

Explaining the Unexpectedly Low Use of Solar Cookers in Gujarat, India

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The potential for solar cooking by households in sun-abundant fuelwood-short rural Gujarat was recognized nearly three decades ago. Gujarat Energy Development Agency (GEDA), a public body mandated to promote applications of renewable energy in the province introduced the first SBC in 1979 which was made of steel sheet and weighed 23 kg. In 1985 that was replaced by a new model made of aluminum sheet weighing half as much and incorporating some other features of convenience such as the castor wheels. The model marketed today is essentially the same.



New aluminum SBC was promoted vigorously via media, users were oriented to solar cooking, entrepreneurs were inducted into SBC manufacturing and standards of quality were established. The sale price was subsidized by the government over several years to encourage people to adopt solar cooking. As shown in graph annual sale varied between 2000 to 4000 up to the year 2000, perhaps the phase in which users learnt the use of SBC. After that sales rose steadily reaching nearly 17000 by the year 2006 the year price subsidy ended. Buyers began to pay full price (presently Rs 1700 or \$ 30). Annual sales dropped steeply after 2006 and appear to be leveling off at around 8000 -10000 units, half of the peak witnessed in 2006.

There may be two possibilities. One, that the drop is temporary effect of subsidy withdrawal, much like drop in car sales in the wake of steep rise in price of gas. The fact that it has not happened in six years may point to the second possibility - the aluminum cooker has diffused as much as it had potential, demand that persists is mostly for replacement of old units. New buyers are not many. Simple calculations would seem to support this view. The total number of SBCs sold in Gujarat till the year 2000 was 57,000. That number rose to 157,000 by 2006. The number of cookers sold after the year 2000 thus was 70,000 in 2006. Add to this another 30,000 units sold during 2006-2011. Thus the number of SBCs no older than 11 years will be presently nearly 100,000 units. Given that the normal life of aluminum cookers is upwards of ten years, the replacement demand from the stock of 100,000 owners would be indeed be around 8000-10000, nearly the same as the current annual sales.

In order to expand the market, attract new buyers it would be necessary to launch a model that meets their expectation better. Some idea of what the customers desired and did not find in the model marketed was reported by Naik and Sharan (1997). They polled sample of the actual and potential users of SBC to determine the features they desired and also



how much more they could pay for the improvement. Fifty users and equal number of non-users were polled; responses analyzed using conjoint analysis, a commonly used technique among product designers that permits evaluation of weights consumers attached to each of the proposed new features in a product and how much they

could pay. Out of 50 users only 9 attached positive value to the SBC model they used then which was the same that was introduced in 1985. They desired stainless steel vessels (instead of aluminum), provision of a backup source so that the cooker could be used even when sky is cloudy and an indicator to readily show if the food inside was done without opening the cover which was inconvenient. If these three features are provided the number of owners attaching positive value to cooker went up to 41. At the time of study the price was Rs 600 (\$ 10). Respondents stated that they would buy such a cooker even at \$15 a piece. More than half the respondents (28) were willing to buy it even at \$ 20 that is twice the current price. Responses of the non-users or potential new customers were similar. Sharan and Pilare (1999) determined the amount of back-up electrical power needed if SBCs were to be made capable of year-round use. Sharan (1999) also explored the use of reflective insulation (in place of glass fiber) which was found equally effective and which could reduce the weight by about one kilogram.

It is useful to ask - if all that done to promote SBCs in Gujarat over 30 years had to be done afresh what would be done differently? We suggest by hindsight that the engineering R&D would be organized differently - it would be carried out at one or more designated product design centers and will be driven by feedback periodically and systematically obtained from the market and users. This was obviously not the case. The SBC being sold today is essentially the same as it was in 1985. Although, some research agencies were commissioned to gather feedback from users at one time or other, it was never explicit as to how and who was expected to redesign the cooker based on that and put out a new models. Once a model design was selected all vendors were asked to manufacture and market the same. Thus there was an element of competition among the vendors, but none among the designers.

The need for design engineers to receive feedback and act upon it is of key importance in further refinement of basic product. As an example, the Sol Cafe's designed by author (GS) for use in schools in Kutch region a few years ago originally had large glass mirror as reflector. In one installation at a school, after a few months of use some children broke it inadvertently while retracting. It took six months for getting the replacement for it had to be bought in Bhuj the nearest town 90 km away and transported by bus. The first replacement broke during transport as it was stowed on top of the bus without adequate packaging. We then decided to use aluminum foil instead to make the reflector which

worked as well and was vastly lighter and not vulnerable to breakage. All mirrors in Sol Cafes in that neighborhood were replaced proactively. Another change will be in induction of entrepreneurs - large businesses with high tech manufacturing know how and facility will be enlisted for mass production and marketing.

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