

## **Micro-finance provides solar lighting to homes in rural Sri Lanka**

### **Summary**

Sarvodaya Economic Enterprise Development Services (SEEDS) has financed the installation of around 52,000 solar home systems (SHSs) in rural areas of Sri Lanka.

Grid electricity extends to about 55% of Sri Lanka's population, but to only 40% in rural areas. The infrastructure is gradually being extended; but there is a shortage of generating capacity, since the generation of power has not increased alongside an ever-increasing demand. The average rural family in Sri Lanka spends 19% of their income on energy, and many can afford off-grid electricity with a suitable credit system.

SEEDS works through accredited solar installers to identify potential loan customers. These loans enable poor households in rural areas to purchase SHSs, and receive the benefits of improved light, communications and entertainment. The monthly repayments are set at a rate which the household can afford to pay, and the loans are paid back over a period of one to four years. Local field officers employed by SEEDS collect monthly repayments, and also carry out checks and minor repairs to the systems. SEEDS has financed the installation of around 52,000 SHSs (out of a total of 71,000 installed in Sri Lanka) since 1998. It has also installed 13 micro-hydro schemes in rural areas and has given off-grid electricity to 370 families (comprising 1,800 people). A further 1,800 poor rural families have received loans to enable them to connect to the mains grid.

### **The organisation**

SEEDS is a micro-finance institution which belongs to the Sarvodaya Group, the largest development NGO in Sri Lanka. The aim of SEEDS is to eradicate poverty by promoting economic empowerment for a sustainable livelihood. SEEDS operates an energy financing division to carry out renewable energy lending initiatives. Its main focus is on financing and managing SHSs.

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## Technology and use

Solar-home-systems (SHSs) are small stand-alone electrical systems. They consist of a photovoltaic (PV) module (usually rated at between 20 and 80 Wp), which generates electricity from sunlight; a re-chargeable battery, which stores electricity so that it can be used during both day and night; a charge controller, which prevents the battery from being over-charged or deep-discharged; wiring and fixtures. Modules and many of the components used are imported from various countries, including Australia, India and Germany. The SHS supplies power to four to six compact fluorescent lamps (CFLs), a TV and sometimes a mobile phone charger or DVD player.

SEEDS provides finance but does not undertake SHS installations. Instead, they partner with approved installer companies, through an agreed Memorandum of Understanding (MoU). MoUs are currently in place with 11 installers, which range in size from small, local start-up companies to multinationals.

## How users pay

The main role of SEEDS is to provide affordable financial packages to enable users to pay for their off-grid electricity systems. However, the way in which they do this goes far beyond the role of a conventional bank.

When a decision is made to promote solar home systems in a particular village, representatives of SEEDS and a partner installer company visit the village and demonstrate the operation and benefits of SHS. The partner companies also market the systems by advertising in the local media and canvassing business through sales staff.

Once a potential customer is interested, a representative from SEEDS visits them at home to carry out a preliminary loan assessment. If the customer has no cash to invest, details of the loan scheme are provided and the representative helps with filling in a loan application form. SEEDS staff check the form and schedule a date within the next week for one of their field officers to visit. The field officers are from the local area, and have been trained to assess the payment capability of the applicant by looking at their income, expenditure and housing. Energy expenditure (for example, on kerosene lighting) is especially important since this will be saved in the future. SEEDS field officers are very thorough: personal knowledge of the household and informal checks with local contacts may support the formal process. The applicant needs two guarantors, and cannot be over 50 years old. Customers must pay the full price of the system over an agreed period in instalments. The system prices vary between Rs 26,000 and Rs 75,000 (£130 to £400) depending on size. A minimum down-payment of 15% is required, and is collected up front by the installation company. The balance is granted as a loan and repayments are made over one to four years.

If the loan is approved, the security documents will be obtained from the customer and the supplier company informed. They install the SHS immediately, and are paid directly by the SEEDS head office. A SEEDS field officer calls each month to collect the repayments and check that the system is working correctly. Once the repayments are complete, ownership is transferred from SEEDS to the customer.

The careful assessment of financial circumstances and use of local field officers have produced an impressive track record on repayment. Only 1-2% of customers have defaulted on their repayments, and these problems have usually been solved by careful re-scheduling of the loan. If the borrower has died or become permanently disabled, the outstanding loan is recovered from a loan assurance fund set up by SEEDS. The family are relieved of further repayments and keep the SHS. If a loan is wilfully defaulted and all other efforts have failed, SEEDS persuades the guarantors to put pressure on the debtor. As a last resort, SEEDS can recover the SHS and sell it to a new customer, but this is very rare.

## **Training and support**

Under the terms of the MoU, the Technical officer from the installation company provides training to the users: explaining how to read the indicator lights, when to top up the battery and how to ensure that the electrical connections are clean and tight, and when to clean the PV module. One month after the system has been installed, an employee of the installing company visits the user to check that the system is working satisfactorily and to answer any questions. The householder is given a card which explains common faults that they can fill-in and return if they need help. Customers are encouraged to phone up the installation company or the SEEDS office if they have problems.

SEEDS field officers are technically trained to carry out basic maintenance (such as topping up the battery) and can supply spare CFLs. Using the SEEDS field officers to check systems when they collect the monthly repayments has been a very effective way of sorting out minor problems. More serious faults are referred to the installer. The installing companies maintain the systems for three years under a service agreement with SEEDS. After this period, users pay a small fee for servicing. On rare occasions, SEEDS has brought in technical help if the installing company has problems.

All system components have warranties, ranging from one year to three years for the batteries, and 15-20 years for the PV modules. Any work needed following the expiry of a warranty has to be paid for by the customer. SEEDS extends credit for replacement of batteries and other components.

## **Benefits of the project**

Solar home systems replace kerosene lamps, and in doing so they provide several benefits. The immediate benefit to users is avoiding the fumes and fire-risk of kerosene lamps. There are also substantial savings in production of greenhouse gases. SEEDS used an independent agency to estimate kerosene usage in 1998. This survey found that the average household used 25 to 30 litres of kerosene per month, which suggests a total saving of between 16 and 19 million litres of kerosene per year, and an avoidance of between 40 and 47 thousand tonnes of CO<sub>2</sub> emissions.

Children do better at school as a result of being able to do their homework in the evenings (although the access to TV which the SHS provides is also sometimes a distraction!) A CFL is brighter than a kerosene lamp and is safer to use. SEEDS knows of cases where children have been severely burnt as a result of the kerosene lamp falling over when they had fallen asleep studying. These benefits are greater for families with more than one school-aged child – where children often had to take it in turns to study with a single lamp. Many rural families choose to have one light outside, as a deterrent to elephants.

An SHS can power a mobile phone charger. This makes it easier to use a mobile phone to talk to relatives overseas or to check the market prices of farm goods. Some people hire out phones or sell a phone re-charging service. SHS users are enthusiastic about being able to watch television or DVDs or listen to music.

The average household using kerosene for lighting spends about Rs 1000 (£5) per month at the current price of Rs 39 per litre. A survey undertaken for SEEDS suggested that the average rural household spends 19% of their income on energy for lighting, so once the repayments on an SHS are completed, the owners have significantly more available income. The repayments are set at an affordable level (ranging from the same to double the amount previously spent on kerosene and battery re-charging), so that, even during the repayment period, the financial demand is affordable.

Many SHS owners have also increased their income by starting new businesses or expanding existing ones. One example is the owner of a fruit and vegetable stall near a bus station, whose kerosene lamp would never stay lit on windy days. Using an SHS improved the lighting which attracted many commuters and substantially increased income from the stall. From his savings, the stall owner has been able to buy a two-wheel tractor which he hires out to farmers.

An estimated 250,000 to 300,000 people have benefited from SEEDS solar installations. 11 companies supply systems and several thousand people are employed. Currently, SEEDS is financing 1,000 to 1,300 new loans per month, and it expects to finance 45,000 more SHS within three years. Two commercial companies now use the SEEDS model to run their own solar financing schemes.

## **Management, finance and partnerships**

SEEDS is the economic arm of Sarvodaya, the largest development NGO in Sri Lanka. Sarvodaya aims at a new social order "sustainable livelihood with no poverty, no affluence". There is a strong emphasis on self-help, and finding effective ways to work things out. Following the tsunami, Sarvodaya groups from unaffected villages were twinned with groups from affected ones to provide support. SEEDS promotes economic empowerment through a network of 4,000 village societies, known as 'social groups'. These groups help half a million people to access basic services and livelihood improvements.

The SHS programme is led by Indrani Hettiarachchy, based in the SEEDS head office which provides overall supervision, refinancing and fund management. 20 branch offices in different administrative districts run the local SHS programme, through assistant managers who each head a team of field officers. Nearly 200 staff work directly on the programme.

SEEDS has been enabled to provide SHS finance by loans from the Sri Lankan Government via the World Bank projects, has accumulated sufficient capital to continue operating the programme when these projects finish in 2007.

## **Use of the Ashden Award**

SEEDS plans to use an Award to equip their field officers with hand-held computers, which will enable them to store and retrieve information from visits to potential customers more efficiently and without having to return to the district office. Their customers are all located in rural areas and the field officers have to travel substantial distances, making at least 250 visits each month; so the use of hand-held computers could save substantial amounts of time, money and carbon emissions.

*This report is based on information provided to the Ashden Awards judges to SEEDS, and findings from a visit by one of the judges to see their work.*

*Dr Anne Wheldon, Technical Director of the Ashden Awards  
Jeremy Rawlings, Technical Assistant July 2006.*

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