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THE SOLAR HOME SYSTEM: AN ALTERNATE ENERGY SOURCE FOR RURAL HOUSEHOLDS IN BANGLADESH

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ABSTRACT

If electricity is made more widely available to a greater number of households and commercial enterprises, it has significant potential of enhancing economic and social development. A technology that could serve remote rural households is the photovoltaic (PV) panel or solar home system (SHS). These systems are particularly suitable and convenient for the widely dispersed households whose combined load needs are too small to justify grid-based systems. This study examines the factors that explain the adoption and diffusion of SHSs as an alternative electrification strategy for rural Bangladesh. The findings suggest that price is a key variable along with convenience of use, safety, and the availability of support services to make the SHS an attractive alternative to the traditional sources of rural energy.

Introduction

Of the 12.7 million rural households in Bangladesh, only about 2.5 million currently enjoy electrification from the national power grid (Khan and Huque 1998a). If electricity is made more widely available to a greater number of households and commercial enterprises, it has significant potential of enhancing economic and social development. Apart from the direct economic benefits of increases in household income with the availability of additional hours for productive activities, it can improve educational attainments as well as the health status of the population, engender greater initiative and entrepreneurial activity, establish better linkages with other communities and various sources of information, and deliver a host of attendant benefits that can improve the quality of life of the country's population.

The task of providing electricity to 10 million rural households is, however, challenging, especially because when electricity is made available to rural Bangladesh, only about 30% of the eligible households avail themselves of power connections at the initial stage. Adoption by the remaining households occurs at a slow rate.

To make electricity more widely available and to foster its adoption, two major factors must be better understood: physical constraints on the supply side and household behavior patterns on the demand side. The supply side problems that stand in the way of increasing the conventional supply of electricity include limited existing generating capacity to serve additional households, lack of extensive transmission networks throughout the country, and scarcity of capital for investment in generation, transmission, and distribution capacity. The economics of reaching various remote areas of the country using conventional grid-based systems faces further challenges posed by the generally small load demand and the dispersed nature of the households.

Consequently, to make electric power more widely available, it is important to explore alternatives to the conventional grid-based system. Among these alternatives are low-cost isolated grid systems, as well as solar, wind, and micro-hydro systems. Another technology that has the potential of serving the remote rural households with small loads, inaccessible by other means, is the photovoltaic (PV) panel or solar home system (SHS). These systems are particularly suitable and convenient for the widely dispersed households whose combined load needs are too small to justify grid-based systems. SHSs are especially attractive because of their ability to offer basic electricity services such as lighting and operation of small appliances such as TV, radio, or fans. Moreover, by using a renewable source of energy, the SHS would safeguard the rural areas from the effects of environmental degradation.

Pilot projects using SHSs were undertaken in Indonesia around 1987, which led to the installation of about 16,000 systems in the country. By 1990, a commercially oriented market began to emerge in the country with the establishment of a limited number of private supplier chains (IED 1995). Another study was undertaken by the Asia Alternative Energy Unit (ASTAE 1996) to examine SHS programs worldwide. Results from Indonesia, Sri Lanka, the Dominican

Republic, and the Philippines found that in addition to the need to remove financial and institutional barriers, there was also a need to establish responsive and sustainable infrastructure, and provide quality products and services.

For Bangladesh, while the technological aspect of power generation via SHS is well developed, a major constraint is the lack of institutional network for distribution. Another major challenge is posed by the demand side and involves behavioral determinants of new technology adoption. The important question here is whether and under what circumstances would the dispersed rural consumer would be willing to replace the traditional sources of energy they presently rely upon by the SHS.

Unfortunately, very little is known about the adoption and diffusion of new products and new technology in the context of developing countries. Since the success of a new product concept is contingent upon its acceptance by the consumer and its ability to satisfy personal, social, and environmental needs (Schiffman and Kanuk 1994), it is important to understand the behavioral determinants of new product adoption among the rural consumers. In particular, it is important to identify the relevant factors that are likely to influence the adoption decision. For example, how is the SHS perceived? Is it seen as functional and as a better substitute for current or traditional sources of energy? Does it fit conveniently into people's lives and is it compatible with their lifestyles? Does it provide new benefits or solutions that are better than current alternatives? Is it affordable? For what purpose is the SHS likely to be used? Answers to these and related questions are expected to provide greater insight into the potential success of a new technology like the SHS and its adoption in the rural households of Bangladesh.

In the developed countries, research on new product adoption and diffusion is substantial and growing. The need to understand and model the behavioral determinants of new product adoption has led to a number of studies that focus on consumer preference formation (Carpenter and Nakamoto 1989), frequently purchased consumer goods (Kalyanaraman and Urban 1992), high technology products (Norton and Bass 1987), market entry timing models (Kalish and Lilien 1986; Lilien and Yoon 1990), and the introduction of motion pictures (Krider and Weinberg 1998). Rogers (1983) synthesized numerous studies on how a new idea, a good, or a service is assimilated into a social system to identify several general themes (Lilien, Kotler, and Moorthy 1992). First, Rogers proposes that consumers go through a sequence of five stages during the adoption process (knowledge, persuasion, decision, implementation, and confirmation). Next, he suggests that the rate of adoption is contingent on five key attributes of the innovation (e.g., relative advantage, compatibility, complexity, trialability, and observability). Third, he identifies individual differences along socioeconomic, personality, and communication behavior variables. Finally, Rogers indicates the importance of opinion leaders and interpersonal influences that activate diffusion networks. Researchers have also suggested alternate models of aggregate diffusion to explain the life-cycle curves of new products (Fourt and Woodlock 1960; Bass 1969; Fisher and Pry 1971; Mahajan, Muller, and Bass 1990).

This study focuses on a related theme—the adoption of a new technology–in the context of Bangladesh. Specifically, the potential inherent in solar home systems to meet needs and improve the quality of life of a substantial segment of the population in Bangladesh makes it important to understand whether and how such products are likely to be adopted. The factors that were deemed important in explaining the diffusion process of SHS as an alternative for electrification in Bangladesh include:

- Current energy sources, usage, and expenditures of households.
- Attitude of households toward solar home systems.
- Perceived benefits of electrification.
- Desired level of service and preferred mode of service delivery.
- Willingness to pay the price of a SHS or its equivalent service.

Since price was hypothesized to be a major factor in the decision to adopt SHSs (based on focus group discussions and studies in other countries), three different payment options were also investigated in the final survey to examine price sensitivity and its implications for adoption of an SHS. These options include:

1. Cash purchase through a single payment
2. Cash purchase through payment in monthly installments
3. Monthly payment with a down-payment for electrification services to an Electricity Service Company (ESCO)

Research Method

The study was conducted in two phases: a focus group discussion phase and a field survey

Moderators who were familiar with the SHS technology, and who had surveyed SHS users during a pilot study earlier (Khan 1998b), conducted focus group discussions to elicit the views, opinions, and concerns of the potential consumers.

Insights from the focus group discussions were also used to design the survey instrument that was administered to two groups: households and commercial enterprises. The instrument was pre-tested for clarity, length, omissions, field conditions, and interviewers' ability to conduct the field surveys. The final version of the questionnaire, after field-testing, was administered to a representative sample.

Sampling Strategy: To obtain a representative sample, careful attention was paid to stratification. The first stratification variable was geographic location. Since the Jamuna River divides the country into two major regions, it was felt that both regions should be represented. Moreover, Bangladesh is administratively divided into 6 divisions, 64 districts, 490 thanas, 4451 unions, and 85,000 villages. To account for variation by location, the sample was drawn from randomly selected areas under 2 divisions, 3 districts, 4 thanas, 10 unions, and 60 villages. The final sample was drawn from three thanas (the lowest unit of government administration), representing three different districts of Bangladesh (Natore, Gopalgonj and Kishoregoni) Parts of these thanas are served by their Palli Bidyut Samity (PBS) or rural cooperative organized to provide electricity to its members operating under the regulatory guidelines of the Rural Electrification Board (REB). One additional Thana was selected from outside the operating area of a PBS to represent areas that become inaccessible during the monsoons. Such areas can only be reached via riverine transportation at the time.

The second stratification variable was whether the population was located in a 'buffer zone' served by the grid service of a PBS or away from a PBS service area. Those in the buffer zones are within one kilometer of a conventional grid line. Because expansion of connections to new households is a slow process, many households in these zones continue to remain uncertain about when they will have access to electrical power connection. Unavailability of services from the existing grids in the short-term and long waiting periods for power connection may influence this group to adopt a SHS as a temporary but indefinite solution. Households that are not within the buffer zones, and not included in the five-year electrification plan of the respective PBSs, were the main target of the survey because of their distance from conventional grid lines and their need for alternatives. Many such areas have become economically self-sustaining and are prime targets for solar home systems.

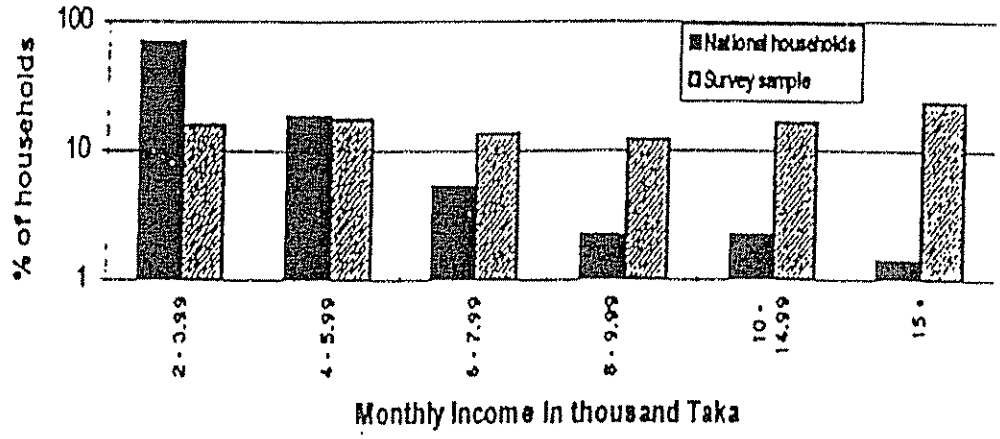
The third stratification variable was that of economic status: Since the level of income of the households is likely to influence their ability and desire to pay for electrification, the survey focused specifically on middle- to high-income households. Tax data from the local Union Parishad (local level administration) were used to select the higher income segment of the population from each village. Where tax data were unavailable, household construction material was used as a surrogate to determine income. Households with relatively permanent structures were interviewed. The income distribution of these households in the survey population compared to the national income distribution of un-electrified rural households is shown in Figure 1. The survey population is nearly uniformly distributed for all income groups earning more than Tk. 2,000 per month (US$1 = Tk. 50 approx at the time of the survey), which is coincident with the upper cutoff income for poverty assessment. Therefore the survey targeted the potential consumers of mid and higher level of income. The selected households were categorized into income groups represented in the Household Expenditure Survey (HES) for Bangladesh of 1995-96 in order to extrapolate the results to the national level. Owners of small commercial enterprises, another potential market for solar PV systems, were also included in the survey. The final sample consisted of 606 households and 95 small commercial enterprises.

Assumptions: It is assumed that solar electrification costs will substantially replace the current expenditures incurred by consumers on kerosene and battery charging from external services for household lighting. A conservative estimate of the *existing market* is therefore solely dependent on current household expenditures. It is assumed that 5% of the monthly income of a household will be allocated for electrification in due course. This forms the basis for estimating the potential *market* for the SHS. Hence, the market is not limited to the current expenditures of households for lighting and other services, but is allowed to grow as a percent of income to determine the market for SHS.

Results of Focus Group Discussions

Focus group discussions provided insight into the needs and desires of both households and commercial

Figure 1. Household Income – National vs. Survey Sample



enterprises for electrification. The two major concerns that emerged in the discussions were affordability and quality of service. On affordability, in general, people were not willing to pay for solar PV service if the price was greater than the price for conventional grid-supported systems. Respondents specifically vented their frustration on the Palli Bidyut Samities (PBSs, i.e., rural cooperatives) in their locales that were unable to extend services more widely and at rates comparable to conventional suppliers. The price of service also seemed to be weighed against the quality of service as focus group participants raised the issue of frequent interruption of grid supported power supply in the electrified rural areas. It seemed reassuring to the respondents that the PV system could be operated in a decentralized manner independent of the erratic nature of conventional power supply or fixed hours of diesel micro grids.

It may be noted that concern about the price of SHS service was less evident in the remote regions where there is no infrastructure to support grid-based extension of services. However, survey respondents also indicated a price threshold: they were willing to pay a price that was comparable or equivalent to their current expenditures on fuel for lighting, i.e., the cost of kerosene.

Highlights *From Focus Group Discussions*

Interest in Solar PV Services

- Respondents indicated the problem of frequent power failures in the neighboring electrified villages and noted its disruptive effects on electricity-dependent activities. With the SHS, the ability to use electricity when needed was viewed favorably, especially the idea of being free from the erratic nature of power supply during which all power-dependent activities had to be performed.

- Solar electrification (SHS) was seen by many as a way to add to the hours after sunset and to use this time to become more economically productive. Respondents also indicated that they expected to use the increased availability of power for other purposes including irrigation. They felt that it was not sufficient to have access to electricity that was limited only to home lighting and other low-load uses.

- Many respondents seemed to be familiar with decentralized power systems, citing the use of diesel generators in the evening for electrification of shops and other retail businesses.

- Most of the respondents were not aware of solar PV systems for electrification since it is not a common method of electrification in rural Bangladesh. However, when the concept was explained, they felt that its varied applications including the advancement of education, shifting of household work to after sunset, and, in the

case of commercial enterprises, facilitating longer operating hours could be very useful.

- Respondents also indicted that kerosene lanterns and kupis (lamps) could be hazardous. Solar electrification was thus seen as far safer and better able to prevent fire hazards.

Expenditures on Electrification:

- Not all rural households are financially solvent to support electrification of their homes; so they typically wait for long periods until government-provided services are available.

- Television and radio sets are commonly operated with rechargeable batteries in the un-electrified villages. The price of a battery is around Tk 4,000, which is paid in full at the time of purchase. Additional costs of Tk 20-30 are incurred each time the battery is charged. Moreover, to charge the batteries, distances of 2 to 8 kilometers are often traversed. In such instances, transportation costs are, on average, an additional Tk. 25 each time. Because of these costs and the associated inconveniences of disconnection, reconnection, hauling, and lost time, batteries are charged every 10 to 15 days, which reduces their useful life and leads to their replacement within a year.

- A typical small family spends between Tk. 5-7 per night for lighting, while larger households spend around Tk. 15 per night on kerosene for lighting. Thus, on average, small families spend approximately Tk. 200 per month on kerosene while larger households spend Tk. 300-400 per month (US $1.00 = Tk. 50 approximately at the time of this study in 1998).
- Grid connected electricity costs around Tk. 600 per acre per season for irrigation. In areas without conventional electrification, people spend between Tk. 1,200-1,500 to purchase diesel and irrigate a land area of the same dimensions. Less than 10% of the farmers can afford these prices. In many parts of the country, since there is only a single crop per year, the monthly cost of solar electrification was deemed high.

- Compared to households in neighboring villages and their monthly expenditures of Tk. 250-300 for conventional electricity (which is used for multiple appliances), costs associated with a solar home system were perceived as more expensive. Some respondents felt they would not be able to pay for this service.

- Respondents felt that if photovoltaic sources of electrification could be used during the irrigation season, then the connection fee and overall utility could be better justified.

- Monthly payment options of Tk. 150 for five lamps, Tk. 100 for three lamps, and Tk. 40 for one lamp seemed attractive to the poorer segments of the population. The affluent 10% of the population seemed to have the ability to pay Tk. 2,500 as deposit for solar electrification with a monthly fee of Tk. 250-300.

Results of the Field Survey

Current Energy Usage Pattern and Expenditures on Energy: The survey results indicated that 98% of the rural households use kerosene lanterns or "hurricane" lanterns for home lighting and for the education of their children; 69% use them for an average of five hours per night. More than 90% of the respondents saw the value of the solar home system in providing better lighting and to advance the education of their children. The use of batteries to watch television is also prevalent among the higher-income rural households. These households felt they would benefit from SHSs by eliminating the inconvenience of transporting batteries to and from the charging stations.

From the surveyed households, it was also found that expenditures for lighting and battery charging were as follows: Nearly 39% spent about Tk. 125; 19% spent about Tk. 160, and 4% spent about Tk. 300 per month. It was also found that the percentage of households spending between Tk. 160-300 per month increases monotonically with incomes above Tk. 8,000.

Willingness to Pay and Preference for Type of SHS: More than 80% of the surveyed households showed interest in the SHS. In general, the higher income groups indicated their willingness to pay for large solar home systems (SHSL), while lower income groups were willing to pay for a small solar home systems (SHSS) (see Figure 2). A comparison of the costs of the two systems is provided in Table 1. The survey also revealed region-wise uniform preference for the SHSs. A striking exception was seen in one area, Kishoregonj, where 100% of the respondents

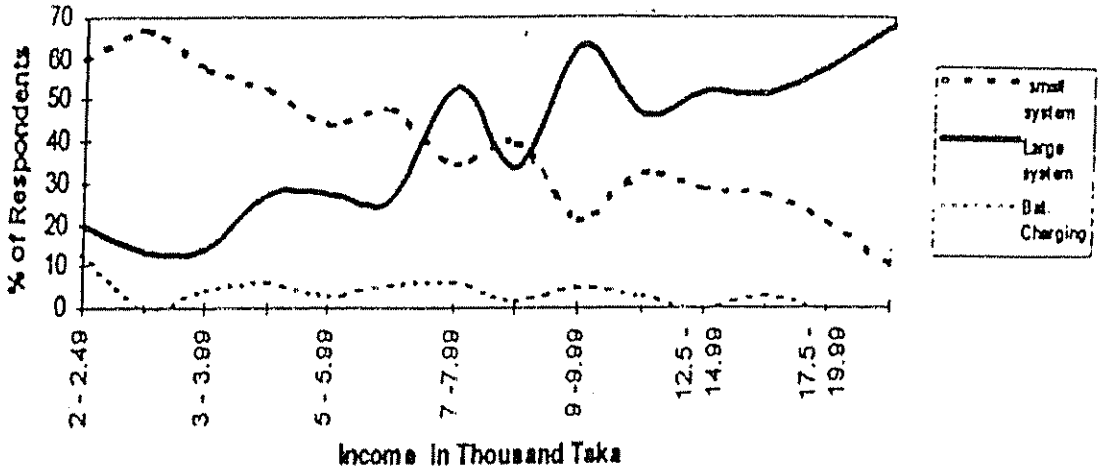
expressed their willingness to obtain SHSs through monthly billing. The agricultural and fishing industry in this area has created a somewhat higher level of wealth compared to the average Bangladeshi village. However, the annual floods all but preclude extension of grid service to this area. The ability and willingness of households to pay for electricity services and the lack of competitive alternatives create an excellent market for SHSs in these areas and may offer the best near-term market for solar home systems.

The willingness to use battery with central PV (solar powered) charging was low. Only 3.3% of the respondents were interested in electrification services through a solar PV battery charging station, although 15% of the surveyed households were already charging batteries to watch television. This reflects the inconveniences and difficulties that consumers endure when using a charging station. Similar results were obtained from a survey of households in the solar electrified island of Narsingdi (Khan and Huque 1998b), where the majority of the users of solar battery charging station expressed their willingness to pay an additional 50% in monthly fees for the use of a designated household solar module instead of central battery charging.

In addition to monthly income, interest in SHS was found to be strongly and positively related to the assets owned by the households.

Preferred Mode of Payment. The surveyed households and commercial units showed a strong preference to purchase SHSs based on monthly installments as opposed to outright purchase or a credit payment plan. Nearly 88% of the respondents indicated their preference for services with monthly billing (similar to ESCO method); the remaining 12% opted to pay in cash or credit. In an ESCO (Electric Service Company) system, the SHS remains the property of the ESCO, and lighting services, including replacement of major components, are provided for a monthly fee. The user typically purchases wiring services and procurement of consumable items like lamps directly.

Figure 2. Income Vs Willingness to Pay for Solar PV



Preferred Service Provider: With respect to choice of service providers, 61% of the respondents preferred the existing and more familiar PBS as their potential service provider (i.e., ESCO). The next preferred service delivery option was local cooperatives (preferred by 18% of the respondents). It was felt that if ESCO services were to be provided by a private dealer or enterprise using commercially available financing arrangements, it could result in higher fixed monthly payments that may be beyond the purchasing capacity of the households.

Preference Within the Buffer Zone. Households within the buffer zones are close enough to distribution networks but are unable to obtain services due to the high costs or delays involved in securing a connection. The survey shows that there is general interest in SHSs in the buffer zones. Of the 274 respondents from these zones, 67% expressed their willingness to obtain SHSs as shown in Table 2. Nearly 30% of these households are currently spending more than Tk. 160 per month on lighting and battery charging for watching television. On the other hand, 85% of the 374 households outside the buffer zone showed interest in SHSs; 44% of these respondents are currently spending more than Tk. 160 per month, and more than 32% of them are using rechargeable batteries to watch television.

Preferences Among Commercial Enterprises: Owners of shops in rural markets also indicated significant interest in using solar systems for lighting in order to facilitate their business operations. Outside the buffer zone, 90% of the commercial respondents were willing to obtain the small system (SHSS) while only 8% were willing to pay for the large system (SHSL). Within the buffer zone, 60% of the commercial respondents were willing to obtain the small system, while 13% were willing to pay for the large system. It may also be noted that 10% of the commercial respondents within the buffer zone are currently spending more than Tk. 300 per month on lighting, which is roughly equivalent to the monthly payment of the large solar home system. However, the smaller solar home system is the optimum size for the majority of rural shops in Bangladesh. It was also found that 20% of the owners of commercial enterprises outside the buffer zone were using batteries to watch television in their homes, and therefore, were familiar with decentralized sources of electrification.

Potential Market for Solar Home Systems in Bangladesh: Based upon the survey respondents and household income data, the results indicated that a significant market exists for the SHS in rural Bangladesh. However, typically, rural households do not have sufficient income for direct purchase of a SHS with cash. Thus, the convenience of consumer credit or other forms of extended payment schemes accompanied by regular service could sway the rural household to adopt this technology. Payments could be kept to a minimum when the SHS is owned by an ESCO and the consumer pays a monthly service fee. This option has the potential of reaching electricity to a large segment of the population. Using the services of an ESCO, the potential market size of SHS is nearly 0.5 million households based upon their current expenditure levels. However, considering that consumers are willing to spend 5% of their monthly income on SHS services from an ESCO, the study predicts a potential market of 4.8 million households.

Conclusion

To study the prospects of introducing SHSs as an alternate source of energy to rural homes in Bangladesh, a field survey was used to identify user needs and understand behavioral factors affecting the adoption decision. The findings suggest that the price, convenience, safety, and quality of service associated with solar home systems makes them an attractive alternative to the traditional sources of rural energy.

Affordability was seen as a major obstacle to the adoption of SHSs both during the focus group interviews and the field survey. Considering the willingness of the target group to pay for different levels of service, and the variation of income and assets of the potential users, it is clear that several different levels of service should be offered, depending on the type of SHS users and their needs. The market for SHSs in Bangladesh should grow rapidly with wider availability of the SHS system, especially when its monthly costs are brought in line with current expenditures on lighting. As early adopters begin to enjoy the benefits of electricity, emulators are expected to quickly drive demand in subsequent phases. The convenience of uninterrupted service and being able to avoid the complications associated with recharging batteries also makes the SHS an attractive alternative with a great selling point.

Current users of solar home system in Bangladesh have also expressed that they expect high standards of

service (Khan, 1998b). The need to provide high quality of service is, thus, a major requirement that must be ensured to the adopters. Since a significant proportion of potential users of the SHS preferred the monthly payment option (ESCO) to cash or credit purchase, it is clear that they want to shift the risk of breakdown or service interruption to a service provider. Hence, it is vital that high service support standards are established and that their delivery is impeccable. The unfamiliar technology also mandates that service processes and outcomes are continuously monitored and cost efficiencies transferred to the users if the value of the service is to be enhanced and its viability ensured. A high level of customer satisfaction must also be sustained if widespread adoption of the SHS is to be achieved.

From a policy perspective, it is imperative that excellent training programs are developed for the service and technical staff of the participating PBSs, potential dealers, and especially the private entrepreneurs interested in offering solar electrification and maintenance services, so that an efficient service delivery system is in place. Use of trained distributors and maintenance contractors is highly recommended to sustain problem-free sales growth.

For purchasers of SHS, product certification reflecting high standards of production and quality control of the manufactured hardware, along with appropriate warranties, are also vital. Since awareness of and familiarity with the operation and use of the SHS is important to the product adoption decision, effective demonstrations should be used to develop the confidence of the target group in the new technology in different geographic regions that have no access to grid-based power. Such demonstrations ought to be offered in high visibility and high use facilities such as schools, colleges, mosques, and frequented government or local administrative offices.

It is also important to assess whether the public or private sector will be responsible for making SHSs available on a wide scale. A commercially successful SHS program will depend upon efficient planning of needed resources and inputs, as well as the combined efforts of government organizations, private manufacturing companies, and distribution agencies interested in rural electrification. Financing and loan guarantees, tax incentives, import facilitation, and other infrastructure-building activities ought to be handled primarily by the government, thereby creating an enabling environment for sustained growth of SHS applications. To speed up market entry, fiscal and monetary incentives should also be devised by the government at the initial stage to make the technology financially viable and affordable. Manufacturing, distribution, and service delivery should ideally be left to the private sector to develop the technology and to create employment opportunities based on market forces. However, getting the private sector involved, especially with investment in SHSs, is likely to take time to support the growth of the SHS market. Community based participation and involvement of NGOs and their micro-finance initiatives can also be explored to enhance the rate of adoption of SHSs, by lowering transaction costs and hence making it affordable for the user. To establish the SHS as a viable alternative to grid supported rural electrification, alternative investment plans should be explored and compared.

By providing solar electrification service to rural households that have low energy demand, conventional grid-supported energy can be reserved for high-end users like rural industries, irrigation, and commercial enterprises to spur economic development. However, since household demand is known to increase with time, this proposition must be supported by suitable economic analysis for each area on a case-by-case basis. One also cannot ignore the environmental impact of SHSs. Tapping into a renewable source that is essentially "clean" in nature, the use of solar energy is a rather attractive alternative to pollution generating non-renewable sources such as oil, gas, or coal. The attractiveness of SHS lies in its ability to provide a range of benefits that many rural households are unable to enjoy today. Efforts must be devoted to promoting these benefits to establish the market for this technology that has significant potential to uplift economic conditions, especially in rural Bangladesh. Its favorable environmental impact makes it even more attractive for policy makers to consider pursuing and developing this alternative vigorously.

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Table 1
Cost Comparisons Between Small and Large Solar Home Systems.

Cost of Solar Home System – Large (SHSL)

Description	Basic cost (Taka)	Import Duty And Tax	Total Price (Taka)
Solar Module 75 Wp	16,875	25.38%	21,157
Battery 100 Ah Deep Cycle	4,700	71,75%	8,072
Controller	3,425	25.38%	4,300
Cables & Accessories	2,000		2,000
Local DC Lamps (5 lamps)	3,000		3,000
Sales Tax 4.5%		4.5%	1,351
Installation cost			820
Total	**30,000 Taka**	**9,880 Taka**	**40,700 Taka ($875)**

Cost of Solar Home System – Small (SHSS)

Description	Basic cost (Taka)	Import Duty And Tax	Total Price (Taka)
Solar Module 35 Wp	10.125	25.38%	12,695
Battery 70 Ah (Automotive)	1,828	71,75%	3,140
Controller	1,727	25.38%	2,165
Cables & Accessories	1,850		1,850
Local DC Lamps	1,500		1,500
Sales Tax		4.5%	766
Installation cost			484
Total	**17,030 Taka**	**5,086 Taka**	**22,600 Taka ($486)**

Table 2.
Willingness and Ability to Pay for SHS: Households in Buffer Vs Non-buffer Zone

Type of Zone	Willingness to Pay	Ability to Pay			
	Households Willing to Pay for SHS	Current Monthly Spending More Than			Using TV
		125 Taka	160 Taka	300 Taka	
Buffer Zone (274)	**67%**	**48%**	**29.5%**	**6%**	**26%**
Non Buffer Zone (332	**85%**	**75%**	**44%**	**8%**	**32%**