil fuels and biomass.



**Objective 14: Sustainable conservation and use of oceans, seas and marine resources for sustainable development**

Healthy reefs are essential carbon sinks, fixing the carbon on Earth so that it is not absorbed by the world's oceans. The replacement of biomass combustion fires with solar energy for the basic needs of household favors the preservation of biomass, optimizes the earth's capacity to absorb water and reduces runoff containing pollutants and eroded soils that stifle flows



**Objective 15: Protecting, restoring and promoting sustainable use of terrestrial ecosystems, sustainable management of forests, combating desertification and halting and reversing land degradation and halting the loss of biodiversity**

The rate of desertification can be slowed down when solar energy replaces the biofuels harvested for domestic use. Cooking and pasteurization of water with solar energy can help forest management, curb soil degradation and stop desertification and marine pollution.



**Objective 16: Promoting peaceful and inclusive societies for sustainable development, ensuring access to justice for all and creating effective, accountable and inclusive institutions at all levels**

Access to solar thermal energy free is essential to achieve two of humanity's most important rights: cooked food and drinking water. Solar energy is the most inclusive source of energy: by reducing competition for scarce and costly fuels, it reduces human conflict.

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**Objective 17: Strengthening the means of implementation and revitalizing the Global Partnership for sustainable development**

The solar thermal cooking sector has a long history of appropriate technology. The sharing of knowledge for innovations in solar thermal cooking reinforces and allows members of the community, especially women, to be agents of change for a revitalized and sustainable development.

## Solar Cookers International supports the SDGs

[www.solarcookers.org](http://www.solarcookers.org)



	<p><b>1 NO POVERTY</b> Access to free, no-emission solar thermal energy builds resilience, particularly for the most vulnerable populations. Energy access for all is key to development; hence, policies encouraging solar technologies will help end poverty.</p>		<p><b>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</b> Solar technologies reduce the need for energy infrastructure and increase resilience for all by providing decentralized sustainable energy. Many innovative solar cookers can be made using locally-sourced materials.</p>
	<p><b>2 ZERO HUNGER</b> With free solar thermal energy for cooking, families can cook all traditional and highly nutritious foods. Solar energy access reduces demand for biomass and fossil fuels, and improves land, soil and water quality.</p>		<p><b>10 REDUCED INEQUALITIES</b> Free solar energy is of proportionately higher value to those who benefit most from access to decentralized, free energy. Free solar energy is accessible to all, irrespective of age, sex, disability, ethnicity, origin, religion, or economic status.</p>
	<p><b>3 GOOD HEALTH AND WELL-BEING</b> Women and their young children experience the highest exposure to household air pollution, the number one cause of disease. Because solar thermal cookers do not produce flames, fire risk and respiratory illness is greatly reduced.</p>		<p><b>11 SUSTAINABLE CITIES AND COMMUNITIES</b> Solar energy can be used in urban settings where biomass fuels are not available, reducing reliance on unsustainable fossil fuel for cooking and water pasteurization. Solar energy use reduces competition for energy in urban settings.</p>
	<p><b>4 QUALITY EDUCATION</b> Freed from the time-intensive tasks of gathering biomass fuel for cooking fires by solar cooking, vulnerable persons, including the indigenous, those with disabilities, and children, reclaim time for education and study.</p>		<p><b>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</b> Free solar-thermal energy has an equitable and decentralized distribution chain, reducing environmental costs of fuel production and delivery. This can contribute to sustainable patterns of energy consumption and production.</p>
	<p><b>5 GENDER EQUALITY</b> Using solar cookers reduces exposure of women and girls to violence when gathering biomass fuels. By using free solar energy for cooking, women and girls can gain up to 5 hrs/day for education, empowering them for leadership roles.</p>		<p><b>13 CLIMATE ACTION</b> Use of free, no-emission solar energy reduces production of climate-change forcing agents, such as greenhouse gases and black carbon produced by combustion of fossil fuels and biomass fuels.</p>
	<p><b>6 CLEAN WATER AND SANITATION</b> Sustainable management of drinking water supplies for all will rely on decentralized pasteurization of local water sources. Solar thermal cookers can make water safe to drink, addressing water scarcity and reducing diarrheal disease.</p>		<p><b>14 LIFE BELOW WATER</b> Preserving biomass maximizes water absorption in soil, reducing soil erosion that flows into the marine environment. Ultimately, solar energy reduces deposits of pollutants and fertilizers in the oceans.</p>
	<p><b>7 AFFORDABLE AND CLEAN ENERGY</b> Solar thermal energy is clean, efficient, sustainable, modern energy: it does not need to be gathered or purchased, and is available in all regions on all continents. It requires no supply chain, and no infrastructure for delivery.</p>		<p><b>15 LIFE ON LAND</b> Cooking and pasteurizing water with solar energy preserves forests, and curbs land degradation and desertification.</p>
	<p><b>8 DECENT WORK AND ECONOMIC GROWTH</b> By cooking with free solar energy, household cooking fuel costs can be redirected. With less need to gather or purchase fuels, women gain time for education, productive employment and decent work.</p>		<p><b>16 PEACE, JUSTICE AND STRONG INSTITUTIONS</b> Access to solar energy achieves our human right to cooked food and safe water. Solar energy reduces human conflict over scarce fuels.</p>
			<p><b>17 PARTNERSHIPS FOR THE GOALS</b> Knowledge sharing for appropriate solar cooking technologies strengthens and empowers community members, particularly women, to be change agents for revitalized, sustainable development.</p>

## Emergency preparedness

Being prepared can reduce the fear, anxiety and loss caused by disasters. Governments and religious leaders have advised people to prepare and prepare their homes in times of crisis. Whether it is a natural disaster, (an earthquake, a hurricane, etc.), or a catastrophe of human origin, (such as a terrorist attack or a fire), prudent families are preparing for disasters that could strike unexpectedly. **A solar cooker in the household it's a way to prevent anxiety regarding cooking a meal.**

## Complete your storage for Emergencies with solar cooking

In order to prepare for the unexpected, many families have put aside food, but have trouble storing enough fuel and running it to keep it cool. -Guides are available on the amount of food you need to keep on hand to support your family in an emergency, but do you feel comfortable with the amount of fuel available and how to store it? Use of a solar cooker on days when the sun shines decreases the amount of fuel to store.

### A preparation article that pays

You do not need to wait for an emergency to start solar cooking.- Many ready-to-prepare families who have purchased a solar oven have found that their cooker is quickly profitable by reducing utility bills and the cost of meals taken at the restaurant. Many people do not cook on hot days for fear of heating the house. A solar cooker can cook on hot summer days by leaving the heat of cooking outdoors. The recovery time to recover the cost of-a homemade solar oven can be in the order of a week or two (or longer for commercially purchased solar ovens)

In addition to cooking, a solar cooker can also be used in various other ways, including: stylization of equipment, water pasteurization and food drying.

## Promote solar Cooking

### The planets Project

Determine if solar cooking is appropriate in your area can be explored on the SCI wiki of the following section:

- [Predicting the utility of solar cooking in a given locality](#)
- [The 25 countries with the greatest potential for solar cooking](#)
- [Cultural Variables to consider](#)
- [Solar radiation Maps](#)
- [The particular challenges of solar cooking](#)

### Learning from other people's work and making contacts

- [Find promoters existing in your country of interest](#)
- [Find participants and read previous Conference articles](#)
- [Study the most important solar cooking projects](#)
- [Read previous solar Cooking project evaluations](#)
- [Learn more about cooking for large groups](#)
- [Learn more about solar cooking programs in refugee camps](#)

- [With amaze how to collect data about your project](#)

## What is the concept of entrepreneurship?

**Definition:** Explanation should include the **concept** that an **entrepreneur** is an individual who undertakes the creation, organization, ownership, and risk of a business. It should also address basic personal and societal benefits of **entrepreneurship**, as well as examples of local and national **entrepreneurs**.

**Qualities** of a Successful **Entrepreneur**.: confident, optimistic and disciplined self-starters.

**Entrepreneurship** is the process of designing, launching and running a new business, which is often initially a small business. The people who create these businesses are called **entrepreneurs**. Would you like to be your own boss? Have you ever dreamed of starting your own business? Don't know what to do about your great business idea?

Being an entrepreneur can be full of risks. These risks are minimized through drafting a business plan, knowing your competition, and successful marketing.

## Basics of Starting A Business

- Decide On A Name
- Legal Structure Of Business
- Register The Business
- Choose A Location
- Hire An Accountant

## Create A Business Plan

- What Should Be Included In The Business Plan?
- Gather Documentation
- Develop Business Plan Outline
- Draft Business Plan

## Market the Business

- Traditional Marketing
- Create A Website
- Social Media
- Networking Groups

## Run the Business

- Procurement (purchasing process that controls quantity, quality, sourcing and timing to ensure the best possible total cost of ownership)
- Sell! Sell! Sell! (make deals to sell)

- How To Manage Cash Flow (Stay on top of invoicing)
- Budgeting (creating a plan to spend your money)

### **Grow the Business**

- Offer More Products / Services
- Open Another Location
- Franchise Opportunities (license trade name)
- Scoring Large Contracts ( deals with suppliers)

### **Get Financing**

- Contact Organizations for Guidance
- Decide the Type of Financing
- Shop Around
- What to Do Once Approved

### **10 top qualities of entrepreneurs:**

#### **1. Disciplined**

These individuals are focused on making their businesses work, and eliminate any hindrances or distractions to their goals. They have overarching strategies and outline the tactics to accomplish them. Successful entrepreneurs are disciplined enough to take steps every day toward the achievement of their objectives.

#### **2. Confidence**

The entrepreneur does not ask questions about whether they can succeed or whether they are worthy of success. They are confident with the knowledge that they will make their businesses succeed. They exude that confidence in everything they do.

#### **3. Open Minded**

Entrepreneurs realize that every event and situation is a business opportunity. Ideas are constantly being generated about workflows and efficiency, people skills and potential new businesses. They have the ability to look at everything around them and focus it toward their goals.

#### **4. Self Starter**

Entrepreneurs know that if something needs to be done, they should start it themselves. They set the parameters and make sure that projects follow that path. They are proactive, not waiting for someone to give them permission.

## **5. Competitive**

Many companies are formed because an entrepreneur knows that they can do a job better than another. They need to win at the sports they play and need to win at the businesses that they create. An entrepreneur will highlight their own company's track record of success.

## **6. Creativity**

One facet of creativity is being able to make connections between seemingly unrelated events or situations. Entrepreneurs often come up with solutions which are the synthesis of other items. They will repurpose products to market them to new industries.

## **7. Determination**

Entrepreneurs are not thwarted by their defeats. They look at defeat as an opportunity for success. They are determined to make all of their endeavors succeed, so will try and try again until it does. Successful entrepreneurs do not believe that something cannot be done.

## **8. Strong people skills**

The entrepreneur has strong communication skills to sell the product and motivate employees. Most successful entrepreneurs know how to motivate their employees so the business grows overall. They are very good at highlighting the benefits of any situation and coaching others to their success.

## **9. Strong work ethic**

The successful entrepreneur will often be the first person to arrive at the office and the last one to leave. They will come in on their days off to make sure that an outcome meets their expectations. Their mind is constantly on their work, whether they are in or out of the workplace.

## **10. Passion**

Passion is the most important trait of the successful entrepreneur. They genuinely love their work. They are willing to put in those extra hours to make the business succeed because there is a joy their business gives which goes beyond the money. The successful entrepreneur will always be reading and researching ways to make the business better.

Successful entrepreneurs want to see what the view is like at the top of the business mountain. Once they see it, they want to go further. They know how to talk to their employees, and their businesses soar as a result.

## How to Promote a New Product or Service

It is tough to come out with a new [product or service](#), it can be hard to get the word out. You could be offering the best new product or service in the world, but if you don't promote it properly, you may end up losing money down the line. Here are some creative ways to promote a new service or product for your small business.

When it comes to promoting a new product or service for your business, it can seem like there are endless options. It can be difficult to figure out where to get started and which methods of promotion will give you the best results. The truth is that there are many ways to [promote your business](#), and what works may depend on your business. Here are 9 ways to promote a new service or product for your business.

### 1. Offer Customers an Exclusive Preview

Your loyal customers are a key part of how to promote your product, because they are most likely the first ones who will buy it. Offer customers an exclusive preview of your new product. This can take the form of a private, pre-launch party, an online preview, or a special invitation to test out your latest service. These [exclusive offers to loyal customers](#) will make them feel good and keep them coming back.

### 2. Social Media Contests

Contests, giveaways, and sweepstakes are a very popular tool among top quality marketers. Why? Marketers know that social media contests work!

Social media contests are a fun, easy way of connecting with customers and bringing in more fans for your social media platforms. [A simple Facebook contest](#) for example, garners 34% new fans on average per campaign. That's huge considering that organic reach is low on Facebook!

Instagram giveaways give customers an exclusive chance to be the first person to get their hands on your new product—for free! The giveaway can be marketed all across your social media channels and through email. [Run an Instagram giveaway](#) to get more direct traffic, put your business in front of new customers, and for a fun way to connect with fans.

## Email Marketing

Did you know that 82% of consumers open emails from businesses, and that 44% of email recipients made at least one purchase last year based on a promotional email? [Email marketing via newsletters](#) is a fantastic vehicle for advertisement, and is one of the best ways to promote a new service or product.

Email newsletters allow you to easily share news of your product, photos, and information with customers. From there, offering an exclusive discount or promotion is a great way to “seal the deal” so to speak, and get cash flowing your way. For more ideas, check out this post on [email newsletter topic ideas](#).

## 4. Facebook Ads

With 1.44 billion monthly active users, Facebook is a window to a huge market. That’s why [Facebook ads are an incredibly effective marketing tool](#). Facebook is particularly useful in concisely targeting your audience, as Facebook’s impressive data collection allows businesses to target by gender, age, location, interest, and more. You also have an array of [options for the type of ad you want](#), and you can easily stick to your budget by creating a cap on how much you want to spend daily or monthly.

## 5. In-Store Promotions

Businesses with brick and mortar locations have the added opportunity to [promote a new product or service in-store](#). If you want to know how to promote your product in your studio or store, the #1 thing you need to do is to give people a reason to go to your store.

Aside from having attractive logos and signage, you can promote your new product or service in store with signs and promotional materials inside. Offer [exclusive in-store discounts](#), such as a buy-one-get-one-free or a percentage discount. You could also market your product as being exclusively available at your retail store. Whatever your promotion, be sure to emphasize that it won’t last forever. Customers whose purchase power is limited, either by time or inventory, feel a more pressing sense of urgency to buy when it comes to your product.

## 6. Host an event

Another way to get people to your physical location is to [host an event or an open house at your business](#). Hosting an event is a great way to get people physically into your business, which makes them more likely to become a customer. Events don’t have to be fancy and super organized; something as simple as an open house or an info session will work for locations like salons, fitness centers, yoga studios, spas, and retail stores.

If your business is in a location with other local businesses, you can work together to have a sidewalk sale or outdoor open house to draw even larger crowds! This is a great way to promote a new product or service that you’re offering.

## 7. Offer an Upgrade or Trade-In

If your business is more service-based than product-based, like a salon, spa, fitness center, or consulting business, you can offer an upgrade for customers to try out your new service. Offering a new facial or massage at your spa? Provide a complimentary upgrade for existing customers to try it out! Expanding your consulting services? Offer expanded services to loyal clients so they can see the difference!

If your new product is, in fact, an upgrade on an older one, you can consider crafting a trade-in promotion. Trade-in promotions are proven to be effective because they incentivize consumers to buy a new product using a token or credit they already have (the product they own). You can also resell the old trade-in products, provided they are in good enough condition, or use them for future giveaways.

## 8. Share Customer Reviews

One of the best ways to promote a new product or service is to let your customers speak for you by [sharing reviews](#). If you take advantage of some of the ideas previously mentioned and offer an upgrade or free preview to customers, ask them to review the new service or product online or to provide a testimonial for you to share. People will be more likely to sign up or try it out if there's a glowing review from another customer.

## 9. Share on Social Media

Another way to promote new products and services is to announce and share this on social media. If you're using the tactics mentioned above, make sure to share any of them on social media, including: customer exclusive events, open houses, trade-in or upgrade opportunities, giveaways, customer reviews and photos. If you find that customers are posting on social media sites like Facebook and Instagram, make sure to share those photos with your own followers to entice people to try out your new service or product!

If you've got a new product or service that you're looking to promote, try out one of these 9 ideas for your business. If you've been successful with another promotion, let us know in the comments below!

How do I start a help group?

### Starting Your Support Group

1. Run meetings efficiently. ...
2. Draft a mission statement or a statement of purpose. ...
3. Share responsibilities and delegate work in the group. ...
4. Choose a name for your group. ...
5. Publicize and run your first public meeting. ...
6. Make plans for the next meeting.

What is meant by self-help groups?

**Self-help groups**, also known as mutual **help**, mutual **aid**, or **support groups**, are **groups** of people who provide mutual **support** for each other. In a **self-help group**, the members share a common problem, often a common disease or addiction.

## Why is a support group important?

Why **Support Groups** are **Important**. World Mental Health Day is October 10. For those facing **major** life changes, including medical issues, **support groups** often share experiences and advice that can be healing to the mind, body and spirit. They can offer a forum to meet and network with others sharing the same challenges.

How do I set up a support group on Facebook?

## How to Create a Facebook Group

1. Find "Add Group" From your "home page" on Facebook go to the Explore - Groups section on the left side menu and click on, "Groups." ...
2. Click "Create Group" ...
3. Name Your Group. ...
4. Add Members. ...
5. Choose Privacy Setting. ...
6. Click Create. ...
7. Add Your Cover Image. ...
8. Complete "About" Section.

## Benefits of participating in support groups may include:

- Feeling less lonely isolated or judged.
- Gaining a sense of empowerment and control.
- Improving your coping skills and sense of adjustment.
- Talking openly and honestly about your feelings.
- Reducing distress, depression, anxiety or fatigue.
- In a **support group**, members provide each other with various types of help, usually nonprofessional and nonmaterial, for a particular shared, usually burdensome, characteristic. Members with the same issues can come together for sharing coping strategies, to feel more empowered and for a sense of community.

## The self-help group microfinance model

*Frances Sinha is writing about lessons from her important new book, [Microfinance Self-Help Groups in India: Living Up to Their Promise](#). This post introduces the book.*

In India, Self Help Groups or SHGs represent a unique approach to financial intermediation. The approach combines access to low-cost financial services with a process of self-management and development for the women who join as members of an SHG. The SHGs

are formed and supported usually by NGOs, or (increasingly) by Government agencies and sometimes directly by banks. SHGs are linked to banks first with a group deposit account, then for credit, which is disbursed to the group and in turn distributed to the members. There is a process of group formation and group leaders and members are trained on managing the savings and credit. Often too SHGs are linked to wider development or community programs. SHGs are thus seen to confer many benefits, both economic and social, providing new and real opportunities for rural women that challenge the traditional barriers that women face. SHGs enable women to grow their savings and to access the credit which banks are increasingly willing (or directed) to lend. SHGs can also be community platforms from which women become active in village affairs, stand for local election or take action to address social or community issues (the abuse of women, alcohol, the dowry system, schools, local water supply).

SHG numbers have grown rapidly since 2000, across India first in the more developed south, now too in the north. The SHG 'bank-linkage' program is the flagship microfinance program of the National Bank for Agriculture and Rural Development (NABARD) which has actively supported the development of this program since the early 1990s. For some time, NABARD's website announced: Did you know: more than 400 women join the SHG movement in India every hour; an NGO joins our microfinance program every day?

But, as with much of microfinance everywhere, so with SHGs, alongside the growth numbers there are also some questions. Microfinance Institutions (MFIs) do usually publish information about their financial performance. Some MFIs are also beginning to report on their social performance. But in the case of SHGs, there is little information, even on financials. Even the growth and portfolio data reported by NABARD, at the time we started the study for this book, were cumulative rather than annual. And the data on loan repayments was unclear.

Before participating in a self-help group explore certain financial and social questions. On the financial side, how effective and transparent are the groups in managing their financial transactions? Are the groups sustainable? Are they equitable? On the social side, what does it take for SHGs to mobilize for social or community action? How effective are such actions? On both sides, financial and social, who is really benefiting? Do the poorest benefit, do they not join at all or if they do join, are they more likely to drop out?

These are the questions addressed about self-help groups

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