

PROJECT COMPLETION REPORT

The RERED sub-project

(A CARTA project)

Submitted by:



Population Services and Training Center

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Acronyms

CARTA	Citizen Action for Result, Transparency and Accountability
CSO	Civil Society Organization
FGD	Focus Group Discussion
JSDF	Japanese Social Development Fund
IDCOL	Infrastructure Development Company Limited
KII	Key Informant Interview
MJF	Manusher Jonno Foundation
POs	Participatory Organizations
PSTC	Population Services and Training Center
PTF	Partnership for Transparency Fund
RERED	Rural Electrification and Renewable Energy Development
SHS	Solar Home System
TOR	Terms of Reference
TPM	Third Party Monitoring
WB	World Bank

Table of Contents

1	EXECUTIVE SUMMARY	4
2	Background	6
3	Methodology.....	7
4	Project findings	9
5	Project Management	13
5.1	Implementation of core activities to achieve sub-project objectives	13
5.2	Challenges encountered and the ways they were addressed.....	14
6	Sub-project sustainability perspectives	14
7	Lessons learned and recommendations	14
8	Annexes.....	16
8.1	Third Party Monitoring Framework.....	16
8.2	Geographic location	21
8.3	First and second survey sampling	21
8.4	Questionnaire for KII	23
8.5	Sub-project governance	23
8.6	Case study: A failure to provide service: the meter problem	23
8.7	Case study: Return the system.....	24
8.8	Case study: Return the system (2)	25
8.9	Case study: The story of a successful and careful customer	26
8.10	Case study: Solar light brought the light of education.....	26
8.11	Case study: Unfulfilled expectation.....	26
8.12	Case study: Worried about the future	27
8.13	Case study: Dissatisfaction with maintenance services	27
8.14	Case study: No solution –getting affliction	27
8.15	Case study: Complications after purchase	28

1 EXECUTIVE SUMMARY

The Infrastructure Development Company Limited (IDCOL) started the Solar Home System (SHS) program in 2003 to ensure access to clean electricity for the energy-starved, off-grid, and rural areas of Bangladesh. By 2014, three and a half million SHS units have been installed under the program in the off-grid rural areas of Bangladesh, with a target of 6 million by 2017. About 50,000 SHS units are now being installed every month under the program. Yet, while the program has been acclaimed as one of the largest and the fastest growing off-grid renewable energy program in the world, there are challenges. To help understand some of the issues, IDCOL with the technical assistance of the World Bank contracted with a third-party to provide information about the delivery of the service to the public. Based on the feedback from the users, IDCOL could then make changes.

The Population Services and Training Center (PSTC) was contracted to conduct two surveys, and based on the survey data, to build local capacity. PSTC was supported by MJF and PTF under a program known as CARTA (Citizen Actions for Results, Transparency and Accountability). The primary purpose of a CARTA project is to build capacity of local citizens to demand better service delivery of projects using public funds. CARTA is funded by the Government of Japan, through its Japanese Social Development Fund, which is administered by the WB. PSTC implemented the two-year sub-project, including the surveys and capacity building, beginning 15 September 2012 at 14 unions in 7 upazila in 7 districts.

The primary initial finding, from the first survey data collected in June 2013, is that the Participating Organizations (PO) competing for business in the off-grids areas did not provide satisfactory customer service, and that the extent of the problem was not known because the POs did not systematically measure user satisfaction levels¹. The two sub-project surveys were designed to fill this data gap. Respondents included households and businesses, as well as non-users. In total there were 722 respondents to the first survey, and 912 for the final survey, (Oct. 2014). Based on the data, it became obvious that users demanded a better knowledge of the use and maintenance of the solar units; as a result, the sub-project created 14 users groups: one in each union, and provided training for 350 users.

The increased focus by IDCOL on the deficiencies described in the first survey helped to achieve better results reported in the final survey². Improvement was most notable in the following areas:

- ♦ Because of the promotion of training programs as an essential component of the sub-project, participation in capacity-building training for SHS users increased from 19% to 28% of household users, and 18% to 31% of business users
- ♦ Through such training, the level of knowledge on solar home system improved from 30% to 68% for household users, and 12% to 73% of business users
- ♦ Due to pressure on the POs to provide the agreed technical support, the percentage of users briefed by a technician before or during the installation of their SHS increased from 46% to 68% of household users, and 57% to 70% for business users.
- ♦ Similarly, the percentage of users who received a User's Manual increased from 52% to 77% of household users, and also increased for business users, 24% to 67%.
- ♦ The percentage of households with SHS problems decreased from 28% to 5%, and 16% to 1% for business users.
- ♦ The response time to fix problems also improved from "31-60 days" to "1-15 days."

¹ It should be noted that IDCOL carries out inspections. Although direct customer feedback is not gathered on a systematic

² The first and second surveys did not target equivalent user groups. The second survey queried more recent users; therefore, the results cannot be attributable to any particular interventions. While the comparisons are only indicative, it can be argued in a general way that the positive results of the second survey are the result of IDCOL corrective actions and the TPM monitoring.

Despite the short implementation duration of the sub-project, a number of lessons were learned. The most important are that:

- ♦ Knowledge of the use and maintenance of the SHS units cannot be assumed. While documentation is important, frequent training for users is needed, because the lack of proper knowledge about SHS's maintenance can seriously affect its continued, long-term operation;
- ♦ The owner's knowledge of their rights and responsibilities should not be assumed. Many SHS users believe they don't own their system, since they bought it on credit, and because each part of the system has a warranty - so they believe that only the PO is responsible for maintenance;
- ♦ A third-party can provide useful data to a PO about maintenance issues, buyer's motivations, and financing ability of potential customers. To avoid bias, the third-party should commit to the objectives of project, and be prohibited from any profit-making activities related to the SHS market (i.e., no conflict of interest);
- ♦ Don't assume that users understand the benefits of establishing users' groups. It took time and effort to convince community members and selling agents of the usefulness of establishing and training such user groups to improve service delivery.

Recommendations include:

- ♦ POs should invest in improved after-sale service for the customers;
- ♦ POs should be supported in scaling-up training for SHS users. All the problems of SHS cannot be solved by this training, but many common operating errors can be avoided;
- ♦ The credit system needs to address the problem of high down-payment cost. POs should also consider offering a less expensive SHS to reach the very poor target groups;
- ♦ A skilled technical PO workforce must be permanently available to ensure proper operation and maintenance of the SHS. This implies a requirement for continuity of training to meet minimum standards for technical assistance;
- ♦ Ensure that an effective Grievance Redress Committee (GRC) is formed for each upazila to ensure easy accessibility by the SHS users;
- ♦ Consider creating forums for the exchange of experiences and ideas between service providers, and similarly for field level technicians. In-country exchange visits in both the successful and problematic areas may be organized for project implementing staff (partner organization). This would create an opportunity for exchange of ideas and bring in new innovations for addressing problems.

In summary, PSTC's work revealed a number of policy and operational challenges. In the context of rapidly growing coverage with installations throughout the country, there was always the risk that POs would pay less attention to individual clients, and more on continuous, rapid expansion. This risk has started to manifest itself. Understandably, the PO's ability to provide service on time can be limited by many constraints, especially in remote areas. While the beneficiaries and the PO staff admitted that the SHS performed excellently when first installed, the system performance deteriorated over time due to issues such as minor parts failure, installation location issues, and general lack of information. Unfortunately, the users' attempts to repair the system without having proper knowledge and skills only led to more complicated problems, which led to even more public dissatisfaction that was shared with others, including possible SHS buyers. This negative perception can only hurt the spread of SHS technology. The establishment of user groups mitigated these problems. The availability of customer satisfaction data also helped POs to provide better support.

2 Background

The Infrastructure Development Company Limited (IDCOL) started the SHS program in 2003 to ensure access to clean electricity for the energy-starved, off-grid rural areas of Bangladesh. The program supplements the Government’s vision of ensuring “Access to Electricity for All” by 2021. The program has been privatised; IDCOL implements the program by granting exclusive concessions to private companies in a particular geographic area. At present 47 Partner Organizations (PO) are implementing the program. IDCOL provides grants to POs to reduce SHS cost and capacity building, and soft loans to POs for technical assistance (training, logistic and promotional supports), and monitors the implementation of the program.

As of late 2014, about 3.5 million SHS units had already been installed under the program. As a result, 13 million beneficiaries use solar electricity, which is around 9% of the total population of Bangladesh. IDCOL has a target to finance 6 million SHS units by 2017, with an estimated generation capacity of 220 MW of electricity. About 50,000 SHS units are now being installed every month under the program. Approximately 70,000 people are directly or indirectly involved with the program, which has been acclaimed as one of the largest and the fastest growing off-grid renewable energy program in the world.

Rural Electrification and Renewable Energy Development Project (RERED)

The SHS system installation is promoted by the World Bank, through the Rural Electrification and Renewable Energy Development II (RERED II) project. The RERED project’s objective is to increase access to electricity through SHS and other renewable energy mini-grids in rural areas of Bangladesh. The RERED II project concentrates on supporting POs across the country to promote, deliver, install and support the maintenance of the SHS units to individual households and businesses.

Figure 1: IDCOL’s Operation

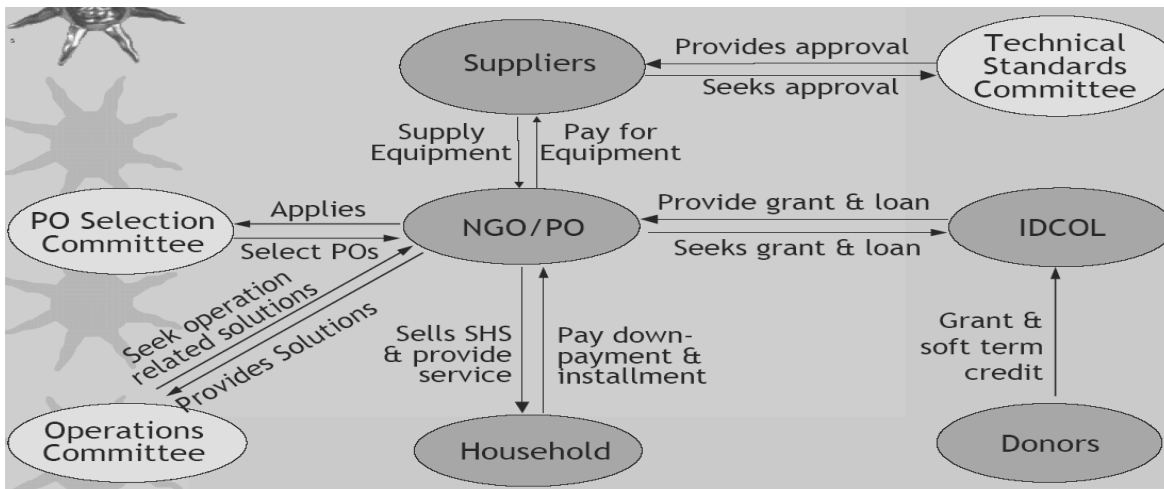
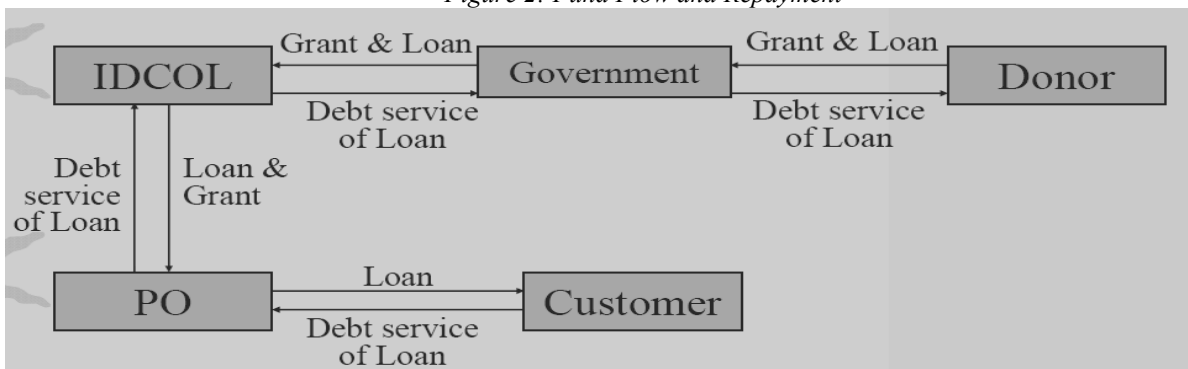


Figure 2: Fund Flow and Repayment



While the sale of SHH systems has increased dramatically, the POs had not invested sufficient resources to systematically measure satisfaction levels of customers, and to gather information to improve their service delivery. Understandably, they were busy expanding their market. For this reason the CARTA sub-project was asked to measure the satisfaction levels and expectations, and to gather data on the recommendations of customers.

CARTA Program

In 2011, the Japanese Government, through its Japanese Social Development Fund, approved a grant for the implementation of a project, Citizen Action for Result, Transparency and Accountability (CARTA). The project is managed by the Partnership for Transparency Fund (PTF). In Bangladesh, PTF contracted with the Manusher Jonno Foundation (MJF) to locally manage the CARTA project. MJF hired PSTC to implement the project in selected districts. Through CARTA third party monitoring was introduced in the Solar Home System component of the RERED Project.

CARTA's objectives were to:

- ♦ Increase awareness within beneficiary groups of services, resources and grievance mechanisms available through WB financed projects
- ♦ Improve the constructive engagement among beneficiary groups, selected CSOs and PIA or agencies representing the PIA of WB-financed projects
- ♦ Improve skills of communities to measure and to monitor the effectiveness of selected components of WB financed projects.

By achieving these goals, solar home system users would become more knowledgeable, and be able to provide feedback and suggestions to improve service delivery, thereby holding the suppliers more accountable. CARTA aimed to strengthen citizen engagement by using third-party monitoring tools to improve the service delivery of public programs and projects.

The CARTA sub-project

The implementation of the CARTA sub-project was contracted to a local NGO, the Population Services and Training Centre (PSTC). PSTC implemented the RERED sub-project for two years, beginning 15 September, 2012. The sub-project worked in 14 unions of 7 upazilas in 7 districts (annex 7.2). A total of 210 Citizen Group members were directly engaged with the project implementation. The members included users, and people with experience in volunteer activities. The total budget was 13,014,525 (BDT); PSTC contributed 891,131 (BDT).

3 Methodology

The sub-project used two surveys, focus group discussion, and interviews with key informants to gather data. The household surveys gathered data about the effectiveness and impact of SHS systems over time, and the user's perception of services provided by POs that were responsible for installing and maintenance of the SHS units.

The first survey:

The 722 households interviewed for the first survey were selected from seven upazila communities that were already known to PSTC. The survey was conducted from April until June 2013 by 14 enumerators and 7 supervisors. Three groups of respondents were selected for the survey: the solar home system users, the non-users of the system and the business people who use the system. While the seven upazilas were selected based on SHS usage levels, the two union parishads from each upazila were randomly selected from the list of IDCOL. In total, data were collected from 163 villages (see annex 8.3 for details).

The collected data included the user's expectations and their satisfaction level; the user's awareness and use of complaint mechanisms, the extent of SHS unit penetration to marginalized groups (women, poor); why users buy the SHS and in medium and low penetration areas; and purchase decision-making criteria.

Findings of the survey were verified through Focus Group Discussions (FGD) conducted using a checklist. 27 FGDs were conducted where the both female and male users of SHS participated in the FGDs. The participants from the nearby houses attended in an FGD conducted at a common place. The Key Informants (KI) of this survey are the SHS providers (IDCOL Partner Organizations – POs) Open-question interviews with POs were conducted to get a better understanding of the SHS installation and maintenance arrangements, as well as to validate the answers of the service users. 67 interviews were conducted with POs in the areas where the survey was done.

Final survey:

The final survey covered 912 different households, which were selected from four groups: 489 from among the Solar Home (SHS) System Users, 305 from the (SHS) Non-users, 69 households the Business People who use (SHS) and 49 from households who replaced their batteries for SHS. These four groups of interviewees were selected from seven districts- Rajshahi, Kishoreganj, Chittagong, Sylhet, Barisal, Dinajpur and Narsingdi.

Based on IDCOL documents and on former studies about the SHS and discussion with the World Bank, PTF, and MJF, the PSTC team developed a final survey framework for the SHS activities. The final survey was modelled on the first survey questionnaire. Preliminary questionnaires and interview guidelines were then developed and discussed with PSTC field staff. Like the first survey, clusters of questions were used to gauge the user's satisfaction in several categories—price, credit system, product quality, maintenance, as well as information on the user's poverty level. The duration time of the interviews was about 45 minutes. A total of 21 trained, local, field staff conducted this survey.

Besides the final survey, there were also key informant interviews and focus group discussions. Secondary data was also collected mainly by reviewing the relevant, publications, literature, and through Internet searches and discussions.

Comparison of data between the two surveys:

The two surveys used slightly different approaches. The second survey differs from the first one because of the following changes:

- ♦ The questionnaire was slightly modified—new issues were included, based on suggestions from IDCOL—such as battery recycling, capacity building for the users, and impacts of SHS on health, education, gender aspects;
- ♦ The users' selection criteria were changed (also following the suggestion of IDCOL)—so that only recent users (6 months to 2 years) were selected.

The difference in approaches does not allow an exact comparison of findings; the first survey covered a broader user group than the more focused second survey. Since the second survey focuses on newer users it presents a better picture of the current practices. This project completion reports does note comparisons where possible, but mainly focuses on the findings of the second survey. Findings of the first survey were finalized in a separate report from October 2013.

Interviews and focus group discussions:

Semi-structured interviews were conducted with the PO staff. Interviews were conducted in-person, or were video-taped, each lasting about 30 minutes. Questions focused on areas related to technical problem they faced frequently, users' attitude towards regular maintenance, problems with credit recovery, capacity-building training for SHS users, and recommendations. A total 23 interviews were conducted with PO staffs and IDCOL staff members.

A total 62 focus group discussions (total participants 420) were conducted with marginalized groups and those that had received training from CARTA program. Marginalized groups were asked about their use of the SHS units and their capacity to purchase. Topics for trained groups were usefulness, impact and recommendations.

4 Project findings

Desk Review

A review of background documents³ led to the following observations and recommendations:

- ♦ Many households abstained from spending significant amounts of money to purchase SHS.⁴ Appropriate financial arrangements, which may include payment in instalments, fee for services and other suitable modes, are necessary for rural people to afford the system.⁵ Also, the lack of awareness of solar energy technology necessitates demonstrations to rural people.⁶
- ♦ Technical training can enable users to do trouble-shooting for minor problems such as replacing fuses, adding distilled water, and replacing bulbs. This may avoid technician calls and increase system reliability.⁷
- ♦ Technician training is essential for developing local technical support, which can also help make the project sustainable. Women also should be invited for training, as they are the main users of the system and can do some of the maintenance.⁸
- ♦ The dissemination of SHS in Bangladesh is actively contributing to conserving natural resources and the environment, since it reduces CO₂ emissions through the saving of kerosene consumption. On the other hand, old batteries might represent a serious threat to natural resources. However, introducing a reliable battery recycling system can significantly reduce this threat.⁹

Survey Findings

The first and second surveys conducted in, respectively, June 2013 and October 2014 covered different groups of household and business users; therefore comparisons should be made with care. The first survey presents a snapshot of the existing conditions at time of sub-project implementation. The following highlights from this survey are noted:

- ♦ In terms of **daily use of SHS energy**, SHS were used longer by HHs than by businesses, which are closed at night;
- ♦ **Level of understanding of use of SHS** was rather high among non-users (50%). Both users and non-users tend to learn about SHS mainly from neighbors or other SHS users. The users also often received the information through the marketing organizations. Effectiveness level of the SHS awareness programs run by IDCOL and POs was rather low.
- ♦ The findings showed the growing popularity of solar energy, and increasing potential for more sales in the surveyed areas. The survey, however, did not look at the reasons for not buying the system. The number of installations was gradually growing between both HH and businesses; the popularity of SHS increased drastically among businesses in the recent years.

³ Although slightly dated, they are still relevant

⁴ Electricity and Sustainable Development: Impacts of Solar Home Systems in Rural Bangladesh, Michael Blunck

⁵ Applications of Solar PV On Rural Development in Bangladesh, Faisal Ahammed, Journal of Rural Community Development 3 (2008) 93–103

⁶ *Ibid*

⁷ *Ibid*

⁸ *Ibid*

⁹ Blunck, M. *Electricity and Sustainable Development: Impacts of SHS in Rural Bangladesh*

- ♦ The number of those **not signing, or not being aware about the fact of signing an agreement** was alarming. This share was surprisingly higher among business users who are expected to be more literate in legal matters.
- ♦ The percentage of users **briefed about the SHS system during installation** was rather low among both HH and business users on average, but this percentage varied across the regions.
- ♦ **The level of complaints during installation** varied by the type of users and location, but in general, the number had considerably increased in the last two years.
- ♦ **The understanding of using the SHS system** (including cleaning) seemed to be higher among business users than HH users.
- ♦ Almost one-fourth of SHS users faced **problems with SHS maintenance**, with almost one-third of the HH users reporting repetitive problems. Among the most frequently faced problems were issues with electronic equipment and the charge controller.
- ♦ Analysis of SHS maintenance **problems solutions** showed that most frequently problems are solved within “31-60 days”.
- ♦ Of those respondents who had problems, almost half of HH users were **still waiting for their problems to be solved**. Among unresolved problems those related to the charge controller dominated.
- ♦ The majority of users were aware of availability of the post-purchase services.
- ♦ An overwhelming majority of users observed a **positive impact of SHS** on their lives in terms of income earning potential, savings, education, communication, social dignity and recreation.
- ♦ The majority of users were either **highly or moderately satisfied with their SHS**. The highest levels of satisfaction correlated to: understanding the use of the SHS, the loan scheme, technical aspects, and maintenance-related issues. (Initially, users were highly satisfied with the use of SHS because they had electricity for the first time. This was a new experience for them, but after one or two years many faced maintenance and contractual problems).

The second survey

The increased focus by IDCOL on the deficiencies identified by the first survey helped to achieve better outputs identified in the second survey. The findings from the second survey are grouped according to the expected project outputs. The data from the first survey is shown for comparison purposes, but remember that the second survey data was concentrated on the more recent users.

Outcome 1: Participation in capacity building training for SHS users increased from 19% to 27% of household users and 18% to 31% of business users

The POs have a provision in their contract with IDCOL to provide training to SHS purchasers. PO staff members claimed that the users needed better training on the proper use of the solar systems, but they were not able to organize sufficient training for their customers in the beginning. Initially the CARTA sub-project did not provide training for the SHS users; however, PSTC found that the demand was high. Therefore, as endorsed by IDCOL and the World Bank, user groups were set up and operation and maintenance training was provided to the users. After training, FGDs were conducted to understand the effects of training and it was found that most customer who received training from the CARTA program were maintaining their SHS regularly, and also made their neighbours aware of the importance of maintenance of SHS. After this user training, POs staff became aware of the positive effects; consequently, they organized training regularly, which result in higher levels of participation.

Respondents received training about the solar home system from the various sources, such as service-providing organizations, CARTA and other organizations.

Outcome 2: *The level of knowledge about the solar home unit improved from 30% to 68% for household users, and 12% to 74% for business users*

Frequent community visits and suggestions by CARTA staff encouraged the community people to use solar energy and increased their knowledge about SHS. The CATRA staff also raised awareness and developed capacity among solar system users through other good practices such as involving community power structure and using a citizen report card. As a result, community people noticed that the POs felt the need increase their after-sale services like maintenance, training and information dissemination. Although the attribution of improvements registered in the surveyed areas and reported in survey cannot be made entirely to the capacity building inputs of the CARTA program, CARTA-related activities certainly contributed to improved users' organization and awareness about maintenance and recycling issues.

For example, more users are aware of the availability of service contracts: From the final survey, 63% of HH users and 88% of business users are aware of maintenance services. Two thirds of the HH users (68%) said that they would get the 36-month service contract, while 74% of business users said that they would get a 30-month service contract. The reasons for not getting a contract are not known, but are probably related to the cost. By the end of the sub-project, 30% of households using a solar home system had signed a maintenance agreement.

Measuring changes in the user's knowledge about the SHS system is not quite as straightforward as it seems. Sometimes users are unaware of what they don't know; they assume greater knowledge before they realize what they need to know to service the system. For example, data from the first survey shows that 85% HH users and 92% business users thought that they had the necessary knowledge on SHS maintenance. The final survey findings showed lower levels—69% of the HH respondents claimed that they know how to take care of the SHS, while 74% businessmen thought the same. This may appear that the trainings were ineffective, but in reality, based on interviews, the users began to realize what they did not know.

Outcome 3: *The percentage of users briefed by a technician before or during the installation of their SHS increased from 46% to 68% for household users, and 57% to 70% for business users.*

The exact cause for this increase is not known, but it is believed that, because the POs were aware of the users' groups and the rising expectations of users, the POs were more diligently briefing new customers. Unfortunately, the lack of information on SHS customers was a major challenge for the CARTA sub-project.

Outcome 4: *Percentage of users who received a SHS User's Manual increased from 52% to 77% of household users, and 24% to 67% of business users.*

It is not clear why all the users don't receive a manual as part of the standard purchase documentation. This manual is available to the POs, and users are aware that it exists. (Unfortunately, the survey did not capture the reasons why the manual was not given to a user.) The primary reasons for this increased percentage are that POs became more aware about information dissemination, and community people, as a result of awareness building, are seeking more documents on SHS. Through KII found that IDCOL had developed more IEC materials than the previous year.

The first survey data shows that users attending training sessions by the PO reported receiving other types of information: 34% received leaflets, 5% posters, 24% users' guidelines, 11% other types of documents; and, 1% had no idea there were any written documents. These numbers had increased by the second survey: leaflets were collected 52 percentage points more, posters were collected 9 percentage points more and users' guidelines were collected about 9 percentage points more in second survey than the first survey by the household level users. Leaflets were collected 60 percentage points more by the businessmen using solar home system in the second survey than in the first survey.

Outcome 5: The percentage of households experiencing problems with their SHS unit decreased from 28% to 5% of household users, and 16% to 1% of business users

Both the household and business users of solar home system think that the problems with the SHS have decreased significantly. In the first survey data over one quarter of SHS HH users reported maintenance problems, but by the end of the CARTA sub-project, out of 558 respondents, only 5% shared that they have problems with the solar home system. For business users the results were similar. Through training, FGD and the use of a citizen report card during CARTA program, SHS users became more aware about regular maintenance, and the PO staff became more responsive about after-sale service.

Outcome 6: The time taken by POs to solve an SHS problem decreased from “31-60 days” to “1-15 days”

According to the final survey data, 86% of HH respondents indicated that the PO resolved their problems in a timely manner; 100% of business users reported the same.

Through the CARTA intervention SHS users become more aware about service provision and POs staffs become more responsive about after-sale services.

The following table compares the indicators from the two surveys¹⁰:

A comparison of indicators from the first (June 2013) and second (October 2014) surveys

SI #	Indicators	Solar Home System (SHS) Users		Solar Home System (SHS) Non-Users		Businessmen using SHS	
		2012	2014	2012	2014	2012	2014
OUTPUT 1.	Participation in capacity building training for SHS usages has increased from 19.4% to 27.0% of household users and 18.4% to 31.9% of business users						
1.	Participation in training on SHS	19.4	27.0	6.2	NA	18.4	31.9
OUTPUT 2.	Level of knowledge on solar home system has improved from 30% to 68.1% of household users and 12.2% to 73.9% of business users						
1.	Knowledge about how to take care of solar home system	85.4%	90.1%	NA	NA	91.8%	88.0%
2.	Proportion of households signed agreements with the service providers	61.7%	48.3% ¹¹	NA	NA	58.2%	52.2%
OUTPUT 3.	Percentages of Users were briefed by a technician before or during the installation of their SHS have increased from 46.2% to 67.5% of household Users and 57.1% to 69.6% of business users.						
1.	Users were briefed by a technician before or during the installation of their SHS	46.2%	67.5%	0	0	57.1%	69.6%
OUTPUT 4.	Percentages of Users who received a Users’ manual of SHS have increased from 52.4% to 77.4% of household users and 24% to 66.7% of business users.						
1.	Collected leaflets	7.5%	60.3%	0	0	16.3%	76.5%
2.	Collected posters	1.6%	10.3%	0	0	2.0%	5.9%
3.	Collected users’ guideline	37.6%	46.2%	0	0	36.7%	35.3%
OUTPUT 5.	Percentages of households face problems with SHS have decreased from 27.6% to 4.7% of household users and 16.3% to 1.4% of business users						
1.	Respondents’ thinking about weaknesses	7.3%	22.1%	NA	NA	8.2%	13.1%
2.	Proportion of households had problems with SHS	27.6%	4.7%	NA	NA	16.3%	1.4%
3.	Proportion of households paid extra money for buying SHS	4.3%	3.5%	NA	NA	4.1%	4.3%
4.	Proportion of households paid extra money	11.2%	2.7%	NA	NA	6.1%	2.9%

¹⁰ This comparison is only indicative, because the two surveys covered different groups of users. Still, since IDCOL took some corrective actions based on the findings of the first survey, it can be argued that the positive results of the second survey are to be attributed partly to the TPM project impact.

¹¹ These changes need to be researched further. It is not clear why the percentages would decrease, but it may be due to the change in the contracts.

SI #	Indicators	Solar Home System (SHS) Users		Solar Home System (SHS) Non-Users		Businessmen using SHS	
		2012	2014	2012	2014	2012	2014
	during installation of SHS						
OUTPUT 6.	Time taken by POs to solve SHS's problem has decreased from 31-60 days to 1-15 days						
1.	Proportion of households thinks that there are positive impacts of solar home system	96.1%	96.5%	NA	NA	89.8%	97.1%
2.	Proportion of households think that there are some negative impacts of the SHS	7.3%	22.1%	NA	NA	8.2%	13.0%
3.	Solar Home System of <30 Watt used by the respondents	16.4%	39.3%	NA	NA	30.6%	66.6%
4.	Solar Home System of ≥30 Watt used by the respondents	83.6%	60.7%	NA	NA	69.4%	33.4%

The final survey also covered several issues related to batteries. Information was gathered on battery replacement, the use of old batteries, the role of POs' role concerning defective batteries, and knowledge on how to maintain batteries. It found that the main problems were (a) battery fluid was not checked as often as needed and (b) damaged charge control indicators.

In summary, PSTC's work revealed a number of policy and operational challenges. In the context of rapidly growing coverage with installations throughout the country, there was always the risk that POs would pay less attention to individual clients, and more on continuous, rapid expansion. This risk has started to manifest itself. Understandably, the PO's ability to provide service on time can be limited to many constraints, like distance and outreach, especially in remote areas.

While the beneficiaries and the PO staff admitted that the SHS performed excellently when first installed, the system performance deteriorated over time due to issues such as minor parts failure, installation location issues, and general lack of information. Unfortunately, the users' attempts to repair the system without having proper knowledge and skills only led to more complicated problems, which led to even more public dissatisfaction that was shared with others, including possible SHS buyers. This negative perception can only hurt the spread of SHS technology.

5 Project Management

5.1 Implementation of core activities to achieve sub-project objectives

- ♦ Conducting two surveys.
- ♦ 14 one-day orientations were conducted for union-level stakeholders, to inform them about the CARTA sub-project objectives and benefits.
- ♦ 14 union-level SHS user groups were formed and mobilized. These users groups were the agent to achieve project objectives.
- ♦ Capacity-building training for users group was one of the major activities of the RERED subproject under CARTA program. From July to August 2014, Population Services and Training Center (PSTC) undertook community capacity training for users group at 14 unions. The objectives of these training were to improve self-organization and capacity of SHS user groups in relation to awareness of the SHS technology and daily self-maintenance and to assess the effectiveness of users' organization and capacity building (including identifying appropriate and relevant good practice examples) and draw relevant recommendations and lessons learned.
- ♦ On the 12th of February, 2014 PSTC presented first survey report presentation at IDCOL office. The presentation was attended by a total number of 8 participants. Throughout the meeting, attendees

engaged in interactive. Discussion on report provided opportunities to share knowledge and generate commitment ideas that support long-term benefits for CARTA program. After discussion IDCOL assured us to provide cooperation for capacity building training for SHS users.

5.2 Challenges encountered and the ways they were addressed

PSTC's work revealed a number of policy and operational challenges.

- ♦ In the beginning of the sub-project the POs were unwilling to share information publicly, because they believed exposure would reveal problems that would hurt their future business.
- ♦ The community user groups were not sure what to expect from the sub-project. It took some time and effort to convince community members and representatives about the nature of the project and its relevance for efficient and effective service delivery.
- ♦ Keeping the interest of a volunteer user group was also a challenge. Many people want to work voluntarily, but there are also some people who expect fees or compensation for their work. This challenge was minimized by reviewing the User Group Rules of Operation and Rules of Conduct.
- ♦ The key implementation challenge was to raise the awareness of the users, and then focus their discontent into positive channels. Users had to recognize that the PO was in business, and that the installation and on-going maintenance were not gifts. Therefore PSTC had to empower the users carefully so that they did not take collective action against a PO that was willing to change, but where change would take time. This was especially true where credit was given to a user and the repayment was a problem. In such cases there was always the concern that the delinquent person might organize the group to act against the PO on his behalf.

6 Sub-project Sustainability Perspectives

There are two functions that the sub-project provided that seem to be self-sustaining. First the need for independent feedback from customers for the service provider is essential, and second, the users need high-quality training to use the SHS units as they are intended. Both activities are worth continuing since these can pass a cost-benefit analysis. The PO could offer the training for a fee or incorporate the cost into the price of the product. The data collection would be paid for by the PO, or by IDCOL, and reimbursed through a licensing fee to the implementer.

7 Lessons Learned and Recommendations

Despite the short-term of the sub-project, a number of lessons were documented throughout the project implementation. Some of the key lessons are discussed below.

- ♦ Do not assume that users know what to do. A training program for users needs to be organized to provide training for SHS user on basic knowledge of using SHS when they will purchase the equipment. Proper training for users can ensure the durability of SHS. The lack of training for users led to many subsequent problems. The report from the beneficiaries and the PO staff was that the SHS unit performed excellently when first installed; however, the performance deteriorated over time due to minor maintenance issues. Users often attempted to repair the system without having proper knowledge and this led to more problems, which further results in their dissatisfaction that is shared with others including the non-users. The overall effect was that there was a negative impression about the SHS benefits.
- ♦ Don't assume that users read and understand the information given to them. The dissemination of information about all the characteristics of SHS can make users more responsive to their SHS, which can ensure the durability of SHS, but there needs to be follow-up to ensure that there is understanding;

- ♦ Don't assume that users understand their obligations when they buy the system. Many SHS users believe that they are not responsible for their system. For example, many thought that since they bought it on credit, and each part of the system has a one-year warranty, they believe that only the POs are responsible to look after their SHS. PO staff, however, do not get sufficient time to look after SHS of each household. This attitude is changing; the CARTA project built awareness through training, orientation and consultation with SHS users. After this intervention users now feel greater ownership about their SHS, and they maintain their SHS units regularly;
- ♦ A third-party can mitigate the gap between POs and users by creating awareness about maintenance, and by motivating people to use SHS and to make loan payments regularly. But the third-party should commit to the objectives of project and be prohibited from any profit-making activities related to SHS market;
- ♦ Reliable technical assistance is needed from the very beginning, even at the point of sale. Many problems, as seen in the case study, were because systems were placed in the wrong location.

Recommendations

- ♦ POs should maintain after-sale service for the customers;
- ♦ POs should be supported in scaling-up training for SHS users. All the problems of SHS cannot be solved by this training, but many common usage errors can be avoided;
- ♦ A suitable credit system needs to address the problem of high down-payment cost. Also, POs should offer less expensive Solar Home Systems to reach very poor target group;
- ♦ A skilled technical workforce must be permanently available to provide support, implying a requirement for continuity of training within the POs to maintain their skilled workforce. (The PO staff members expect adequate compensation from a profit-making organization. Low wages can lead to turnover and low morale, leading to low motivation levels and sub-standard performance. According to interview data, many employees reported dissatisfaction with their wages. In addition, the lack of employee motivation also affected the performance of the PO. Many of them believed that they were not paid sufficiently by their organization. This attitude and the previous factors became more of an issue when the SHS needed maintenance.);
- ♦ Ensure that an effective Grievance Redress Committee (GRC)¹² is formed at each upazila to ensure easy accessibility by the SHS users;
- ♦ Thought needs to be given to the planning of forums for the exchange of experiences and ideas between service providers, and similarly for field level technicians. In-country exchange visits in both the successful and problematic areas may be organized for project implementing staff (partner organization). This would create an opportunity for exchange of ideas and bring in new innovations for addressing problems.
- ♦ The CARTA project duration should be extended to realize even more impact. The interventions need to be concentrated in all the upazilas and unions of the districts.
- ♦ POs are profit-making organizations; consequently, POs will make a cost-benefit decision about promoting sales in remote areas, or to low-income groups. It may be necessary to create special incentives and/or quotas to encourage POs to work in these areas.

¹² The name and format of a GRC can be modified based on the situation on the ground, but it is recommended that an effective mechanism to deal with consumer complaints

8 Annexes

8.1 Third Party Monitoring Framework

Indicators	Questioner/topics for collecting information during first survey	Type of information/data	Tools/methodology	Frequency
Policy compliance	What are the main policies/ approaches applied (SHS promotion/ info dissemination, targeting, price and crediting, environmental, etc.)	Policies applied	Interviews with Key Informants	First survey Midline Second survey
			Analysis of documents	
	Are you aware of SHS? If yes, how did you learn about it? Are you aware of its benefits? If yes, what are they, to your opinion? Would you be interested to install SHS? If yes, what would be your expectations of impact? Do you plan to install it in the coming year? If not, why? If yes, have you already undertaken any steps for this? If yes, what steps?	People awareness	CRC (extension to non-users - neighbors)	
	Awareness about SHS and their possible benefits. Interest to install and expected impact. Obstacles to installation. Under which conditions would install?	Potential for targeting vulnerable	Focus Group Discussions	First survey, further frequency to be seen

Technical aspects/Installation	When your SHS was installed?	Community perception of service	Citizen Report Card	First survey Midline Second survey
	Have you had any problem with SHS since?			
	Are you able to identify these problem(s)?			
	If yes, how many times have you faced problem? (1/2/3/ more than 3)			
	Are there any weak points in the SHS use? If yes, what are they?			
	Did you have problems in the past with the SHS? If yes, are any of the problems still unsolved?			
	Correctness of SHS installation	Service provision practices and challenges	Observation by community committee	
	Main challenges of SHS promotion. installations. Frequency. How they are dealt with. Complain mechanisms. Average time for solving problems.		Interviews with Key Informant	
Financial aspects	Which of the following are sources of energy used in your household? (Multiple response is applicable)	Community expectations and satisfaction	Citizen Report Card	First survey Midline Second survey
	How much money do you spend for line setup and installation? (Each Month) On each of your sources (Multiple response is applicable)			
	How much money do you spend monthly for each of your energy source? (Multiple response is applicable)			
	On average, how much do you pay per month for each of your energy source? (Multiple response is applicable)			

	How many hours do you use various energy source in a day (Multiple response is applicable)			
	How much money have you paid to buy this SHS?			
	What was your payment schedule?			
	What was your Down Payment? Your interest Rate? Your instalment schedule?			
	Do you find it difficult to pay? (very difficult, rather difficult, rather easy, very easy)			
	Did you pay extra charge without money receipt for buying the SHS? If yes, how much? To whom?			
	Did you pay extra charge without money receipt for installing the SHS? If yes, how much? To whom?			
	Main challenges in managing credit schemes. Statistics of down payment and tendencies. Management of cases of payment delays, non-payment	Existing financial situation and financial management practices	Interviews with Key Informants	
Operational and maintenance issues	Did the technician explain to you about SHS maintenance?	Community expectations of impact (to contribute to project impact)	Citizen Report Card	First survey Midline Second survey
	Did you learn how to take care of the SHS?			
	Who is responsible for cleaning the module?			
	Did you receive any written information about the SHS?			

	Have you any complaints about the installation?			
	Did you pay extra charge without a money receipt for repairs/ resolving problems? If yes, how much? To whom?			
	In how many months your agreement with the PO for O&M expires?			
	Do you already know how you will service your SHS system when the contract expires? If yes, how?			
	Type of main technical problems. Frequency. How they are dealt with. Complain mechanisms. Average time for solving problems.	Existing O&M practices and challenges	Interviews with Key Informant	
Impact of SHS	Do you think the SHS has any positive impact in your household? On your business (for businesses)	Impact perception	Citizen Report Card	First survey Midline Second survey
	If yes, explain list these positive impacts?			
	Do you think the SHS has any negative impact in your household? Or business (for businesses)			
	If yes, explain list these negative impacts?			
	Can you assess to which extent your expectations were met? (not met - partially met-fully met)			
	Do you know many people who installed SHS in your village? (a lot/ many/ just a few/ none). If you know, what are the main motivations of these people to install SHS?			

	For businesses: Do you think the SHS technology influences the business activities in your area? If yes, explain how?			
	Observed impact of SHS on households and businesses (both positive and negative)	Impact observation	Interviews with Key Informant	
	Do you know many people who installed SHS in your village? (a lot/ many/ just a few/ none). If you know, what are the main motivations of these people to install SHS?	People awareness of SHS impact	CRC (extension to non-users - neighbors)	First survey, further frequency to be seen
Satisfaction level of SHS user	Rate satisfaction (very s/rather s/rather uns/highly uns)	User's satisfaction perception	Citizen Report Card	First survey Midline Second survey
	Location of the unit in the house			
	Location of lights			
	Contract with PO			
	Credit scheme			
	Services of the technician			
	Impact of SHS			
	Maintenance cost of SHS			
	What are the reasons for rather unsatisfied/ highly dissatisfied?			
What suggestions do you have for improving the quality of service provided by POs				

8.2 Geographic location

District	Upazila	Union	Household	Population
Rajshahi	Charghat	1. Solua	5803	29015
		2. Nimpara	7037	28148
Kishoreganj	Mithamain	3. Ghagra	4060	24360
		4. Sadar	3904	19520
Chittagong	Rangunia	5. Chandraghona	4644	23220
		6. Sharapbhata	4198	25188
Sylhet	Jaintiapur	7. Charikata	2472	12360
		8. Darbasta	5330	31980
Barisal	Bakergong	9. Daruria	8864	37248
		10. Darial	6284	31420
Dinajpur	Kaharole	11. Rasulpur	4800	19200
		12. Dabar	4779	23895
Narsingdi	Roypura	13. Musapur	4732	23600
		14. Alipura	3270	16350
7	7	14	70,177	345,504

Source: Bangladesh Bureau of Statistics

8.3 First and second survey sampling

First

Data was collected from 163 villages in a random sampling method. A total of 722 households (HH) were interviewed in the survey for this report. Three groups of respondents were selected for the survey: the solar home system users, the non-users of the system and the business people who use the system. 561 of the HH were SHS-electrified, 45 were business related SHS-electrified, and 112 were non-electrified those who are not using Solar Home System, they were not a control group.

Table 1: Number of households interviewed by Upazilas

Districts	Upazila	Unions	SHS HH User		HH Non-User of SHS		Businessman using SHS	
			Total	%	Total	%	Total	%
Rajshahi	Charghat	Salua	4	0.7	0	0.0	7	14.3
		Nimpara	28	5.0	10	8.9	3	6.1
		Total	32	5.7	10	8.9	10	20.4
Kishoreganj	Mithamoin	Ghagra	41	7.3	12	10.7	2	4.1
		Mithamoin	78	13.9	12	10.7	2	4.1
		Total	119	21.2	24	21.4	4	8.2
Chittagong	Rangunia	Chandraghona	27	4.8	5	4.5	3	6.1
		Sarapbhata	83	14.8	25	22.3	6	12.2
		Total	110	19.6	30	26.8	9	18.3
Sylhet	Jointapur	Charikata	22	3.9	9	8.0	0	0.0
		Darbasta	10	1.8	6	5.4	1	2
		Total	32	5.7	15	13.4	1	2
Barisal	Bakerganj	Daruria	77	13.7	19	17.0	5	10.2

Districts	Upazila	Unions	SHS HH User		HH Non-User of SHS		Businessman using SHS	
			Total	%	Total	%	Total	%
		Darial	0	0.0	1	0.9	2	4.1
		Total	77	13.7	20	17.9	7	14.3
Dinajpur	Kaharol	Rasulpur	96	17.1	0	0.0	7	14.3
		Dabore	47	8.4	0	0.0	1	2
		Total	143	25.5	0	0.0	8	16.3
Narsingdi	Roypur	Radhanagar	26	4.6	10	8.9	6	12.2
		Alipura	22	3.9	3	2.7	4	8.2
		Total	48	8.6	13	11.6	10	20.4
Total			561	100%	112	100%	49	100%

28 enumerators and 7 supervisors were appointed to administer the survey. Three questionnaires were designed for each separate group of respondents:

- ♦ SHS users (561; m-397, f-164)
- ♦ SHS Non-Users (112; m-79, f-33)
- ♦ Persons using SHS for business purpose (49; m-42, f-7)

The households were selected using simple random sampling method. Before drawing random sampling the three categories of households were selected proportionately.

Findings of the survey were verified through Focus Group Discussions (FGD) conducted using a checklist. 27 FGDs were conducted where the both female and male users of SHS participated in the FGDs. The participants from the nearby houses attended in an FGD conducted at a common place. The Key Informants (KI) of this survey are the SHS providers (IDCOL Partner Organizations – POs) Open question interviews with POs were conducted to get a better understanding of the SHS installation and maintenance arrangements, as well as to validate the answers of the service users. 67 interviews were conducted with POs in the areas where the survey was done.

Final

The survey interviewed 912 households those were selected from four groups- 489 from among the Solar Home (SHS) System Users, 305 from the (SHS) Non-users, 69 households the Business People who use (SHS) and 49 from households who replaced their batteries for SHS. These four groups of interviewees were selected from seven districts- Rajshahi, Kishoreganj, Chittagong, Sylhet, Barisal, Dinajpur and Narsingdi.

Table 2: Numbers of households interviewed in each district

Districts	Upazila	SHS		Non-Users of SHS		Businessmen using SHS		User of New Battery		Total	
		Total	%	Total	%	Total	%	Total	%	Total	%
Rajshahi	Charghat	50	10.2	46	15.1	9	13.0	4	8.2	109	12%
Kishoreganj	Mithamoin	74	15.1	45	14.8	15	21.7	21	42.9	155	17%
Chittagong	Rangunia	73	14.9	45	14.8	10	14.5	1	2.0	129	14%
Sylhet	Jointapur	75	15.3	45	14.8	2	2.9	2	4.1	124	14%
Barisal	Bakerganj	75	15.3	35	11.5	15	21.7	10	20.4	135	15%
Dinajpur	Kaharol	74	15.1	46	15.1	15	21.7	8	16.3	143	16%
Narsingdi	Roypur	68	13.9	43	14.1	3	4.3	3	6.1	117	13%
Total		489	100.0	305	100.0	69	100.0	49	100.0	912	100%

8.4 Questionnaire for KII

- ♦ How the SHS providers implement the awareness program?
- ♦ What is your experience of selling of SHS?
- ♦ What problems do you face while selling SHS?
- ♦ What is your opinion about the selling arrangements and price of the SHS?
- ♦ After selling of the SHS what type of problems you face in recovery of the payment instalments?
- ♦ What types of problems are there with the batteries?
- ♦ What process is followed in replace the batteries?
- ♦ Are there many SHS users returning batteries due to some problems?
- ♦ Your opinion about the quality of the SHS
- ♦ Your recommendations for improving the Solar Home System.

8.5 Sub-project governance

The sub-project was funded under Citizens Action for Results and Transparency and Accountability (CARTA) programme, which is being managed in Bangladesh by MJF in partnership with the Partnership for Transparency Fund (PTF). MJF selected PSTC as partner through a bidding process to implement this RERED sub-project. PSTC was responsible for overall project implementation.

PSTC formed 14 union-level, SHS-user groups. A total of 210 users group members were directly engaged with the project implementation. PSTC recruited one project coordinator and one quality assurance officer at the head office, and seven program officers and 14 field organizers for the field office. Under the supervision of Executive Director of PSTC one Project Director (PD) was responsible for overall management of the project.

MJF provided technical support, and shared reports. MJF also provided assistance to PSTC to organize sharing meeting with IDCOL. PTF provided feedback on survey questionnaires, reports and presentations.

8.6 Case study: A failure to provide service: the meter problem

Hellen has no electricity from the grid. Attempts were made to bring pollybidyt¹³ but failed. Mr. Niranjan Shill has also tried that option, but then he heard about solar energy. With the opinion of family members, he decided to install a solar home system. One day he met with the manager of Srijoni, the seller of solar energy of Bakergonj upazilla. He wanted to gather knowledge about the merits, demerits, and methods of using solar energy. He purchased a 55-watt system with cash (tk-26000 with a 3% discount). The manager confirmed the purchase, and committed to provide on-going after-purchase services.

He did not face any problems for the first two years. After two years his wife was working in kitchen one day, when she saw a meter fire. Unfortunately it was spreading; the house was catching fire. She began to shout and gathered the neighbours, who came to help. Later, they realized that the house caught fire from the tube light, which was used with solar energy. Unfortunately, many necessary things were burned in the fire. When he tried contacting the manager who sold the unit, he did not respond. The owner believes that because he bought the energy with full cash, they will not provide service. He complains that he did not receive a contract since he bought with full cash. He complains that they did not train him to use the SHS unit, and that they did not help him in any way.

After that fire the tubes were fused. He informed the provider, but they still did not come. At last he opened the meter to repair it, but he was not successful. Now he doesn't know what to do; both sides of the tubes become black after 10 or 12 days of use, and as the result, they have to be changed every few days.

¹³Rural electric cooperatives are called *PalliBidyuitSamity* (PBS)

The owner is the first user of the solar energy of the village. Many villagers began to use solar energy because he inspired them. But now he is unsatisfied, and others are affected by his opinions. Perhaps the sale of new systems will be affected as well.

8.7 Case study: Return the system

Mr Forkan Ali is a poor fisherman in Char Bishari village of Bakerganj Upazilla. With a wife, two sons and one daughter, he maintains his family. At times he is so needy that he borrows money to carry on his business; however, when his business goes well, he can easily pay his debts.

One day the agent for solar energy came to their house and informed his wife about solar energy. They assured her that there would be five years of service with few problems. She was concerned that their house did not get sufficient sunshine, but the agent said that it was enough to run solar energy. Mr Ali's wife informed him about the meeting, and he talked with the agent's manager about the advantages and disadvantages of using solar energy. Considering the benefits, especially the children's ability to study and the ability to do housework, he decided to purchase the SHS unit on January 15, 2012. The down payment was 3,420tk for a 42-watt package (total cost: 27,452tk)



For five to six months there were no problems. Suddenly, one evening, all the lights of his house went off. He informed the agent, and they suggested a battery charge. Mr Forkan went to the Kamar Khali Office to charge the battery. The service staff began bargaining with him for payment, but at last he was able to charge the battery. But, after a few days, the same problem began again. He informed the agent, but they never came to see his problem. Finally, he went to them to request a repair. They came to the house, and said that the panel does receive sufficient sunshine to be charged. They then went away without providing any solution to the problem. He continued making the instalment payments, and after many more requests, the service staff moved the panel to an open place. Still the problem with the battery existed. Becoming very disturbed, he declares that he will not pay any instalment until the problem is fixed. The agent claimed they could not resolve the problem so they returned 3,000 tk to him, and removed the system. His children cried. Mr Ali stated that he would use the solar again if he can cut the trees near his house to get sufficient sunshine.

8.8 Case study: Return the system (2)

Mr Hawlader's is an uneducated man who has suffered. He supports a large family: two sons, a daughter, a mother and wife. While he could not acquire an education, he wants his children to have an opportunity. He noticed that his neighbours use solar to light their house, while his was dark. The children cannot study in these conditions so he decided to buy a solar unit. He gathered the information about the advantages and disadvantages, and then contacted Grameen Shakti of Kamarkhali union. They ensured him that they would solve any problems. And so he bought a 20-watt unit with a down payment of 1,200tk, and instalments of 375tk monthly. Now his suffering really began. He complained that:

- ♦ They did not train him to use the solar unit,
- ♦ The battery charge reduced quickly,
- ♦ There was irregular co-operation
- ♦ The sellers were not truthful,
- ♦ The selling agency misbehaved,
- ♦ Disturbance machineries

Overall, he is disappointed with the service, and wonders what he can do.



8.9 Case study: The story of a successful and careful customer

Mr Aliur Rahman, a teacher, lives in Kamrangikhel of Charikata union. He used to light his house with a kerosene lamp, and everyone in the house would compete with each other to use the lamp—it was bothering him. Actually, he was looking for a long-term solution anyway because the cost of kerosene was high. He was inspired to use solar by his neighbour.

He purchased a 40-watt unit for 41,400 tk with a monthly instalment of 597 tk from IDCOL's agent, Grameen Shakti. Mr Aliur paid the 36 instalments successfully. He is now the owner, and bears only the maintenance cost.

Aliur Rahaman is very pleased with the service of the agent. He says that they are co-operative, helpful and sincere. When he faces any problem he gets their attention and they provide timely service. He acknowledges that he takes care of basic maintenance. He says that both the carefulness of the customer and the co-operation of the agency are required to be a successful user of a solar system.



8.10 Case study: Solar light brought the light of education.

Biva Majumder is a successful young woman in Samsadi village of Garulia Union. She is an honor student in her second year studying marketing at B. M. College in Barishal. Besides attending college, she earns money to support her family. Unfortunately, the village has no electricity from a *pollybidyuit*, because the geographic location of the village households can't support it.

Biva, like so many students of the village, dreamed of leading a modern life with electricity in the house. But the darkness of the village spoiled these dreams. To remove the darkness, solar energy could be the solution.

Debashis Majumder, brother of Biva is a schoolteacher. Thinking about his sister, he decided to buy a solar unit. He made a down payment of 4,275tk for a 50-watt unit in June, 2012. The package value of the unit was 28,500tk, with monthly instalments of 880 tk.

With the light of kerosene lamp, Biva started a business; she began to earn money by teaching the children of neighbours. She gave lessons in the evening until 9:00 p.m. Afterwards, she continued her studies until midnight. Now her family does not have to support her study cost—she bears all expenditure as even provides some necessities for her family. She has changed her life style with the help of solar energy that she could not imagine before.

8.11 Case study: Unfulfilled expectation

Mr Ali lives in Charikata Union of the Jaintapur Upozilla of Sylhet. Until recently, he depended on expensive kerosene to light his home. His neighbors advised him that he could minimize his cost by purchasing a solar unit. As a result, last February purchased a 20-watt unit from the agent, Grameen Shakti of Jaintapur Upazilla.

As per his contract, Mr Ali stated his 36 instalment payments. Unfortunately, his expectations for the unit have been unfulfilled, because he has faced many types of problems. The battery seems to lose its charge quickly and he has had problems with the agent's instalment collection methods—the agent doesn't write down the amount in the instalment book properly. There is also the irregular communication and the lack of sincerity by the agent to resolve the problems.

Mr Ali has said that, he has received fewer benefits than expected. Overall, because the maintenance costs have been high, he thinks that the unit has not been worth the investment.

8.12 Case study: Worried about the future

Kadal is another unprivileged village in Charikata Union of Jaintapur Upazila. Still now the village is not under *pollybidhyut*; consequently, most of the people depend on kerosene lamps.

Mr Ali Ahamed is one of them. At the beginning of 2012, to minimize the cost he has bought 42-watt pick solar from the agency of IDCAL named Grameen Shakti. He wanted his children to have light in the evening to study. He had good expectations, but, unfortunately, these were not fulfilled.

Like others Mr Ali have faced many problems. He had to change the solar panel a few times, the battery charge diminished much faster than expected, the selling agent seemed indifferent---only showing up to collect their instalment payment, but providing no service, and the communication with the agent was irregular at best. He thought that as a customer, his duty is to pay on time; the agent's duty is to resolve problems quickly. While he felt that he held up his end of the agreement the agent did not. He now concludes that, all things considered, he is worse off as customer of solar system. He is worried about what types of problem he has to face in future.

8.13 Case study: Dissatisfaction with maintenance services

Gouri is another under-privileged village in Charikata Union of Jaintapur Upazila. Abdul Hannanis a resident who used kerosene lamps, but recently it has become impossible for him to buy kerosene, because the price is increasing day by day.

Several neighbours advised him to buy a solar unit. He purchased a 20-watt unit in February, 2013, with a down payment of 2,000tk and 36 monthly instalments of 375tk from Grameen Shakti, an agent for IDCOL.

Abdul Hannan claims that the solar unit is cost-effective. His monthly cost is less than the monthly cost of kerosene. Also, there are other benefits that can't be measured in money. His neighbours and relatives also benefit, and his children are also happy, because it is easier to study.

But he has criticized the service provided by the agent. He reported many problems with the charge controller. And he still has not received his instalment payment book, warranty card, or maintenance book. He has said that when he contacts them about the missing documents, they have said that they will give the instruments after 6 months.

8.14 Case study: No solution – getting affliction

Mahbubur Rahman resides in South Kamrangikhel in Charikata Union of Jaintapur. Before buying a solar unit his children could not continue their studies in the evening. And, the price of kerosene was increasing day by day. Meanwhile, many people in the village started to use solar electricity. Based on this advice he purchased a 75 watt unit from Grameen Shakti, an agent of IDCOL, for 36,900 tk.

Soon he began to experience problems. He believes he uses the machine properly according to the instructions of the agent, but the battery charge does not last long, and the cost to recharge is very high. He is quite bothered by this problem, but he receives little support from the field workers of the agent. They do not communicate; they do not respond when he calls them. This type of service support deeply disappoints him. He thinks the agent doesn't understand how important this investment is to him and his family. He thinks the agents should be aware about of the emotions of the poor people who buy their product and depend on it for advancing in society.

8.15 Case study: Complications after purchase

Khairabad is an under developed village in Garulia Union of BakerganjUpazilla. Most of the houses of the village are not under a *pollybidyut*. Mr Nurul Islam, a businessman, resides in the village. Like the other villagers, he has decided to use solar energy so that he can continue his business work from evening to midnight. He is the owner of a restaurant, and he expects that the lighting will make his restaurant look beautiful, which will attract customers.

For this restaurant, He bought a 20-watt unit from Grameen Shakti, with down payment of 1,210tk and instalments of 375 tk monthly. The package value was 12,100tk, with a service charge of 14,071 tk. The interest rate was 8%.

When he bought the solar system, the agent said that they will fix any type of problems that he might face for the next 3 years. They promised to replace the bulb if any bulb fused, and to repair the battery. For the first two months he did not have any problems. But then the bulbs would not light. He informed the selling agent; they repaired the battery but demanded payment for shipment of a new battery. After one month, the same problem happened again. Now, he has to pay another cost. But the problems are not solved completely. The signal shows that the battery is fully charged, but after a short time with the lights on it shows only a medium charge. The seller company has said that 3 or 4 hours are enough for a full charge, but Mr Islam has charged for 5 or 6 hours, and yet the battery is still not charged fully.

He is now faced with the cost of the solar system and the use of kerosene. The solar system is too weak for lighting his restaurant, so he uses kerosene. He is not satisfied with the solar. Now he wants to remove the system, because he thinks about cost efficiency. He has decided that if they do not take it away or they do not solve the problem he will not continue to make the instalment payments.