

Financing Solar Home Systems

Lessons from Swaziland

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ABSTRACT: Many Solar Home System pilot projects have been implemented to date, but only few have resulted in a sustainable market development. 'Finance' or better the lack of it is often quoted as a major obstacle. Formal banks are reluctant to deal with rural households - the primary target group for SHS - which are generally considered as 'non-bankable'. This paper shows that in Swaziland as well as other countries in Southern Africa a latent demand exists, but actual demand for SHS is still too small for commercially sustainable market development. Sustainable finance scheme can help to reach the middle and higher income groups, but to reach a critical mass a lot of effort and time is needed. If SHS are to become within reach of the poor, a helping hand of the Government is needed.

Keywords: Solar Home System (SHS) -1: Finance -2: Southern Africa.

1. INTRODUCTION

Early 1997 the company Solar International Swaziland (SIS) was established, being a Joint Venture (JV) between an existing local company Swazitronix and Dutch parties. Since 1991 Swazitronix had tried to build a sustainable solar business, but failed to do so. Forced to diversify the business and on the brink of 'giving up' on solar, the JV - guaranteeing Dutch support - came at the right time and kept the solar spirit alive. With the necessary technical requirements already in place, the support concentrated on the establishment of a SHS credit scheme and creation of awareness. In the first year of its existence SIS managed to sell and install 170 SHS on credit. Swazitronix used to sell an average of 20 SHS per year (between 1992-1996) on a cash basis. At first sight, SIS seems to have realised significant increase, but the numbers are still far below the projected 500 SHS. Sales remained rather constant in the following year and dropped to about 100 last year due to the fact that Triodos Bank stopped further loan disbursements to SIS and consequently SIS had to stop its onward lending to its customers.

In a country with a relatively high GDP per capita, and less than 5% of the rural households connected to the grid, one would expect a higher uptake of SHS. The analysis below tries to reveal some of the factors that may contribute to the discrepancy between realisation and projections.

2. SIS'S CREDIT FACILITY AND PERFORMANCE

SIS's credit facility

To make SHS affordable to more than just the high-income households, a credit facility was set up with

the assistance of the Dutch Triodosbank. Initially local banks were approached to 'adopt' the SHS credit facility, but only with a 100% guarantee and unacceptably high service fees they were willing to do so. Due to this 'risk averse behaviour' of local banks, the credit was offered directly to SIS, who was prepared to carry the full responsibility for repayment of the loan.

A lump sum loan of US\$ 150,000 was given at an interest rate of 14% and repayment period of 3.5 years. SIS in turn provided credit to its customers at 22% annual interest, which was slightly under prevailing 'formal' lending rates. The difference in interest rates (14% versus 22%) compensated for the low retail margin on SHS and was necessary to pay for SIS's overhead cost. The maximum repayment period was 3 years and a deposit of 25% of the purchase price was required. To keep administration and logistics simple, the credit facility started with one standard product costing US\$ 675 and consisting of:

- 45 Wp poly crystalline panel
- 6 Amp regulator
- 96 Ah deep cycle battery plus storage box
- 4 energy efficient 9 W lights
- cabling, mounting
- transport and installation.

The design was based on prevailing rural energy demand for lighting, radio and television, generally met by candles, dry cell and car batteries [1].

Performance

To date about 400 SHS (45Wp or more) have been sold and installed, the majority on credit. Although most customers initially prefer to repay their loan in 3 year, in practise people tend to pay faster. The payments of the monthly instalments have been rather satisfactory. Sometimes, household budgets

are tight due e.g. funeral expenses or school fees. In such cases SIS applied a flexible approach and allowed people to catch up with payments in the following months. So far about 40% of the customers have completely paid off their system. Among those that have entered their 3rd year of repayment, the discipline to pay their monthly instalments tend to have weakened, suggesting that a 2-year repayment scheme is likely to generate the best results. To date 5 SHS have been repossessed and 5 more are likely to be repossessed soon. With a default rate of 3% the credit scheme can be considered successful.

3. REGIONAL EXPERIENCE WITH SHS CREDIT SCHEMES

Looking at similar SHS credit schemes in the region, more or less the same results can be noted.

Table 1: SHS Credit Schemes in Southern Africa

	Swaziland	Namibia	Botswana
grid electrified rural househ.	5%	10%	8%
project start	1997	1997	1997
price SHS*	US\$ 700	US\$1095	US\$ 800
deposit	25%	20%	15%
interest	22%	5%	14%
repay. period (months)	60	36	36
no. installed SHS end '99	350	280	350
seed finance	US\$ 150,000	US\$ 650,000	US\$ 900,000
source of finance	Triodos bank	Nam.Gov/ USAID/ NORAD	Botswana Government
repayment seed money	repayment at 14%	repayment flows back in revolving fund	repayment flows back in revolving fund

*) In all 3 cases a SHS refers to a 4 light, 45-50 Wp SHS. Source: [2], [3], [4].

Based on invested money and number of installations and considering the fact that the project was run without subsidies the project in Swaziland has done well. But like many other countries, no critical mass has been reached yet.

At present there are about 100,000 rural households in Swaziland that are not connected to the grid and have little or no prospect of being connected soon. So, why don't all these households line up for a SHS?

4. THE PRICE/QUALITY ISSUE

The low sales in the above examples seem to indicate a discrepancy between supply and demand

The SHS offered under the various schemes, are high quality systems with corresponding high price tags. Looking at the few cases in Africa where SHS have become a commercial success, notably Kenya, this was mainly attributable to small PV panels (around 10-15 Wp). The Kenyan solar market has been active for more than a decade during which 150,000 units have been sold commercially. Many of the systems are technically imperfect. They are often procured incrementally starting with a television powered by a car battery, charged in a nearby town, followed by a small solar panel and sometimes followed by another panel. Due to a mixed quality of components, incorrect installation and maintenance, about a third of the existing systems in Kenya are not fully operational [5]. A similar tendency can be noticed in Swaziland. The aforementioned end of the credit facility mid 1999 resulted in a significant reduction in the sale of 45 Wp systems. To counter balance this, small panels and PV kits have been offered on a cash basis. Demand is slowly picking up and more than 100 smaller systems/panels have been sold within a period of 6 months. It is not unlikely that also these systems will show a poor performance in due course.

The above highlights the present SHS market stalemate. One the one hand suitably sized and installed systems are preferred from a performance point of view, but are too costly for the majority. Only with a sustainable finance facility in place, good quality SHS are within reach of the middle and higher income groups. In the absence of such finance households tend to buy low quality/low price systems, which may fulfil a need, but often result in sub-optimal operations. For the low-income group electricity, be it grid or solar, will remain mere wishful thinking.

5. SHS WITHIN THE POLITICAL CONTEXT

Rural electrification in developing countries in most cases can not be placed outside the political context. Grid electrification is highly visible and symbolises development. Electrification has a positive correlation with quality of life indicators such as life expectance, infant mortality, food availability and literacy [6]. As such the promotion of rural electrification creates political goodwill. But more often than not, rural grid electrification is too costly due to the dispersed rural settlements. The high expectations created by politician and the consequent 'wait and see' attitude of the rural population have in many cases been damaging for private initiatives. Large efforts, low margins and lack of volume have killed the spirit of many small solar entrepreneurs. Only a few involved in solar systems for professional applications, notably telecommunication, have financially performed

well. The market for Solar Home System is generally regarded as too difficult and none rewarding.

On a higher level, however, there seems to be a general consensus regarding the role SHS can play in rural electrification. Evidence shows that SHS can improve rural life, but market development requires substantial efforts and success won't come overnight. Moreover, the commercial procurement of a SHS requires a certain level of income. It's an illusion to view SHS as the answer to electrifying to poor. The latter can only be achieved through direct intervention of Government or donor community.

6. CONCLUSIONS

The project in Swaziland shows that SHS seem to meet a demand, but only few have the financial capacity to acquire a SHS. The establishment of the credit facility has clearly shown its positive impact on the SHS market. By ending this credit facility a trend can be noticed towards low quality/low price systems, which may result in poor performance. Reviving and extending the credit facility will clearly help to keep the reputation of SHS high and will be beneficial for further market development. To date there are 100,000 rural households in Swaziland that still lack access to electricity. The many SHS publications that has appeared recently by World Bank and others often indicate a (commercial) market potential for SHS in developing countries for SHS of 10-20% of the rural population. For Swaziland this would mean 10,000 to 20,000 households for whom SHS could become a reality. The project in Swaziland indicates that even without heavy subsidies results can be generated. They don't come easy and don't come overnight. Much more time and effort is needed, but it nevertheless poses a real challenge.

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