

Making a business from solar home systems

Summary

SELCO-India is a private business which has designed and sold over 48,000 solar home systems, powering electric lighting and small appliances for 220,000 people in Karnataka and other states in South India.

Around 46% of households in India do not have mains electricity, and for many others the supply is unreliable. The use of photovoltaic (PV) solar-home-systems (SHS) can provide reliable power for lighting and low-power appliances, which brings great practical benefits. Smoky, dangerous kerosene light is avoided, people have extended hours for work and study, and more opportunities for leisure and entertainment.

Many programmes throughout the world have attempted to improve quality of life using SHS, but often they have not led to long term use and continuing markets. SELCO-India believes that the use of SHS will become widespread only if the system and after-sales service are of high quality, and if people want an SHS enough to pay for it. What they provide is properly designed and installed systems, excellent on-the-spot service and links to organisations which offer appropriate and affordable finance. The Ashden judges were highly impressed with the philosophy and excellent management within SELCO-India: they have built a thriving business by providing poor people with a high quality product and service.

The organisation

SELCO-India was founded in 1995 by Harish Hande, the current managing director, and Neville Williams. SELCO-India grew by gradually expanding their network of service centres, and building up confidence in local financial institutions that SHS were suitable for loans. SELCO-India is managed by a board of directors, and currently employs over 170 people, 25 at their headquarters in Bangalore and the rest at 25 service centres in South India. Their annual turnover in 2004-5 was over £1.5 million, 85% of which came from the sale of SHS, and the remaining 15% from larger PV projects and other PV and solar thermal uses.

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Technology and use

The core business of SELCO-India is the design and sale of photovoltaic (PV) solar-home-systems (SHS), principally for lighting, but also suitable for radios, cassette players and fans. A common system design supplies four 7W compact fluorescent lights (CFLs). Electrical power is generated by a 35 Wp PV module, which is usually mounted on the roof of a house. A 90 Ah lead-acid battery is used for storage, so that the system works both day and night and throughout the year. The batteries used are designed to withstand significant discharge each day without rapid deterioration. (Cheaper car batteries cannot withstand this, and would become unusable within about six months) An electronic charge-controller protects the battery from charging or discharging too much, and enables the battery to be used for at least five years. However, systems are individually designed to meet the needs (and budget) of each customer, and there are many variations which can be used. The installation of the system is carried out by SELCO technicians, and great emphasis is placed on appropriate siting of all components, and tidy wiring.

One innovative idea from SELCO to make systems affordable is to mount a light in the corner of one room and remove bricks into other rooms, so that a single light provides background illumination in three rooms. Another feature which allows flexibility at low cost is having lights which can be moved from one place to another, and installing the wiring and brackets for six lighting points in a four-light system.

Similar systems have been sold to stallholders in street markets. Here, less individual lights may be needed, but with higher illumination or for a longer period, so custom design is again important. All the components of the PV systems are manufactured in India. PV modules and batteries are bought in, but SELCO initially had problems with the quality of CFLs, so set up a sister-business to manufacture both CFLs and charge controllers.

How users pay

A core principle of SELCO-India is that poor people are able to afford modern energy services - and that in the case of PV, an energy source which is regarded as expensive by the rich (in comparison with grid electricity) is actually cheap for the poor (in comparison with kerosene lamps and dry cell batteries). The main problem is lack of initial capital.

SELCO does not provide credit or loans, but has built up working relationships with local banks and microcredit organisations over many years. This has given finance organisations the confidence to provide credit for PV systems, and an understanding of the payment terms which different owners may need. Some users work directly with the finance organisations, others work through self-help-groups which gives additional security that a loan will be repaid.

A typical 4-light SHS costs the user about 18,000 rupees (£220) including design, installation and a one year service contract. In the past there has been a 33% government subsidy, but this has been discontinued, so users now pay the full cost. Microfinance organisations usually require a small downpayment, and then instalments of 300 to 400 rupees per month (£4 to £5 per month) over five years. This level of payment can be affordable from the extra earnings which the light enables: one woman visited by an Ashden judge had increased her production of bidis (traditional cigarettes) from 400 to 600 per day, and her extra daily earnings of 13 rupees were more than enough to cover the 300 rupees/month repayments on her loan. Other women use the extra time to increase their work and income from tailoring, basket making or betel-nut shelling.

Users have the option of including the cost of a second battery via slightly higher monthly instalments, so that they are not faced with the cost of a replacement battery just when their loan has been repaid. This ensures that the replacement battery is a proper PV battery, rather than a cheaper car battery. It also makes sure that spent batteries are returned to SELCO for recycling.

Street vendors normally use large kerosene pressure lamps. For them the savings on kerosene can repay the loan on a PV system, but they are not used to monthly budgeting. One vendor whom

the Ashden judge met thought that he would not be able to manage the bank repayments of 200 rupees/month for five years, even though SELCO had helped him to work out that he was saving 14 rupees/day or 420 rupees/month on kerosene. So SELCO provided a money box for him to deposit 14 rupees at the end of each day, and he now takes 200 rupees to the bank at the end of each month and still has an extra 220 rupees to spend! Another way in which systems have become affordable for very poor traders is through PV battery-charging businesses. These charge the batteries during the day, and hire them to traders each night for a rental fee. In this way the trader has to pay only for the CFL, and the regular payment is brought to a more manageable daily basis.

Training and support

For customers, SELCO-India provides individual design, to produce a system which meets both their wishes and their budget. All installations and user training are carried out by SELCO technicians. Service is free during the first year, and SELCO staff visit each system every three months to make sure that it is working correctly. All SELCO service centres hold full stocks of spares, so that replacements can be made quickly if there is a problem.

PV modules supplied by SELCO come with a 10-year guarantee and batteries with a 3-year guarantee: any faults are reported to the SELCO head office, which keeps full details of all systems, so that problems with suppliers can be tracked down quickly.

Benefits of the project

The immediate benefit to users is the provision of clean, good-quality light, and power for small appliances. Good light improves morale and opportunities in ways which are difficult to quantify. Children are able to study (or, as one homeowner told the Ashden visitor "they have no excuse for not studying"!), domestic tasks are done more safely and easily, and there are increased opportunities for income generation. For vendors, produce from stalls is displayed better, and they do not have to work with the smell and heat from kerosene lamps.

For both homes and street vendors, the reliability of the PV systems is a major benefit. Users remember one or two days each year in the monsoon season where there was not sufficient output, but that is in a region where the mains electricity fails for an average of four hours per day.

There are significant environmental benefits from the PV systems. The immediate benefit is that the use of smoky, dangerous kerosene lamps is minimised. In addition, owners no longer use and dispose of dry-cell batteries. Families who use kerosene for lighting consume about 120 litres per year, so the 48,000 systems installed avoid the emission of about 14,000 tonnes of CO₂ equivalent per year. (This figure takes into account CO₂ equivalent 'embodied' in the manufacture of the SHS.)

The operation of SELCO has provided valuable employment opportunities. The total number of employees is about 170, of whom about 145 are in the 25 local service centres. Service centre staff are recruited locally, and all start with few qualifications. SELCO provides good opportunities for career development, and many staff stay with the company for a long time, and move up to senior positions. Employment has also been generated outside the company, including increased sales of small electrical appliances like fans and radios. One effective way of bringing in customers is using local agents who receive a percentage commission for each SHS sale which they initiate: in some service centres, local agents are the initial point of contact for up to 70% of customers.

Many of the benefits of the work of SELCO are particularly significant for women: they often spend more time in the home and therefore appreciate the improved light and income-generation opportunities. Many women take the responsibility of paying for the SHS, and through this gain confidence in financial management. SHS owners who were visited by an Ashden judge were very pleased with their systems, and clearly took pride in them.

Within SELCO, 21% of service centre staff and 43% of head office staff are female, and their sister-company has an entirely female workforce.

SELCO provides an excellent, replicable model for providing better energy services to poor people, while at the same time developing a thriving business. They have shown that solar electricity can be successful and affordable, provided that a proper service and financing system is in place. Within India alone, 46% of households do not have grid electricity, and many more have an unreliable supply, so the opportunities for similar enterprises are enormous.

SELCO aim to have installed 235,000 SHS by 2010, but also want to provide other energy services. One area which they would like to cover is the provision of cheap, improved cookstoves: savings on wood might also be linked to payments for the SHS.

Management, finance and partnerships

SELCO-India has exemplary management practices, and it is through these that they have been able to build a thriving enterprise, as well as provide energy services to the poor. These management practices are evident in their dealings with customers and external agencies, and also within their organisation.

The main work of SELCO is carried out by local service centres, and the aim is that all customers should be within 3 hours travelling distance of a centre. Each centre keeps a stock of components and equipment, and has clear operational requirements, and monthly targets for both number of systems sold and financial turnover. Service centre managers report daily by email to Head Office, and have weekly and monthly meetings, and this close liaison avoids many operational problems. Within each centre, roles are clearly defined. The sales agents are responsible for promoting the business, visiting potential customers, designing systems and taking payment. The technicians install and maintain the systems, but do not deal with any financial matters.

SELCO has been approached by people who would like a franchise to sell their systems. However, they have deliberately not followed this option, because the reputation of their brand name depends on the service which they provide as much as the hardware, and it is much more difficult to guarantee service within a franchising system. SELCO will only move to a new region if they have good contacts there, both for dissemination of information and for providing finance. For instance, in Belthangadi region in Karnataka, the main partner is the NGO Shri Ksetra Dharmastala Rural Development Project (SKDRDP) which runs a network of 5,000 self-help groups. These groups meet to support members in domestic and farming matters, and make regular savings. If a member wants a loan - for instance, for an SHS - the group decides whether it is an appropriate purchase, and the group as a whole takes out the loan. Although there is great enthusiasm to purchase SHS in this way, the groups make sure that members have covered more basic needs (like wells or farming equipment) before they invest in an SHS. Because of the interest from SKDRDP, SELCO opened a service centre in the region, and most of the 3,000 SHS which this centre has installed have been for members of the self-help groups.

A separate division at the SELCO Head Office deals with large projects, such as lighting systems for religious houses and emergency lighting in parks. They also deal with sales to entrepreneurs who hire out batteries. This means that the local service centres can focus on their core product, the SHS.

Use of the Ashden Award

SELCO are one of the longest running solar power companies in India, and since winning the Ashden Award they have continued to increase the number of installations. In the 12 months following the Award they installed a further 1,250 solar home systems (SHS) in various poor regions of Karnataka, India. In addition to this they have also established five new distribution partners, two of which are NGOs and three of which are financial institutions. They have also formed a link with a leading women's microfinance institution, which has helped them to secure additional funding.

Over the past year SELCO has helped to create more than 25 entrepreneurs, who are serving 750 clients by providing solar lighting to street vendors, home based workers and small businesses. This helps to spread the benefits of solar powered lighting beyond the use of systems in the home.

SELCO has faced the same cost increases for solar PV modules as all companies in the sector. They have not passed on the increases to their customers, and are looking at other energy technologies that could be distributed using their business model, to help profitability.

This report is based on information provided to the Ashden Awards judges by SELCO-India; findings from a two-day visit by one of the Ashden judges to see their work in Karnataka; and presentations by Harish Hande at Ashden Awards seminars in London.

Dr Anne Wheldon, Technical Director of the Ashden Awards, November 2005.

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