

# Solar Stoves for Third World Countries: Development Issues

Punya Chaudhuri

Process Improvement Systems

Plankgatan 26, Norrköping, SE 602 19, Sweden

tel: +46 11 160593/fax: +46 11 160493

The New solar stove is available on demand, environmentally friendly, easy to handle and cheap!



## New Solar Stove fulfills users' requirements!

**Potential users and their lifestyle:** Housewives in rural areas in developing countries are the potential users.

Housewives gainfully occupied with other duties like washing, cleaning, agricultural field work etc. during the daylight hours. They have no time to prepare a midday meal. The family eats after sun down and at sun rise.

**Users' Requirement:** A solar stove to be used when the sun is not shining.

**Motivation:** A new type of solar stove is needed, since most of the Solar Stoves currently available are suitable only for the daytime use.

**A successful solar stove must be:**

• **available on demand:** Store heat from daytime (charging) for nighttime use (discharging)

• **user friendly:** controllable, safe, easy, affordable, versatile, etc.

## Characteristics of the Solar Stove

**Size:** A family of 5 people requires ~3 kWh for one dinner and one breakfast.

• A stove needs to contain ~12 litres of CaO (~4 kg). This could be split into 2 pots.

• Each family would possess 3 sets of stoves (200 x 300 mm)

**Capacity:** The energy density of lime is 615 kWh/m<sup>3</sup> (theoretical), 250 kWh/m<sup>3</sup>

(practical). In comparison, fuel oil has a value 45 times higher but lime can be reused 100s of times.

## Operation

• **Control:** Heat discharge is controlled by the amount of water added to the burnt lime. Each 56 g of CaO will absorb 18 g water. A graduated spray water bottle is the control system: more water applied = more heat (up to a maximum of 0.6 litre/stove containing 2 kg CaO)

• **Recharging:** The temperature needed for the reverse reaction is 560 °C. This can be achieved by a dish-type solar concentrator. To make it cheaply, the dish can be made of clay and lined with mirror. Using a moving-focus design, stoves can be slowly heated up to 600 °C.



, absorbs heat, releases H<sub>2</sub>O (preparation)

produces heat (cooking).

