

Green Power - Lighting up Rural India

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Introduction

The following article discusses the use of solar home systems/lanterns that have been successfully employed in India and have displaced carbon emitting fuels such as kerosene and diesel. All information presented is in the context of the Photovoltaic Market Transformation Initiative (PVMTI).

The photovoltaic (PV) Solar Home Systems (SHS) under discussion are sold mostly to rural and semi urban households in India. Many of the regions in rural India are completely off-grid (around 46%); others are connected to the grid but have intermittent or no supply, so there is a real need for these consumers to find alternative power solutions. The SHS provides reliable power for lighting and other low-power appliances, such as radio and television. Customers today understand the benefits of installing SHS and see the value of investing in one. Though initial applications of these SHS were restricted to domestic lighting, today there are many instances of installations in schools, small hospitals, community centres, and a multitude of micro-enterprises, where SHS can extend viable working hours into the night and provide power for operations. The SHS have great intangible benefits too – smoky and carbon intensive kerosene lights are avoided and people have new leisure and educational opportunities.

However, in the initial years, it was



Figure 1 Mobile educational service van SHELL (photo: Shell Solar India)

an uphill task for the SHS integrators (entrepreneurs). There were many challenges – a negative image of solar due to bad experiences with unscrupulous operators; solar was considered too expensive and unaffordable since there was no concept of credit sales; customers' insisted on using available government subsidies, which were not always paid on time and meant the entrepreneurs had to find extra working capital.

Over time, several initiatives were undertaken by the solar integrators to overcome these barriers:

- **Establishing Credit Sales:** The integrators invested considerable time and effort to create awareness of solar energy among various local financiers and to provide loans for the purchase of SHS. At present, around 90% of all sales are credit sales as against the cash sales that existed 4 – 5 years ago. The customers can now pay for these systems over 3 – 5 years with monthly instalments not exceeding the total monthly expenditure on kerosene.
- **Prompt and reliable after sales services:** There are various models that integrators have adopted. However, whether this is the setting up of their own service infrastructure or developing a strong dealer network, the key to success has been prompt after sales delivery. All integrators have technicians regularly visiting customers thus giving them the comfort level about product reliability. In some cases the entrepreneurs have also trained local people to look after basic maintenance of the systems with their technicians handling more complex issues.
- **Establish linkages with the grass-roots level organisations:** India has a multitude of cooperatives, self help groups, NGOs etc. operating at the village level. Almost all the entrepreneurs have

developed strong partnerships with these organisations. They have been instrumental in marketing, creating awareness, appraising customers and in some cases extending financing for purchase of the SHS (Figure 1).

- **Design for the customer needs:** Whether it is technical or financial requirements, some integrators focus on customisation. This reflects in the type of systems sold and the loan products offered. The systems sold are not standard off the shelf products. Technicians have studied the requirements of the users and solutions are offered based on their need. For example some households have only one light installed but it is installed in a manner that lights up at least 2 rooms.
- **Move beyond simple lighting:** Use of SHS for increasing employment income (Figure 2). In some cases the entrepreneurs



Figure 2 Silk rearing - SELCO installation (photo: ITPI personnel)



Figure 3 Woman entrepreneur - SELCO installation (photo: ITPI personnel)

Table 1 Projects/Installations supported by PVMTI in India

Company	Nature of Business
Shell Solar India Pvt. Ltd.	A solar home system integrator based out of South India. Current areas of operations are Karnataka, Kerala and Andhra Pradesh.
SELCO Solar (P) Ltd.	A solar home system integrator based out of South India. Current areas of operations are Karnataka, Kerala and Andhra Pradesh. Recently started operations in Gujarat.
SREI Infrastructure Finance Ltd.	A Non Banking Finance Corporation providing working capital finance to system integrators and end consumer loans for purchase of SHS in West Bengal, now expanding into surrounding regions.
Shri Shakti Alternate Energy Ltd.	A private company promoting sales of solar and gas based appliances in urban areas. The company has also set up independent PV plants awarded to it through government tenders.

have worked with the users to generate additional income from use of SHS. These income streams have then been used to service the loans. An example of this would be the purchase of small lighting systems by street hawkers¹ (Figure 3). The solar systems generate savings over the use of kerosene lamps. These savings are then set aside on a daily basis and repay the monthly instalments to banks. These savings are more than adequate to repay the banks.

Today, these entrepreneurs have clearly demonstrated that SHS are a viable and affordable option for low income households. Figure 4 shows the installed capacity across India due to PVMTI.

Of course no technology will work on a stand alone basis and it needs to be supported by an equally strong financing and service infrastructure.

From PVMTI's perspective, what is crucial to the success of a technology are entrepreneurs who are committed to the technology. The companies sponsored by PVMTI have taken a few years to develop the required infrastructure but

they run profitable businesses today. What is also needed is for financial institutions to come forward and support such entrepreneurs by offering flexible financing options that would allow them to pursue their goals. PVMTI has been flexible in adapting to the changing times and to help the entrepreneurs readjust their business models according to the need of the time.

About PVMTI

Funded by the International Finance Corporation (IFC) and the Global Environment Facility (GEF), PVMTI promotes sustainable commercialisation of PV technology in the developing world by introducing successful, replicable business models. Since 1998, about US\$ 16.6 million have been committed to nine projects in India, Kenya and Morocco and finalization of additional projects for the remaining funds is underway. The program has financed 4 projects in India, committing around US\$ 10.8 million (as debt, grants, equity and guarantees) to these projects.

Projects/Installations supported by PVMTI in India are shown in Table 1.

The funds available under PVMTI are concessional in nature. However, PVMTI's strength has been the flexibility it has offered in terms of guarantees and repayments. The program has looked at new and innovative projects and has worked with entrepreneurs to readjust their business strategy when the need arose.

IT Power India Pvt. Ltd. (ITPI), a member of the IT Power Group based out of UK, is a reputable renewable energy and environmental management consultancy firm, based in Pondicherry, India with regional offices in Pune and New Delhi.

ITPI's core expertise lies in the following areas: harnessing alternative energy, designing and developing rural electrification systems, managing funds for financing renewable energy technologies, facilitating phase-out of ozone depleting substances, implementing Clean Development Mechanism (CDM), tackling waste management, R&D in appropriate technology for health, and developing and elaborating standards..

Under the PVMTI project, ITPI is part of the External Management Team which manages PVMTI's investments in India and Morocco.

¹Model promoted by SELCO India. More details can be found at:

www.ashdenawards.org/winners/selco

Profile of the author

Ms Hari is a commerce graduate from Sri Ram College of Commerce, Delhi and holds a postgraduate degree, Masters in Finance from the prestigious Indian Institute of Management, Bangalore. As manager of the Financial Solutions Group at IT Power India, she is also the Deputy Country Manager for PVMTI India. She was previously employed by JP Morgan Chase and has worked in Singapore, Hong Kong, Tokyo and Mumbai.

Sum of Kilo Watt Peak (kWp) installed in India

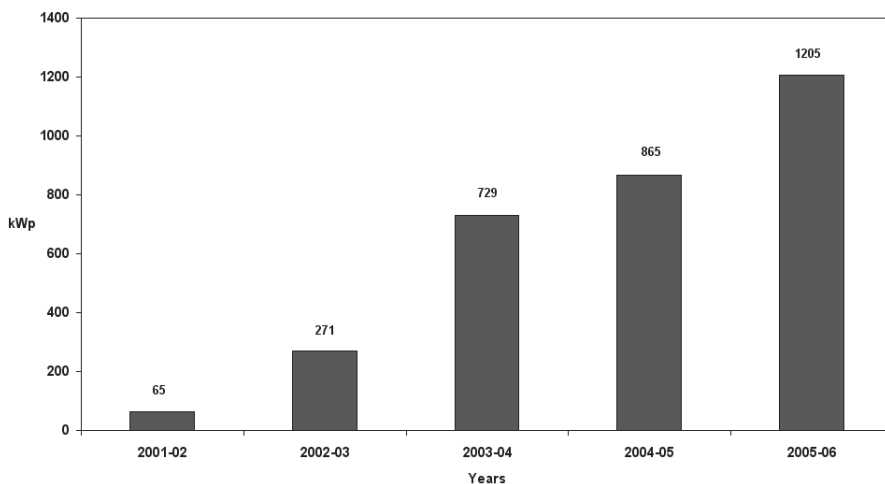


Figure 4 Installed Capacity (kWp) in India under PVMTI