

Promotion and microfinance of solar home systems for rural households in Bangladesh

Summary

Grameen Shakti has sold and installed over 65,000 solar home-systems (SHS) in rural Bangladesh, and brought major benefits to its users. Nearly 70% of households in Bangladesh are not connected to the electricity grid and depend on kerosene for lighting. This includes most rural areas and extends as far as the fringes of Dhaka. There are plans to extend the grid, but there is little prospect of substantial change in the foreseeable future.

By selling SHS, Grameen Shakti has provided lighting, communications (especially mobile phone charging) and TV, and has increased employment opportunities. It is the largest single installer of SHS in Bangladesh.

This impressive number of installations has been achieved by enabling users to purchase their systems on micro-credit with affordable terms, tailored to their specific needs. Funding for the micro-credit system comes from the World Bank and GEF via the Infrastructure Development Company Limited (IDCOL) which provides Grameen Shakti with both subsidy and concessional loans. The cash pool from credit repayments will enable Grameen Shakti to continue the scheme when the subsidy, which is being phased out, ceases in 2008.

Grameen Shakti has also started a network of technology centres throughout the country to manage the installation and maintenance of SHS locally. It emphasises the importance of technicians who know local customs working through local branches, and has trained 2,000 (mainly female) technicians. It aims to install 100,000 systems by 2006 and sees the potential to install one million systems by 2015.

The first prize Ashden Award to Grameen Shakti recognises the key contribution which it has made to the enormously successful programme of solar home systems in Bangladesh, through effective provision of both affordable finance and installation services.

The organisation

Grameen Shakti was established by Grameen Bank in 1996 to promote, develop and supply renewable energy technologies to rural households in Bangladesh. It seeks to improve the livelihoods of people who cannot access grid electricity.

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Technology and use

Solar-home-systems (SHS) are small, stand-alone electrical systems. They consist of a photovoltaic (PV) module, 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; four to six fluorescent lamps; wiring and fixtures. The PV modules, rated at 40 to 120 Wp, are supplied by Kyocera and BP-Solar and imported from Japan and India. Grameen Shakti uses 55 to 130 Ah deep-cycle batteries, manufactured in Bangladesh mostly by Rahimafrooz Batteries. They make 70% of their own charge-controllers; the remainder are imported from India.

Grameen Shakti employs 20 staff at its production unit in Dhaka, and has set up fifteen manufacturing units in rural areas of the country to scale up production. They have installed over 65,000 SHS in Bangladesh since 1996, and are now installing about 2,700 per month. A price reduction was offered in the run-up to the school certificate examinations and installations then exceeded 3,200 per month.

How users pay

At the time of writing (July 2006) 130 Taka (Tk) = UK£1 = US\$1.8

The cost of a 50 Wp system is about Tk 24,000 (£185), which is equivalent to about half the average annual income of a rural household. After signing the contract, the customer pays a deposit of 15% to 25%, or about Tk 3,300 (£25). The outstanding sum is granted as a loan which is repaid at Tk 400 to Tk 800 per month (£3 to £6) over a period of two to three years. This covers the whole cost of the system. Contracts are signed with either men or women. Grameen Shakti seeks to sign women where possible, since they are in the home more than men and use the SHS more.

The programme is supported by IDCOL under the Rural Electrification and Renewable Energy Development Project (REREDP) financed by the World Bank and Global Environment Facility (GEF). IDCOL's subsidy and concessional loans have helped to create a pool of capital to start the programme, which can be recycled when loans are repaid. Initially the subsidy was £50 per system but this has been gradually reduced to £28 per system and is due to end in 2008. Grameen Shakti is confident that the programme can then continue to expand without the support of a subsidy.

Training and support

From the start of its work, Grameen Shakti involved the local community in the planning, implementation and maintenance of SHS. They are now moving to providing components and servicing at a community level, by local people who are familiar with community needs. To achieve this Grameen Shakti has started a network of technology centres, managed mainly by women engineers, which train other women as solar technicians. Female technicians are allowed to visit homes during the daytime if the men of the household are away. The technicians are equipped with tools to service and repair the systems in their areas, and to assemble SHS accessories such as charge controllers. They attend a 15-day full-time course during which they learn to install, replace and maintain PV modules, batteries and other components. Seven technology centres are already in operation, with about 2,000 trained technicians. Users have also been trained to take care of their own systems and to diagnose simple faults.

Grameen Shakti intends that these technology centres will become self-sufficient businesses that will carry out the routine servicing of SHS, charging Grameen a fee. The centres will be able to take out small loans to purchase tools and equipment and also sell their services directly to SHS customers. Grameen Shakti wants the centres to promote entrepreneurship and boost local economies, and also save the costs of centralised management over a large geographical area, thereby compensating for the phasing-out of the current subsidies.

PV modules are guaranteed for 20 years, batteries for five years, and charge controllers for three years. Once some components are out of warranty, Grameen Shakti offers SHS owners a service

contract for Tk 500 (£4) per year. Rahimafrooz Batteries collects life-expired batteries for recycling and pays the users Tk 300 to Tk 500 (£2.30 to £4).

Benefits of the project

Solar-home-systems are replacing kerosene lamps, and in doing so provide several benefits. The immediate benefit to users is avoiding the fumes and fire-risk of kerosene lamps. Women, who usually spend more time in the home, benefit most from the elimination of kerosene smoke and the risk of burns.

There are also substantial savings in production of greenhouse gases. The Finance Ministry which administers the REREDP scheme estimates that each SHS saves about 375 kg CO₂ per year (assuming the use of about 12 litres of kerosene per month), so the total annual saving from the systems installed to date is about 22 thousand tonnes of CO₂.

Owners of an SHS save about Tk 400 to Tk 500 per month on kerosene at the current price of Tk 40 per litre which, in many cases, covers their loan repayment. Kerosene costs have risen by 60% in the past year, and are continuing to increase due to rising world oil prices and higher transport costs. They will increase further when the government reduces its subsidy of kerosene. Therefore the economic benefit of owning an SHS will also continue to increase.

The use of solar-home-systems brings significant social benefits. Many clinics use them to provide lighting during check-ups or operations. The availability of PV power for phone chargers has made it possible for people in rural areas to use mobile phones. This increases business opportunities, and also allows people to maintain contact with family members throughout Bangladesh and abroad. Families can watch television or listen to music. Domestic chores and studying can be carried out more easily, for longer, and more safely in the evenings with PV lighting, and there is less risk of eye strain.

SHS have significant income-generating potential. Many women have used the increased working time provided by the SHS to start small-scale businesses such as poultry and handicrafts. Businesses can remain open for longer, including tailoring shops, restaurants and grocery shops. New business opportunities such as running community TV stations and renting mobile phone time and jobs such as solar technicians and electronic repairers, have been created.

Grameen Shakti set up a micro-utility scheme to help shopkeepers get access to PV lights and extend their business hours. Under this scheme a shopkeeper installs a PV system with spare capacity. This capacity may be used to operate lights in neighbouring shops, for a fee, or to charge portable lanterns which can be rented to others shopkeepers. There are now more than 10,000 micro-utility lights operating in rural market places

Management, finance and partnerships

The SHS programme is led by Mr Dipal Barua, Managing Director of Grameen Shakti and Deputy Managing Director of Grameen Bank. Grameen Bank was the first bank in the world to develop micro-credit to help poor people. Grameen Shakti employs approximately 60 staff in the head office and more than 840 field staff (mostly engineers) and are currently recruiting nearly 100 staff per month. They have about 2,000 certified PV technicians.

From the beginning, Grameen Shakti sought to give local communities control over solar installations in their area. It worked with teachers, community leaders and elected officials, who explained the benefits of solar home systems to the people they lead and represent. It has also enabled communities to get access to SHS by training local technicians.

The initial funds to establish the programme were sourced from the Grameen Trust and Grameen Fund. Later on, it received both subsidy and concessional refinancing from IDCOL under REREDP. This enabled Grameen Shakti to lend money at affordable instalments to its customers, and it now runs on a financially sustainable basis.

IDCOL provides both finance and logistic support to the many organisations involved in the widespread uptake of SHS in Bangladesh. This support includes nationwide campaigns to raise awareness about the benefits of SHS; setting and maintaining quality standards; inspection and monitoring of systems; and liaison between the different organisations.

Use of the Ashden Award

Grameen Shakti plans to increase the number of technology centres from seven (as of April 2006) to 30, and to train at least 1,000 more women technicians. This increase is crucial to achieve their planned installation of 100,000 SHS by 2006. They will also train at least 5,000 women from households owning SHS in the first phase of the programme.

This report is based on information from the application submitted to the Ashden Awards by Grameen Shakti, findings from a visit by one of the judges to see their work in Bangladesh, discussions between Dipal Barua and the Ashden Awards judges at interview, and presentations by Dipal Barua at Ashden Awards seminars.

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