FEASIBILITY STUDIES ON DEPLOYING A SELF-CONTAINED SOLAR-HYDRAULIC PILOT POWER PLANT IN A RURAL AREA IN BANGLADESH

Final report

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ABSTRACT

In October 2017, the World Bank reported that Bangladesh continued to reduce poverty - rural poverty decreased from 35.2 to 26.4 percent between 2010 and 2016, but at a slower pace. It is well-accepted that lack of access to electricity is one of the major impediments to growth and development of the rural economies in developing countries (Khandker et al. 2009). In Bangladesh, only 29% of rural areas were covered by the national grid which took up merely 2.27% of the total energy consumption and almost 94.2% of which came from highly polluting fuelwood and other biomass including leaves, crops and dung (BIDS Survey 2004). The problems rural people face in obtaining safe, clean, and reliable energy supplies represent a significant barrier to rural economic development and social well-being (Barnes et al. 2010). Solar energy is an excellent candidate as it is clean, safe and abundant in Bangladesh. Since early 1990s more than four-million solar home systems (SHS) have been installed in Bangladesh and the number is still increasing. However, batteries, especially lead-acid batteries used as energy storage systems in solar off-grid power plants, are considered highly hazardous to environment due to their chemistry. In an effort to eliminate this hazard a novel design hybridizing solar power with hydro power has been conceptualized. In this design surplus electrical energy generated by the solar plant during daytime is stored as potential energy by pumping water into an overhead tank rather than stored as chemical energy in battery for usage after sunset. A prototype system is being designed to develop the proof of concept where a power plant will be installed in an off-grid area of the Chittagong Hill Tracts in Bangladesh. For this purpose, several villages in Bandarban and Rangamati districts have been surveyed for estimating the load demand of those villages and the affordability of the potential consumers. Based on the survey results, a village has been selected and a prototype solar-hydro hybrid power plant has been designed. A business model has also been proposed. This report presents the survey methodology, data analysis, and the design for the prototype power plant and the proposal business model.

Contents

INTRODUCTION

Solar power plants are one of the most promising renewable energy based solutions for powering off-grid areas in this world. Owing to its flexible sizing, starting from 5Wp solar generator to hundreds of kWp, solar powered plants have become a favorable option of power supply for off-the-grid population, especially for consumers of limited affordability.

A crucial component of solar powered systems is the battery which stores energy generated by the solar generator for usage after sunset. The most commonly used battery technology is the lead-acid chemistry due to its lower cost. However, this chemistry of battery is also the most hazardous to the environment and consumers due to its acidic electrolyte and lead based electrodes.

Huge strides have been made in replacing the lead acid chemistry in the last decade. Several non-hazardous chemistries have been developed at the expense of the relatively lower upfront cost of the lead-acid batteries. Although the new technology batteries can be designed to have significantly higher life-cycle than the lead-acid batteries, the upfront investment for initial purchase and replacement (if necessary) is a huge barrier for the much needed further widespread of solar powered systems.

In an effort to eliminate this hazardous nature of off-grid solar power plants, a novel idea for an off-grid solar power plants has been conceptualized by SEMwaves Ltd. Rather than storing the electrical energy in batteries in the form of chemical energy, it would be stored as potential energy in the form of water pumped in to an overhead tank. The water can later be used to drive a hydro turbine generator to provide electricity after sunset.

To develop the proof of concept SEMwaves Ltd and University of Glasgow, in association with J&C Impex Ltd and the Bangladesh University of Engineering and Technology, is planning to install a prototype of the new design in an off-grid village in the Chittagong Hill Tracts. The survey has been funded by University of Glasgow under the Global Challenge Research Fund (GCRF) scheme.

Detailed surveys of several villages in the Rangamati and Bandarban districts were conducted to determine the load demand and the affordability of the potential customers in those villages. This report will summarize the overall activities.

THE SURVEY

A pre-set questionnaire was provided to J&C Impex Ltd by SEMwaves Ltd and University of Glasgow for conducting the survey. Several villages were surveyed to assess their need and determine the load demand and determine which village would be the most suited for implementation of the prototype system. The following table shows the tour plan in each village.

Trip No	Date	District	Village	Coordinates	Team member
01	22/01/2019	Bandorban	Narikal para	(21.7906658, 92.4347085)	Dr.Shimul Saha, Rafiur Rahman,Sayeef Asrar,Ziadul
	22/01/2019	Bandorban	Zinno para	(21.7945878, 92.437088)	Dr.Shimul Saha,Rafiur Rahman,Sayeef Asrar,Ziadul Islam
	23/01/2019	Bandorban	Naikhyang Para	(21.869567, 92.402072)	Dr.Shimul Saha,Rafiur Rahman,Sayeef Asrar,Ziadul Islam
02	18/02/2019	Rangamati	Mobachori	(22.711449, 92.184842)	Ziadul Islam & Sayeef Asrar
	18/02/2019	Rangamati	Killa para	(22.628830, 92.23712)	Ziadul Islam & Sayeef Asrar
	19/02/2019	Rangamati	Shuvolong Bazar	(22.713146, 92.26661)	Ziadul Islam & Sayeef Asrar
	19/02/2019	Rangamati	Uttar Para	(22.714917, 92.267228)	Ziadul Islam & Sayeef Asrar
03	19/03/2019	Rangamati	Shuvolong Bazar	(22.713146, 92.26661)	Dr.Chong Li, Dr.Tarek bin Ahmed,Sayeef Asrar & Ziadul Islam
	19/03/2019	Rangamati	Uttar Para	(22.714917, 92.267228)	Dr.Chong Li, Dr.Tarek bin Ahmed,Sayeef Asrar & Ziadul Islam

The following graph shows the number of people surveyed in each village.

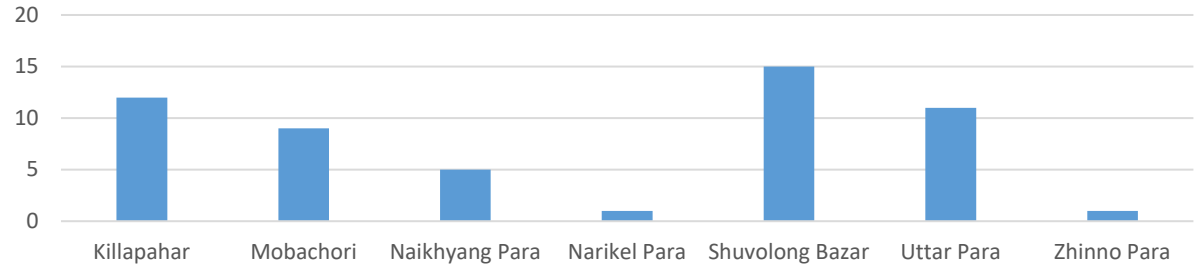


Figure 1. Nos. of people surveyed in each village

SAMPLE SELECTED VILLAGE AND ITS LOAD DEMAND

Several criteria were set to determine which village would be more suitable for implementation of the prototype system.

1. Availability of water body
2. Max load demand of 5kW
3. 30-50 nos. of households

4. An elevated site within the vicinity of the village for construction of overhead water tank
5. Unvailability of national grid

Based on the preset criteria, For example Uttar para village has can be seen village has can be seen as a feasible site for the implementation of the prototype power plant.

Uttar para (Google maps coordinates: **22.714917, 92.267228)** is a small village along the bank of the Kaptai lake located 12km North-East of Rangamati Sadar. The village has a total of 35 nos of households. The village has no national grid connection and is primarily dependent on solar home systems for power.

Figure 2. Uttar para

The most commonly used appliances is this village are CFL lights, DC fans, DC TVs, and mobile phones. The potential users of the village further expressed interest in using refrigerators if electricity was made available to them. Their demand profile as determined through survey is provided below.

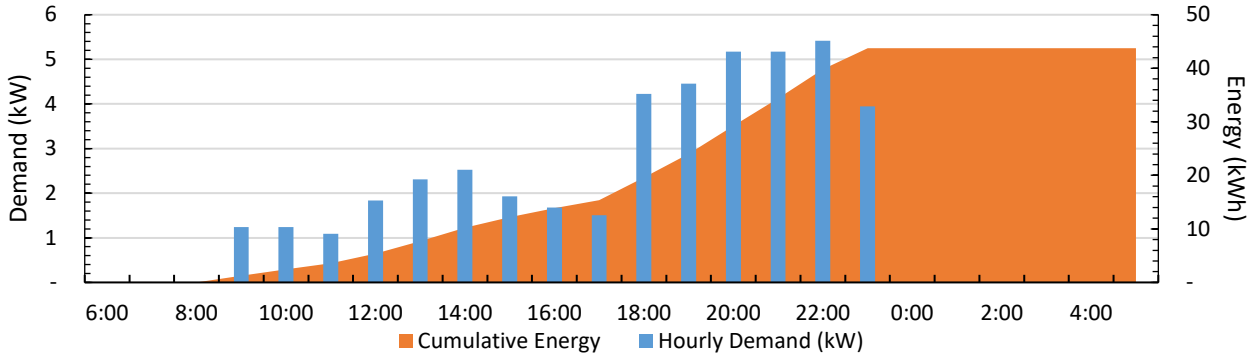


Figure 3. Hourly load demand and cumulative energy profile for Uttar Para

THE PROTOTYPE SYSTEM

Based on the load demand, a power plant with a 20kWp PV plant, 335m^3 overhead water tank, a 6.5kW turbine generator, and an 18kW surface water pump. The system would allow powering the neighborhood for 14 hours each day. An overview of the prototype system is shown in the figure below.

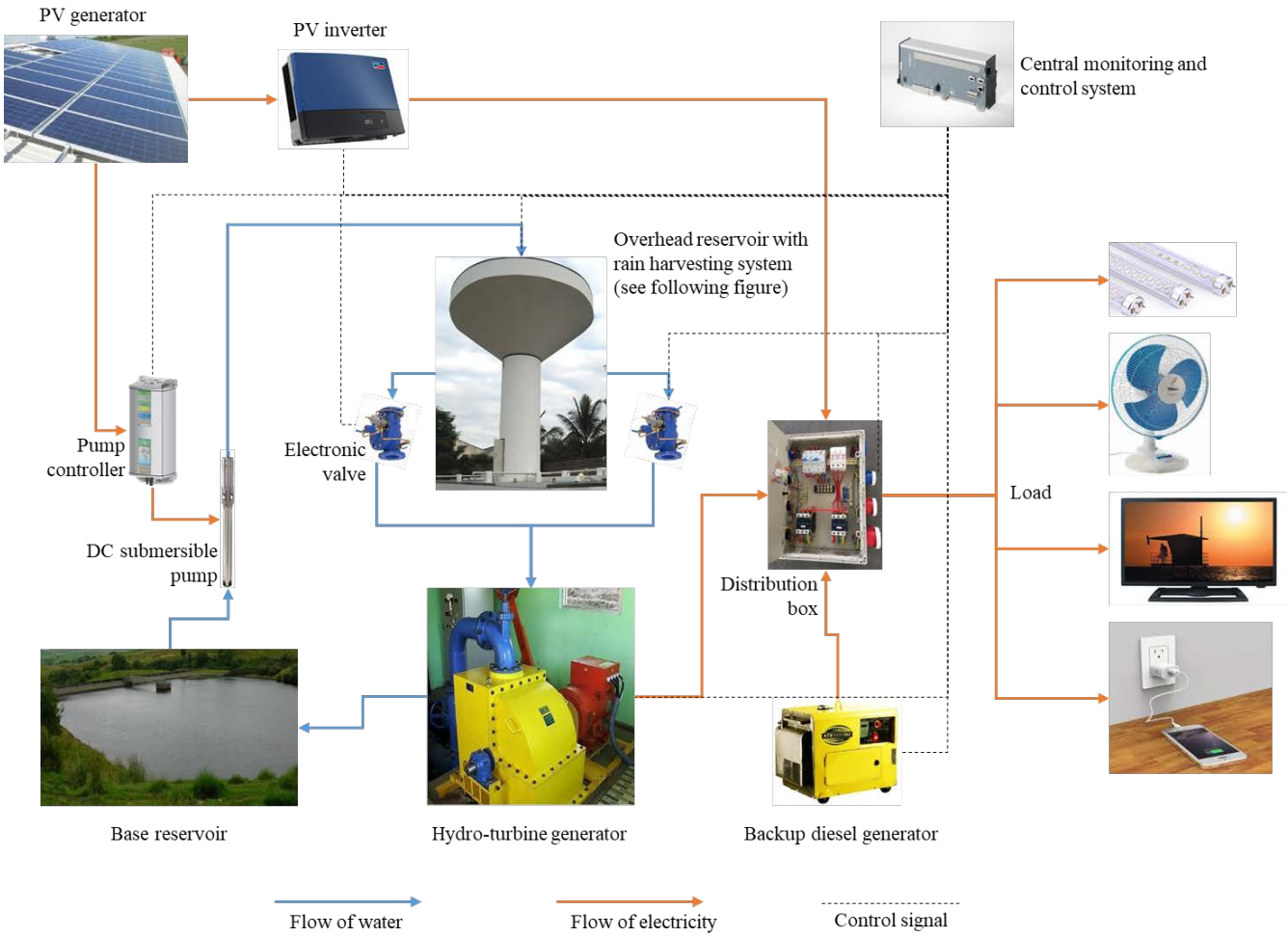


Figure 4. Overview of the prototype system concept

The overhead water tank can be designed to further accommodate a rainwater harvesting system. A conceptual drawing is presented in figure below.

The overall working concept of the prototype is explained below:

1. The PV plant generates power which will be used to power the daytime loads and run a surface pump which will lift the required amount of water to the overhead water tank.
2. The water will be discharge in a controlled manner using the solenoid valves to run the hydro turbine and generate power to supply the nighttime loads.
3. The rainwater harvesting system will be used to harvest and store any rain water for running the turbine.
4. A filtration system may be installed to provide fresh drinking water to the village.

Figure 5. Rain water harvesting system

ECONOMIC VIABILITY AND BUSINESS MODEL ASSESSMENT

Market Overview

The proposed self-sustaining solar-hydraulic power generation system aims to serve the off-grid clustered rural households in Bangladesh, specifically the Chittagong Hill Tracts (CHT) region in the Chittagong division.

The Chittagong administrative division of Bangladesh is a densely populated area, making it ideal for mini-grid power supply. It has about 21.5 million rural population and a population density of about 840 inhabitants per square kilometre, which translates into about 4.6 million households or about 178 households per square kilometre with average household size of 4.7. This means our system could easily get a cluster of 100-150 households within 1 to 3 square kilometres - reducing the cost of connecting households to the system. Assuming 42% of the households have access to grid electricity (World Bank) and based on current grid growth prospects, more than 2 million households in the Chittagong division can be counted toward the potential market of our proposed power generation system. Population growth of the division between the period 2001-2011 is about 17%.

CHT in specific has 3 districts, namely Khagrachhari, Rangamati and Bandarban with a total land area of 13,294 km^2, of which only 3% of the area constitutes plain land suitable for human habitation. Ninety (90) percent of the 1.6 million population, or 335,899 households live in para/ small villages. That means households are highly concentrated across 399 km^2 plain land areas[1], making it easier for a power generation system to scale up and connect more households if needed.

CHT recorded a high population growth at 20% in the period 2001 – 2011 but energy access, including access to renewable energy lags far behind the national average due to the region's hilly terrains, inaccessibility and remoteness. Expansion of the national grid into the areas is technically difficult, risky and very expensive; it is not likely to be achieved in the near future. Transportation of fossil fuels for localised generators is also costly and risky. At present, a majority of households in the CHT continue to rely heavily on traditional sources of energy such as firewood, kerosene and even candles as opposed to modern clean energy sources like solar power, wind, and hydro electricity.

The government recognises off-grid renewable energy generation systems being the most viable option to improve energy access in the region. Thus, it has sought to encourage private sector participation in the development of solar hybrid mini-grids and subsidised credit sell of different solar PV applications in the area. Being a hilly area with abundant water sources, the installation of a solar-hydro micro-grid combo will be a cost-effective option.

Profile of Target Customer Segment

Two-third of the households in CHT rely on farming and fishing as the main economic activity for income generation. Only a small proportion are engaged in artisan and small commercial activities, and salaried jobs. *Household income* in CHT is lower than the national average rural household income, which was reported at 13,353 BDT (about US$159) per month in December 2016[2] by about 15-25%, which is comparable to our survey finding of average monthly household income between US$100-150. Income of indigenous households in particular is skewed towards the lowest end[3].

Energy consumption of our target households at present primarily falls in between Tier 1 and Tier 2, with a few that are involved in business activities at Tier 3 as depicted in the 5-tier energy use of the UN Sustainable Energy for All (SE4All) Tracking Framework (Figure 1).

[1] Bangladesh National Census 2011.

[2] CEIC data, accessed: https://www.ceicdata.com/en/bangladesh/household-income-and-expenditure-survey-household-income-per-month

[3] Asia Development Bank (n.d.) Second Chittagong Hill Tracts Rural Development Project. Accessed: https://www.adb.org/sites/default/files/linked-documents/42248-013-ban-sprss.pdf

Energy is used up to 4 hours per day on average of which less than 2 hours in the evening, and mainly for general lighting and phone charging (Tier 1), and for fans and television (Tier2). However, the last national population and housing census (2011) found over 50% of the population in CHT listened to radio and watched television, although many did (and still do) not own the appliances. There is also a significant proportion of population particularly male (about 75%) reported to use internet, indicating access to devices that require power charging in the region[4]. These figures suggest promising prospect of moving up the energy use tier if energy becomes more easily, reliably and affordably accessible, especially with the decrease in price of some basic low-power appliances as well as increase in rural household income (a 38% increase in rural household income on average in Bangladesh between 2010-2016). This upward trend is supported by our survey findings which shows that a significant number of respondents want to further increase use for lighting, fans and phone charging as well as own televisions and refrigerators. When it comes to cooking, the households in our target location still largely rely on traditional wood burning stove that consumes lumber/ timber available in surrounding areas. Potential to introduce affordable and energy efficient cooking appliances in the future is also present.

Figure 1: SEA4All 5-Tier Energy Use Tracking Framework

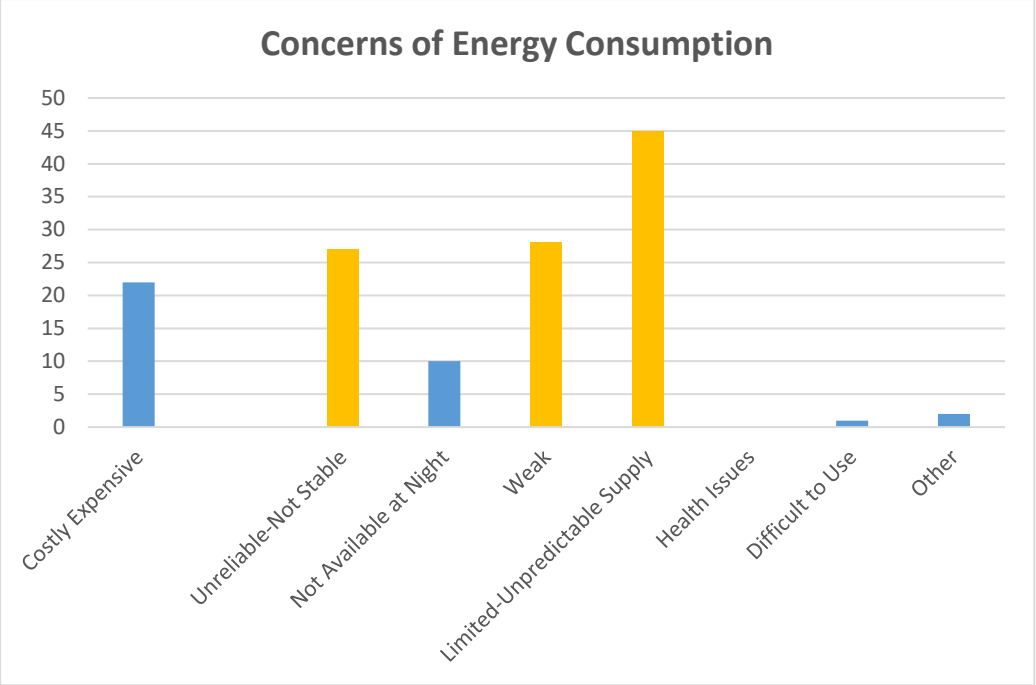
Tier	Definition
Tier 1	Task lighting and phone charging (or radio)
Tier 2	General lighting and television and fan (if needed)
Tier 3	Tier 2 and any low-power appliances
Tier 4	Tier 3 and any medium-power appliances
Tier 5	Tier 4 and high-power appliances

Source: The Energy+ Technical Working Group and the UN Sustainable Energy for All (2014)

At the moment, the top three most cited main concerns of energy consumption by our respondents(n=46) were: 1) Limited and unpredictable supply; 2) Weak power; and 3) Energy unreliable and not stable. Cost, on the other hand, was cited as one of the top three main concerns by about half of the households surveyed.

Figure 2: Top Energy Consumption Concerns of Target Users

[4] Bangladesh National Population and Housing Census 2011, Socio-Economic and Demographic Report, National Series, Volume 4



Our survey indicates that many households are willing to pay a bit more for access to reliable energy. The average amount that the sampled households were willing to pay per month for energy was about 450BDT (i.e. US$5.4), with the highest reported as 1500BDT (i.e. US$17.80) and the lowest as 50BDT (i.e. US$0.59, excluding 3 households that expressed they were not interest to connect and pay).

Competitive Landscape

Energy demand in Bangladesh has recorded double-digit growth in the past decade but energy generation capacity as well as consumption per capita is still among one of the lowest in the world, even when comparing to that of its neighbouring country India, Myanmar and Pakistan. The Bangladesh government has a strong drive to accelerate energy generation capacity, engage private sector partnership, and increase share of renewable energy sources to achieve its vision of electricity access for all by 2021. As a result, it is expected that market competition will become intense. Below are major competitor products of our proposed system in the target market.

The national grid, which is heavily subsidised (avg. tariff US$0.048/ kWh up to 400 kWh)[5] will be the strongest direct competitor if present. However, progress to connect existing households to the national grid is expected to be slow and not likely to be commonly available in the near future due to the landscape of the region mentioned above. Further, reliability of grid power supply is also frequently being cited by many users as a main

[5] Bangladesh Power Development Board (BPDB), 2017.

problem. It is reported that many households connected to the main grid suffer from unreliable electricity supply with power outages of up to 14 hours per day[6].

Solar home systems (SHSs) is another major competitor product. Penetration rate of SHSs has increased rapidly in the last decade largely due to the funding support from international organisations (e.g. World Bank), financing by government, flexible product choices and innovative payment options. It is estimated that by 2016 more than 4 million of SHSs were installed in urban and rural areas (from less than 100,000 in 2006), making Bangladesh the largest market for SHSs worldwide[7]. The whole Chittagong division accounts for about 20% of the total number of SHSs installed. Our survey showed that penetration of SHSs in our target areas was high following government's electrification project. Out of the 46 households in our sampled, only 2 had no SHS installed and close to a quarter had more than 1 SHS. Most of the owners of multiple SHS were running business activities. A few households obtained the SHS as a donation from the government.

In general, the cost of SHSs is still high for a lot of rural households. System size ranges from 10Wp to more than 100Wp. Based on the survey, the cost of SHS with the same system size may vary as a result of different payment methods chosen; a typical one-off payment for a 40Wp system and 100Wp is about US$100 and US$250, respectively. Consumers can pay by instalments but a down payment (normally from 10% to 35% depending on the length of repayment period and interest rate) is required before installation. Paying by instalments normally ends up with higher cost than one-off payment. Both options require customers to have some capital and/or stable income. Furthermore, customers are fully responsible for the repair and maintenance of their standalone system, including replacement of the battery that has a life span of 3 to 5 years and the controller lasting about 3 years. Two of the households, for example, already had the battery of their SHS damaged and not replaced. Supply of power is also not non-stop but mostly for 4 to 5 hours a day, depending on the system size.

Nonetheless, it is expected that cost of a SHS will continue to decrease due to increased competition, technological improvements and lower production costs. The solar panel costs have fallen over 50% in real term in the last 5 years. Providers are also actively introducing new product packages and different innovative payment models such as pay-as-you-go and fee-for services only to enable more flexible use. A few big players dominated the market: Grameen Shakti (GS) is the most prominent player accounting for over 50% of the market,

[6] World Bank (2017) Mini grids in Bangladesh: A Case of the Incipient Market.
[7] REN21 (2017). Renewables 2017 Global Status Report

and others bigger ones include Rural Services Foundation (RSF), BRAC and Srizony Bangladesh. Infrastructure Development Company Limited (IDCOL), the agency which oversees the SHS programme works with over 30 partners. Smaller players and new entrants need to identify a clear market niche to compete with the heavily subsidised IDCOL devices for new users, and to encourage switch/additional use of those who have already invested in SHSs.

Solar mini-grids. The practicality of solar mini-grids to connect remote and difficult to access rural areas is recognised by the government, resulting in rapid increase in the number of mini-grids. IDCOL has a programme of subsidising the development of solar mini-grids. It is reported that over 1000 potential sites have been identified and over 18 projects by 2017[8], with a target to install 50 mini-grids by 2018. Capacity of these mini-grids typically ranges from 100kWh to 250kWh; customers are charged between BDT29 and BDT32 per kWh. Under the subsidised programme, it is expected more providers are seeking to enter the market.

Other systems. Some NGOs have introduced different mini-grid options for remote villages in the CHT region. For example, a pico hydropower plant with a capacity of 10kWh has begun operation in August 2018, connecting 30 households in a village situated by the stream where the plant is located[9]. It has very low building costs of only around 0.18 million BTK (~US$2,150) and annual maintenance costs is estimated at about 2,700BTK (~US$30). Power generation capacity is limited but meets basic electricity need (<Tier 1) of poor households that do not afford to pay for extras. The NGO plans to install more of this system. The CHT Development Board's project proposal to the ministry also include similar pico hydropower plants to be establish in the Bandarban district.

Table 1 provides an overview of the competitive advantages of the existing power generation systems and our proposed system.

Table 1: Competitive advantages of the existing power generation systems and our proposed system

Power Generation System	Competitive Advantages	Status in Our Target Market

[8] http://idcol.org/home/solar_min

[9] https://www.downtoearth.org.in/news/world/tiny-hydropower-plant-lights-up-a-remote-hill-village-in-bangladesh-61444

National Grid	▪ Cheap	Not accessible in foreseeable future
Solar Home Systems	▪ Government Subsidies. ▪ Ownership and control of the system o Strong lock-in effect due to investment made. ▪ Flexible product packages and payment options	Spreading quickly
Solar mini-grid	▪ Reliable ▪ No down payment for equipment (connection charge to the grid may be required) ▪ Central repair and maintenance ▪ Scalable ▪ Power public/ community facilities	Emerging
Pico hydro power plant	▪ Cheap ▪ No down payment for equipment (but connection charge to the grid may be required) ▪ Central repair and maintenance	Emerging
Our proposed solar-hydraulic power generation mini-grid	▪ Reliable ▪ No down payment for equipment (but connection charge to the grid may be required) ▪ Central repair and maintenance ▪ Scalable ▪ Power public/ community facilities ▪ **24-hour readily access** ▪ **No costly battery replacement** ▪ **Can be integrated with an irrigation system**	Feasibility test

Value Proposition

Taking into account the attributes of our target market, customer segment and the competitive landscape, the value proposition is to enable a ***reliable, affordable and self-sustaining clean power generation solution*** that enhances readily access to energy for daily as well as productive activities.

- ***Reliable***: Electricity is readily accessible without interruption for both day, evening and night-time use, and regardless of weather conditions.
- ***Affordable***: A majority of the connected households can afford to consume electricity that suits their household budget.
- ***Self-sustaining*****:** Renewable and self-running power sources that require no manual input of raw materials and are low in maintenance need.
- ***Clean*****:** No pollutants and smoke hazardous to health and the surrounding environment are generated in producing and consuming the electricity.

It is in our hope that the proposed power generation system will significantly improve supply and access to electricity, and to enable and stimulate more uses to help advance the quality of life of our target users.

BUSINESS MODEL ASSESSMENT

Underpinning Model and Financing in the Pilot Phase

Three business models, namely government led, private sector led, and multi-stakeholder led are common for rural electrification projects. Considering Bangladesh's context, the SHS experience, our target market and the initial resource requirements of our proposed energy system, we seek to replicate the multi-stakeholder lead model in the first phase. This will involve securing government, international agency and/or donor funding, including grants or low-interest loans for the infrastructure development cost while seeking out private sector partners in building, running and maintaining the system. For example, IDCOL has a financing programme for the construction of solar mini-grids, with which 50% of the infrastructural production cost comes from grants. The supported institution is responsible for 20% direct investment and the remaining 30% is provided by IDCOL as soft loan at a low interest rate (6% per annum). However, the scheme places a restriction on the electricity tariff (e.g. must fall between BDT30 per kWh to BDT 32 per kWh in the first year). The major setback perhaps, is

the requirement to adhere strictly to the design of IDCOL, which may undermine or deviate from the original design of the system. Further, the primary focus of the programme is on solar mini-grids of larger capacity.

Other than government funding, obtaining the support of international agencies and donors (e.g. Asia Development Bank, World Bank, and national development agencies of countries) can be a more flexible option at least for the pilot phase. It is also possible to approach philanthropist organisations; business angels; and venture arms and foundations of companies that have an active presence in the country and the wider SE Asia region's development initiatives for support. More innovative financing options such as crowdfunding and joint project funding with liked mind institutions/ organisations/ companies can also be considered, in particular for the pilot phase that seeks to establish the technical viability as well as visibility of the system for further financing.

Marketing messages to these potential funders, whose interest generally lies in development outcomes and impact rather than economic returns, shall go beyond the emphasis of the system as merely a solution for energy supply but integrate with other major development benefits (e.g. energy-agriculture-job and wealth creation-clean water-education-health nexus) as a whole. For example, the extended benefits of the proposed system to improve irrigation, drinking water and public services (e.g. local clinics and community centres) can be articulated.

Return of Investment and Development Options

If we use the two tariffs (BDT 30 and BDT 32) and the estimated daily energy demand (38.85kWh) of the first selected site of 35 households for projection, the expected monthly return from the cluster may span from between *BDT27872 (US$330)* in the scenario of 80% daily consumption of the estimated demand at a tariff of BDT30 to *BDT44755 (US$530)* in the scenario of 120% of the projected daily demand at a tariff of BDT32 per kWh. However, the actual return depends on how much the household will consume and are willing to pay. Our survey indicates the average monthly amount that the households is willing to pay is around BDT450 (US$5.3). This may amount to only about BDT15750 (US$187) return from the 35-household community in reality. This suggests the tariff at the lower end (i.e. BDT30 kWh) may still be considered too high and return of investment will not be easily achieved in the short through medium term.

Accordingly, several development options will need to be considered in the business model, in order to enhance the commercial viability as well as sustainability of the system in the long run. Specifically, these options seek to ***reduce the cost*** on the one hand and ***increase the revenue*** (either through energy consumption or other revenue streams) on the other.

Cost reduction

- **Reduce fixed costs:** Existing experiences suggest the cost of capital is a fundamental factor in any mini-grid's success. The overall infrastructure (fixed) cost of the system needs to be brought down. Although it is expected that once installed the system can run for a long time (e.g. solar panel can last for 20 years), the initial investment still appears too high comparing to other available systems and not commercially viable for the target users/ communities when the size, energy demand and economic conditions are considered. Addressing the high fixed cost is particularly essential when there is little room to charge a higher tariff. Considering that the price of solar panels will continue to fall, focus can be placed on addressing the high cost of the water tank that accounts for a quarter of the overall fixed cost.
- **Increase capacity:** Alternatively, capacity of the current design needs to be increased to generate larger energy outputs. This allows reduction in fixed costs per unit of energy output and accommodation of higher energy demand of same number of households or larger number of households at the current consumption level.
- **Manage underuse:** Technically, it is necessary to ensure efficient switch between solar and hydraulic power upon changing conditions (e.g. when one fails or is not adequate) for reliable and seamless supply, which is the top concern of our users and a key competitive advantage of the proposed system. From a business point of view, one also needs to consider how excessive power generated (above the consumption level) can be stored and utilised to minimise costs incurred and/or revenues uncaptured due to underuse.
- **Local-based management, support and maintenance**: It is expected that the system will require minimum repair and maintenance and the tasks will not be complex. As such, it will be worthwhile to develop an essential check and maintenance kit for some common problems and train up a small team of local-community based people for on-the-ground management and maintenance. Major technical support and assistance to the community shall come from a local energy solution partner. This will reduce potential interruptions (e.g. downtime) due to

minor problems, ensure uninterrupted supply, reduce repair and maintenance costs, and increase sense of ownership of the system by the local community. The team could also serve as on-site promoter and adviser of use.

Revenue Generation

- **Appropriate Site Selection:** Site selection is crucial to the commercial sustainability of the system. The system shall target clustered households with diverse business activities and small-scale public facilities (e.g. clinics; trading centres; community places). Having a mix of users will optimise utilisation, efficiency and returns to enhance commercial sustainability. Specifically, households that have business activities tend to present higher capacity and willingness to pay for reliable and high-quality power. Assume that either fixed costs can be reduced or capacity can be increased, it shall focus on larger clusters of at least 100 households to realise higher and faster consumption growth and economy of scale to thin the high fixed costs. Considering the local conditions, a PAYG model using pre-installed meters is most workable and less resource demanding.
- **On-site Marketing:** Marketing needs to be done on-site face-to-face with individual influencers (e.g. community chiefs and local officials) as well as actual decision-makers in the target household at the grassroots. The local community-based team mentioned above can be well positioned to serve this purpose. Specifically, early consultation and involvement of these both influencers and decision-makers in the planning stage will help build trust and earn necessary support to the development.
- **Complementarity with SHSs:** Considering that a significant proportion of the target households have invested in SHSs, encouraging switch from SHSs to the proposed system can be difficult. Therefore, marketing shall focus on how the system can complement (rather than replace) current SHS and fill the quality and demand gaps that SHS cannot meet. Technically, ways to effectively connect and deploy the two systems in a household shall be developed to encourage connection and consumption while minimise waste and interruption.
- **Stimulate Consumption:** Partnerships with appliance manufacturers and suppliers to source and supply compatible energy efficient appliances that meet the budget and need of the target households will not only stimulate energy consumption but may also serve as another revenue stream. Our survey indicates particular strong wish for fans and refrigerators by the target households. The latter appliance requires higher and continuous power, thus, presents

a market that will be well-supported by the proposed system than SHSs. Another potential market is simple and affordable cooking appliances, which present health benefits that may be appealing to not only users but also development agencies. Flexible payment options for appliances may be introduced to improve affordability.

- **Licensing Opportunities:** Once technical as well as commercial viability is assessed and established, licensing of the whole system or by components of the innovative hybrid system can be considered. This option, however, will only be valid with patents in place.

Location: Uttar Para, Shuvolong, Barkal, Rangamati. (GPS: 22.714917, 92.267228)

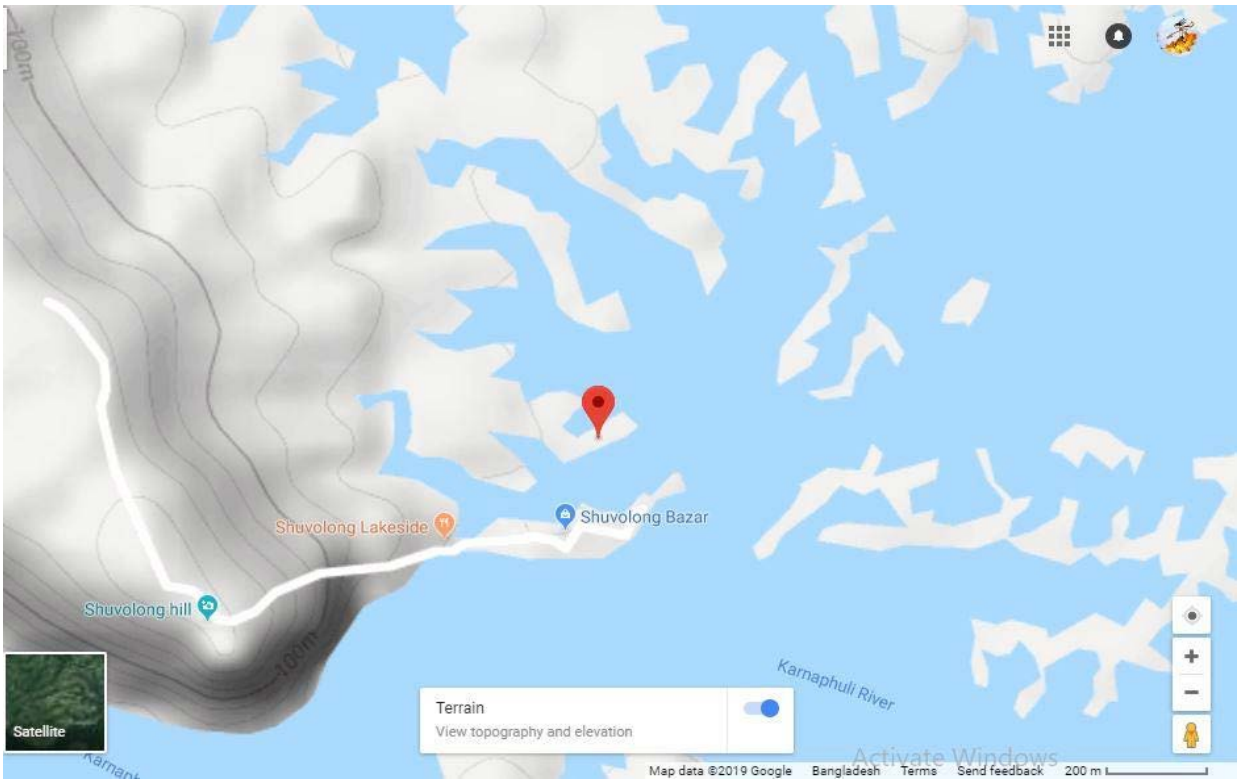


Figure 6:Uttar Para,Shuvolong Bazar, Rangamati

Figure 7:Uttar Para,Upper reserviour water tank site

Figure 8:Uttar Para Alternative,Upper reserviour water tank site

Figure 9: Uttar para,Shubolong,Rangamati

Location: Shuvolong Bazar, Barkal, Rangamati. (GPS: 22.713146, 92.26661)

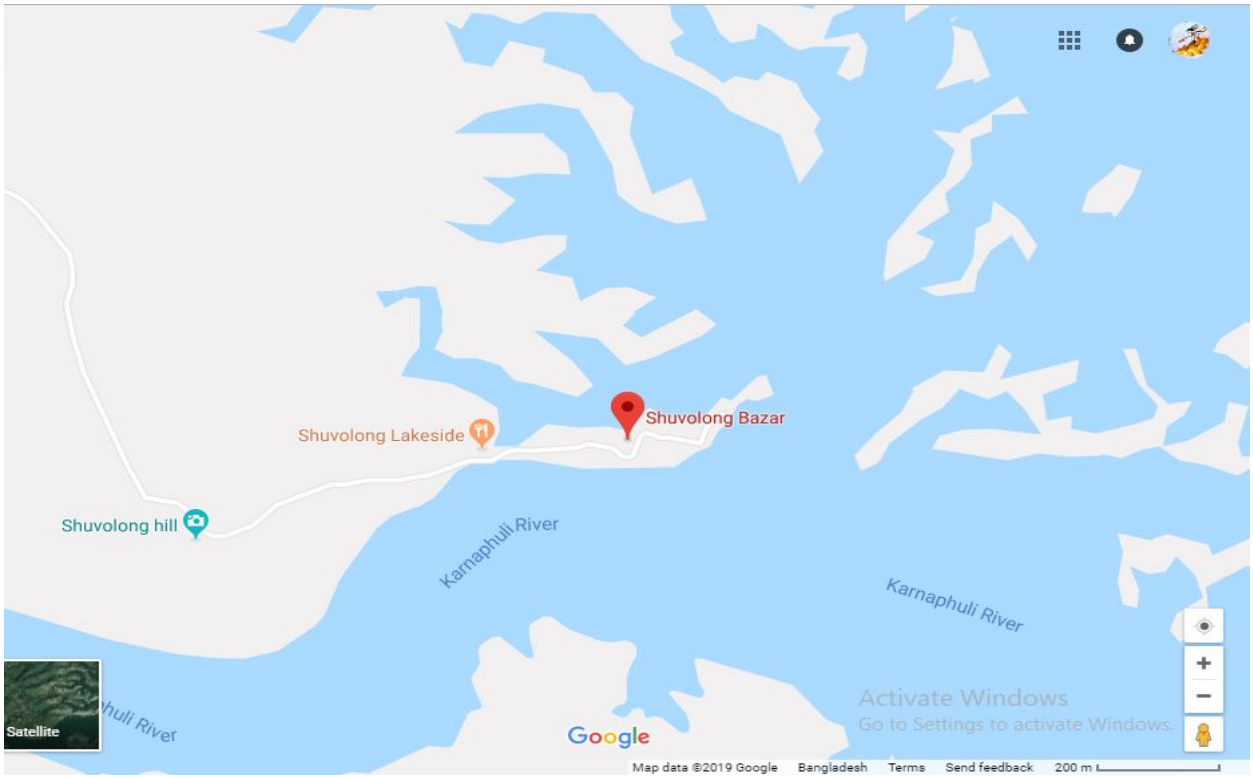


Figure 10:Shuvolong Bazar, Barkal, Rangamati. (Map View)

Figure 11:Shuvolong Bazar,Rangamati

Location: Mobachori, Banduk Bhanga (GPS: 22.711449, 92.184842)

Figure 12:: Mubachori, Banduk Bhanga, Rangamati. (Map View)

Figure 13:Mobachori,Upper reserviour water tank site

Location: Killapahar, Balukhali, Rangamati. (GPS: 22.628830, 92.23712)

Figure 14:Killapahr, Balukhali, Rangamati. (Map View)

Figure 15: Killa para Site View

Figure 16:Killa Para Upper reservoir Water tank site

Location- Narikel Para (GPS: 21.7906658, 92.4347085)

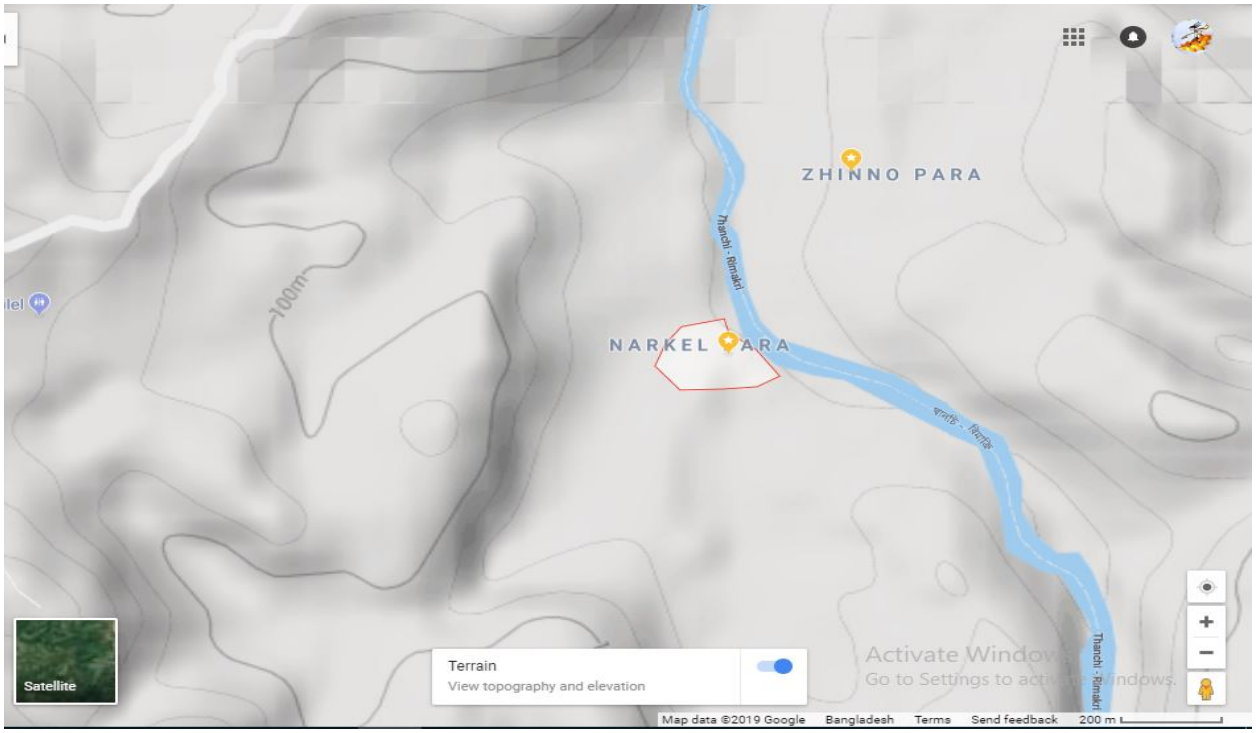


Figure 17:Narikal Para,Bandorban

Figure 18:Narikal Para upper reservior water tank site

Location- Zhinno Para (GPS: 21.7945878, 92.437088)

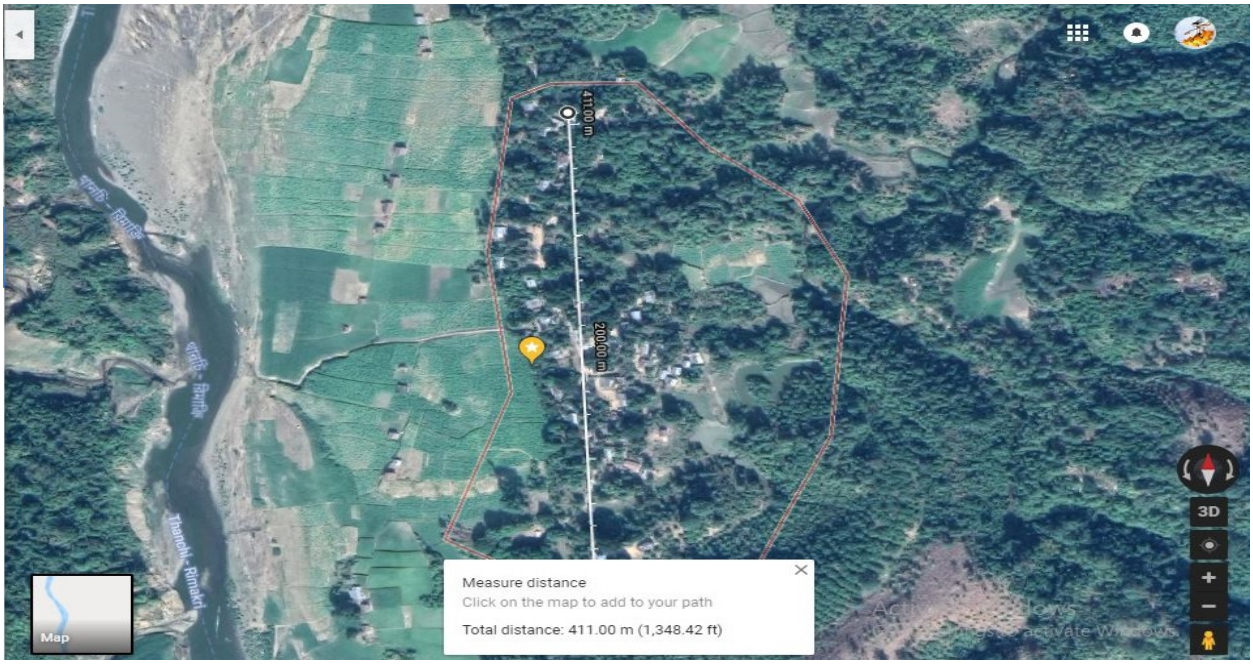


Figure 19:zinno para map view

Location- Naikhyang Para (GPS: 21.869567, 92.402072)

Figure 200:Naikhyang para map view

Figure 211:Proposed location installation water tank and solar panel

Figure 222:33m distance between lower water reservoir and upper reservoir

APPENDIX -A

Technical Data at Uttar para, Shuvolong ,Rangamati

Parameters	Value or Yes/No	Comments/ratings
No of households	35	
National grid presence	NO	
No of households access to SHS	30	
Anysite with elevation of >20 meter in vicinity of the selected village and the actual elevation	16m	
Flat area (Acre/ square meter) available on top of the hills for sloar panel, water reservoir and rain harvestings	96m^2	More area can be used for solar panel installation
Natural water source avilable or not	River	Distance from river to plant site is 27m
Place to bulid lower reservoir in the absence of natural water reservoir	Yes	
Distance between the village and plant site	Maximum linear distance of 150m	
Legal requirement to lease the land (Government/private)	Private	Permission from Bangladesh Army is required
Rate for using the whole land per year both for short term and long term	Not Available.	

Data Solar Home System at Uttar para, Shuvolong ,Rangamati

User	Load with consumption (W)				Solar panel ratings	Initial cost of installations (BDT)	Monthly payment (BDT)	Battery replacement frequency and cost
	Light	Fan	TV	Mobile Devices				
User1	4	1	0	1	60W	10,000	1600(1 year)	No replacement yet
User2	3	1	0	3	40W	10,000	0	No replacement yet
User3	6	3	0	4	100W+50 W	30,000+12,00 0	0+0	Not available
User4	3	1	0	3	20W+20W	15,000 +	0	No replacement yet

						15,000		(1 year)
User5	5	2	0	3	160W	9,6000	1100(1 year)	No replacement yet
User6	3	0	0	3	20W	3500	750 (1 year)	7 years
User7	4	1	1	1	20W	2000	500(5 years)	8 years
User8	4	1	0	3	30W	4000	540 (3 years)	No replacement yet (4-5 years)

Technical Data at Shuvolong Bazar Rangamati

Parameters	Value or Yes/No	Comments/ratings
No of households	244	Either shops or shops and household together.
National grid presence	No	
No of households access to SHS	180 (approx.)	
Anysite with elevation of >20 meter in vicinity of the selected village and the actual elevation	8m	Alternative site can be placed on top of Shuvolong Hill which has a elevation of 39m.
Flat area (Acre/ square meter) available on top of the hills for sloar panel, water reservoir and rain harvestings	Water Reservoir= 46m^2. Solar Panel=289m^2 (On Roof)	Alternate site might have more flat area.
Natural water source avilable or not	River	Distance from river to plant site is 44m.
Place to bulid lower reservoir in the absence of natural waterreservoir	No	Alternate site has.
Distance between the village and plant site	Within 300m radius	Alternate site might have 750m linear distance
Legal requirement to lease the land (Government/private)	Private	Bangladesh Army's permission required. Although the Market Committee will help to get the permission. Alternative site is needs to be leased from Bangladesh Army's authority.
Rate for using the whole land per year both for short term and long term	Advance BDT. 400000 and BDT. 4000 monthly rent.	For 46m^2

Data Solar home system at Shuvolong Bazar Rangamati

User	Load with consumption (W)				Solar panel ratings	Initial cost of installations (BDT)	Monthly payment	Battery replacement frequency and cost
	Light	Fan(T=Table Fan C=Ceiling Fan)	TV	Mobile Devices (S=Smart Phone F=Feature Phone)				
User 1	4	1	0	2	60W	25,000	0 (Paid one time to purchase	4-5 years

							SHS)	
User 2	15	2	2	12	130W+100 W+85W+85 W	44,000+23,0 00+14,000+ 14,000	0 (Paid one time to purchase SHS)	No replacement yet
User 3	6	3T	0	1S	80W+50W	45,000+600 0 (Only Panel)	0+0 (Paid one time to purchase SHS)	No replacement yet (2 years)
User 4	3	1T	0	2S	60W	22000	0 (Paid one time to purchase SHS)	No replacement yet
User 5	4	2T	0	3S+1F	60W+40W	25,000+110 00	0 (Paid one time to purchase SHS)	4-5 years
User 6	5	1T	1	1F	85W	500	2000 (Monthly instalment for 1.5 years)	No replacement yet
User 7	4	2T	0	1S	65W	10,000	800 (Monthly instalment for 3 years) + Gen Cost	No replacement yet (4-5 years)
User 8	5	2T	0	1F	50W	14,000	0 (Paid one time to purchase SHS)	No replacement yet
User 9	3	1	0	1	100W	0	3000 (Monthly instalment for 1.5 years)	No replacement yet
User 10	6	2T	0	1S+2F	60W	12,000	0 (Paid one time to purchase SHS)	No replacement yet

User 11	8	4T	1	4	130W+130 W	25,000+10,0 00	0+200(3 years) + 1500 (diesel cost for generator)	No replacement yet (5 years)
User 12	4	1C+1 T	1	1S+1F	130W	26,000	0 (Paid one time to purchase SHS)	No replacement yet (5 years)
User 13	20	5	1	10	130W	30,000+700 0+10,000	0 (Paid one time to purchase SHS) + 2500 (Diesel cost for generator.)	No replacement yet
User 14	4	2T	0	2S + 2F	65W+20W	7500+2500	900+300 (Monthly instalment for 3 years)	Not Available
User 15	2	2T	0	1F	20W+100W	1500 + 23,000	450 (Monthly instalment for 3 years) + 0	No replacement yet (5 years)

Technical Data at Mobachori,Rangamati

Parameters	Value or Yes/No	Comments/ratings
No of households	102	Bordona has 52 households and Tilokkapara has 50.
National grid presence	No	Locals from Tilokkapara informed that a bill has been passed to bring Banduk Bhanga on-grid. However, we did not find any valid reference.
No of households access to SHS	95	Alternative site has similar head.
Anysite with elevation of >20 meter in vicinity of the selected village and the actual elevation	8m	Alternative site with similar head
Flat area (Acre/ square meter) available on top of the hills for sloar panel, water reservoir and rain harvestings	162.5 m^2	Alternate site has 136 m^2
Natural water source avilable or not	River	Distance to site is 14m
Place to bulid lower reservoir in the absence of natural waterreservoir	No	The alternate site has place to built lower reservoir
Distance between the village and plant site	Within 600m radius.	
Legal requirement to lease the land (Government/private)	Private	May need some permission from Bangladesh Army, Government bodies but the land will be leased from the owner of the land. Owner will only let other parties to use the land only when the neighborhood unanimously decides.
Rate for using the whole land per year both for short term and long term	Approximately BDT. 12000 per year for 1618 m^2	

Data Solar home system at Mobachori,Rangamati

User	Load with consumption (W)				Solar panel ratings	Initial cost of installation (BDT)	Monthly payment (BDT)	Battery replacement frequency and cost
	Light	Fan (T=Table Fan C=Ceiling Fan)	TV	Mobile phone (S=Smart Phone F=Feature Phone)				

User1	3	0	0	1	30W	Donated by Govt.	Donated by Govt.	Did not replace yet. (Using for 3 years)
User 2	5	2T	0	4F	65W	10,000	960	Did not replace yet. (Using for 2 years)
User 3	8	3T+1C	1	3S	150W + 20W	33,000 + 20,000	0 + 0 (Paid one time to purchase SHS)	Did not replace yet (Using for 3 years.)
User 4	5	1	1	1	65	Not Available	1200	Did not replace yet. (Using 9-10 years)
User 5	5	1	1	3	75	25,000	0 (Paid one time to purchase SHS)	Did not replace yet.
User 6	6	2	1	2	85	15000	1070 (monthly instalment for 3 years)	Not Available
User 7	5	2T	1	1	100W+ 50W	20,000 + 10,000	0 + 700 (monthly instalment for 5 years)	12-13 years
User 8	4	2C	1	3F	Not Availabl e	8000	450 (monthly instalment for 5 years)	Not Available
User	5	1T	1	2S	63W	12,000	375 (monthly	Not

9							instalment for 3 years	Available
User 10	3	1T	0	0	50W	14,000	0 (Paid one time to purchase SHS)	Not Available

Technical Data at Killa para,Bhalukhali, Rangamati

Parameters	Value or Yes/No	Comments/ratings
No of households	52	
National grid presence	No	
No of households access to SHS	40	
Anysite with elevation of >20 meter in vicinity of the selected village and the actual elevation	10m	
Flat area (Acre/ square meter) available on top of the hills for sloar panel, water reservoir and rain harvestings	308m^2	
Natural water source avilable or not	River	Distance to site is 17m
Place to bulid lower reservoir in the absence of natural waterreservoir	No	
Distance between the village and plant site	Within 200m radius	
Legal requirement to lease the land (Government/private)	Private.	Bangladesh Army's permission required
Rate for using the whole land per year both for short term and long term	Not Available.	

Data solar Home System Killa para,Bhalukhali, Rangamati

User	Load with consumption (W)				Solar panel ratings	Initial cost of installations	Monthly payment	Battery replacement frequency and cost
	Light	Fan	TV	Mobile Devices				
User1	5	1	1	0	65	20,000	1500	No replacement yet. (8 years)
User2	14	4	2	6	65W+100W+85W	15,000+20,000+0	0+0+1500(3 years)	No replacement
User3	6	2	1	1	85W+200W	40,000+35,000	0 + 0	No replacement yet
User4	3	0	0	0	40W	7000	0	No replacement

								yet (1 year)
User5	4	1	1	2	50W+75W	35,000+ 28000	1100(3 years)+0	Not Available
User6	4	0	1	1	65W	26,000	0	Not Available
User7	5	0	0	2	Not available	Government donation	0	No replacement yet (1 years)
User8	6	1	0	0	85W	20,000	1000(3 years)	Not available

Technical Data at Narikal para,Thanchi,Bandorban

Parameters	Value or Yes/No	Comments/ratings
No of households	36	
National grid presence	No	
No of households access to SHS	2	6 SHS were installed but 4 of them does not work now
Anysite with elevation of >20 meter in vicinity of the selected village and the actual elevation	16.46m	The elevation of the neighbourhood is 191 feet where as the elevation of river is 137 feet. (From app)
Flat area (Acre/ square meter) available on top of the hills for sloar panel, water reservoir and rain harvestings	148.65 sqm (PV) + 400sqm (Water Tamk) + Space for installation of Turbine & Generator.	
Natural water source avilable or not	River	More than 25m range
Place to bulid lower reservoir in the absence of natural waterreservoir	NA	There is a river adjuscent to the neighberhood
Distance between the village and plant site	100m	The neighbourhood is end to end 180m
Legal requirement to lease the land (Government/private)	Private	May need some permission from Bangladesh Army, Government bodies but the land will be leased from the headman of the neighbourhood.
Rate for using the whole land per year both for short term and long term	30000 BDT	For 223 sqm area

Data solar home system at Narikal para,Thanchi,Bandorban

User	Load with consumption (W)				Solar panel ratings	Initial cost of installations	Monthly payment	Battery replacement frequency and cost
	Light	Fan	TV	….				
User1	2	1	0		30W	31000(BDT)	0	3 years

Technical Data at Zinno para

Parameters	Value or Yes/No	Comments/ratings
No of households	56	
National grid presence	No	
No of households access to SHS	40	Most of them damaged
Anysite with elevation of >20 meter in vicinity of the selected village and the actual elevation	18.90m	Alternative Site also available at 12.80m elevation.
Flat area (Acre/ square meter) available on top of the hills for sloar panel, water reservoir and rain harvestings		
Natural water source avilable or not	Yes(River)	More than 233m range
Place to bulid lower reservoir in the absence of natural waterreservoir	Yes	
Distance between the village and plant site	241m	
Legal requirement to lease the land (Government/private)	Private	May need some permission from Bangladesh Army, Government bodies but the land will be leased from the headman of the neighbourhood.
Rate for using the whole land per year both for short term and long term		Could not gather data as headman was not present at survey.

Data solar home system at Zinno para

User	Load with consumption (W)				Solar panel ratings	Initial cost of installations	Monthly payment	Battery replacement frequency and cost
	Light	Fan	TV	….				
User1	2	0	0		30W	21000(BDT)	0	1.5 years
User 2	6	0	0		120	27000(BDT)	0	2 years

Technical Data at Naikhyng para,Thanchi, Bandorban

Parameters	Value or Yes/No	Comments/ratings
No of households	71	
National grid presence	No	
No of households access to SHS	60	Some of therm are damaged
Anysite with elevation of >20 meter in vicinity of the selected village and the actual elevation	9m	Alternative site with 20.42m elevation (N.B. Height might get halved during moonsoon season)
Flat area (Acre/ square meter) available on top of the hills for sloar panel, water reservoir and rain harvestings	278.71sqm	
Natural water source avilable or not	Yes (River)	More than 150m range
Place to bulid lower reservoir in the absence of natural waterreservoir	Yes	
Distance between the village and plant site	160m	The neighbourhood is end to end 197m
Legal requirement to lease the land (Government/private)	Private	May need some permission from Bangladesh Army, Government bodies but the land will be leased from the headman of the neighbourhood.
Rate for using the whole land per year both for short term and long term	BDT 30000	2 Acres of land

Data solar Home System at Naikhyng para,Thanchi, Bandorban

User	Load with consumption (W)				Solar panel ratings	Initial cost of installations	Monthly payment	Battery replacement frequency and cost
	Light	Fan	TV	….				
User1	5	3	1			33000(BDT)	0	Did not replace yet
User 2	4	2	1		50W	33000(BDT)	0	Did not replace yet(Using for less than 1 year)

APPENDIX – B

User Energy Consumption at Uttar Para

Survey Number **01**

Site Location: **Uttar para, Shuvolong.**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **05**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
1		2	2			

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		✓ Wood & Timbers.		

Total Monthly household income (1Tk ~ US$0.012) **<Tk2100 (<US$25)** ❑ **Tk2100 – 4190 (25 – 50)** ❑

Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk12575 (>US$200) [Informed: BDT. 20,000]**	√

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑	**Storage**	❑
	Charging devices	√	**Farming or Fishing**	
	Heating/ Cooling	√	**(e.g. machine and tools**	❑
	Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1. None**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
4	1	1	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
6	2	2	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	√	Illumination, Cooling, Communication	8.21KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg

Natural gas ❑		
Hydro power ❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.) √		Not Available
Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
1	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
3	**Weak** (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify)

Survey Number **02**

Site Location: **Uttar para, Shuvolong.**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **12**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
6	1	4	1			

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		✓ Fishery Business		NGO job

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	Tk8386 – 12575 (100.1 – 150)	❑
Tk12585 - 16770 (US$150.1 – 200)	❑	>Tk12575 (>US$200) [Informed: 20,000]	√

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a one-time down payment fee BDT 30,000 and another BDT. 12,000 for 100W and 50W respectively to purchase and install it.**
Maximum monthly amount willing to pay for energy	**BDT. 800**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	**√**	**Entertainment**	**√**
	Cooking	**❑**	**Storage**	**❑**
	Charging devices	**√**	**Farming or Fishing (e.g. machine and tools)**	**❑**
	Heating/ Cooling	**√**		
	Commercial/ Business activities	**❑**		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (S=Smart Phone F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
6	3 (cannot use)	2S+2F	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
6	3	4	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity ❑		kWh

Solar power	√	Illumination, Communication	20.53 KWh
Kerosene	❑		litre
Liquefied petroleum gas	√		12 litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	❑		
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify)

Survey Number **03**

Site Location: **Uttar Para, Shuvolong.**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **7**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
2	4		1			

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
	✓			NGO job

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	❑
Tk4200 – 8385 (US$50.1 – 100)	✓	Tk8386 – 12575 (100.1 – 150)	❑
Tk12585 - 16770 (US$150.1 – 200)	❑	>Tk12575 (>US$200)	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a one-time down payment fee of BDT 10,000 for a 40W SHS to purchase and install it.**
Maximum monthly amount willing to pay for energy	**BDT. 200 - 300**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
		Storage	❑
Cooking	❑	**Farming or Fishing**	
Charging devices	✓	**(e.g. machine and tools)**	❑
Heating/ Cooling	✓		
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
3	1	3	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
5	2	3	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Cooling, Communication	5.48 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg

Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking.	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
	Unreliable/ Not stable (frequent power cut and interruption)
3	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify)

Survey Number **04**

Site Location: **Uttar Para, Shuvolong.**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **6**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
2	2		1	1		

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
	✓			

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	✓
Tk4200 – 8385 (US$50.1 – 100)	❑	Tk8386 – 12575 (100.1 – 150)	❑
Tk12585 - 16770 (US$150.1 – 200)	❑	>Tk12575 (>US$200)	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee BDT 9600 with a monthly instalment of BDT 1100 for 1 year to purchase and install a 160W SHS.**
Maximum monthly amount willing to pay for energy	**BDT. 200-300**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
Cooking	❑	**Storage**	✓
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	✓		
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
5	2	3	0	0	1	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
5	4	3	1	0	0	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Cooling, Storage, Entertainment, Communication	21.9 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg

Natural gas ❑		
Hydro power ❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.) ✓	Cooking.	Not Available
Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
	Unreliable/ Not stable (frequent power cut and interruption)
	Not available at night time
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify)

Survey Number **05**

Site Location: **Uttar Para, Shuvolong.**

Researcher: **Sayeef Asrar & Ziadul Islam**

Note:

- User uses 2 hours of light in daytime for 5 hours.
- Uses 3 lights for whole night.
- 2 fans are used for 24 hours during summer.

A. Profile of Households in Target Site

Household Size (Person) **7**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
		5		**1**		**1**	

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
				✓ **Carpenter**	

Total Monthly household income (1Tk ~ US$0.012) **<Tk2100 (<US$25** ❑ **Tk2100 – 4190 (25 – 50)** ❑

Tk4200 – 8385	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
(US$50.1 – 100)			
Tk12585 - 16770		**>Tk16770 (>US$200)**	✓
(US$150.1 – 200)	❑	**[Informed: BDT. 40,000]**	

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a one-time down payment fee BDT 15,000 to purchase and install a 40W SHS..**
Maximum monthly amount willing to pay for energy	**BDT. 500**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing**	
Heating/ Cooling	✓	**(e.g. machine and tools)**	❑
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to	**1.**

increase spending, if necessary.	

Number of household electrical devices currently owned (Fill in number)

Lights	Fan (T= Table Fan)	Mobile phones (S=Smart Phone F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
3	1	2F+1S	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan (C= Ceiling Load)	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
5	3C	5	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity ❑		kWh
Solar power ✓	Illumination, Cooling, Entertainment, Communication.	5.48 KWh

Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking.	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
	Unreliable/ Not stable (frequent power cut and interruption)
3	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify)

Survey Number **06**

Site Location: **Uttar Para, Shuvolong.**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **4**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
2		2				

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
			✓ Tea Stall (Server)	

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	Tk8386 – 12575 (100.1 – 150) [Informed: BDT. 10,000]	✓
Tk12585 - 16770 (US$150.1 – 200)		>Tk12575 (>US$200)	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee BDT 2000 with a monthly instalment of BDT 500 for 5 years to purchase and install a 20W SHS.**
Maximum monthly amount willing to pay for energy	**BDT. 200 -300**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing**	
Heating/ Cooling	✓	**(e.g. machine and tools)**	❑
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan (T=Table Fan)	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
4	1T	1	1	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan (C=Ceiling Fan)	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
4	2C	2	1	0	0	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Cooling, Communication, Entertainment.	2.73 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre

Candle ❑		Kg
Natural gas ❑		
Hydro power ❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.) ✓	Cooking.	Not Available
Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

2	**Costly/ Expensive**
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
	Weak (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **07**

Site Location: **Uttar para**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **5**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
2	3					

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		✓ Wood & Timber		

Total <u>Monthly</u> household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	**Tk2100 – 4190 (25 – 50)**	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk16770 (>US$200) [Informed: BDT. 40,000]**	✓

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee of BDT. 10,000 with a monthly instalment of BDT. 1000 for 1 year to purchase and install a 120W SHS.**
Maximum monthly amount willing to pay for energy	**BDT. 200 -300**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing**	
Heating/ Cooling	✓	**(e.g. machine and tools)**	✓
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1. None**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
4	2	3	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what?)
6	3	4	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Cooling, Communication.	16.42 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg

Natural gas ❑		
Hydro power ❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.) ✓	Cooking.	Not Available
Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

2	**Costly/ Expensive**
	Unreliable/ Not stable (frequent power cut and interruption)
3	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify)

Survey Number **08**

Site Location: **Uttar Para, Shuvolong.**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **6**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
1	1	2		2		

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
	✓			

Total <u>Monthly</u> household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	Tk8386 – 12575 (100.1 – 150)	❑
Tk12585 - 16770 (US$150.1 – 200) [Informed: BDT. 15,000]	✓	>Tk12575 (>US$200)	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**Not Available.**
Maximum monthly amount willing to pay for energy	**BDT. 200 -300**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	❑		
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
4	0	1	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
4	3	2	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Communication.	6.84 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg

Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking.	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
1	**Unreliable/ Not stable** (frequent power cut and interruption)
2	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
3	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify)

Survey Number **09**

Site Location: **Uttar Para, Shuvolong.**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **8**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
3	4		1			

Sources of Income

Farming (tick)	Fishing (tick)	Househd business (What?)	Employed labour (tick)	Others (What?)
			✓ Carpenter	

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	Tk8386 – 12575 (100.1 – 150)	✓
Tk12585 - 16770 (US$150.1 – 200)	❑	>Tk12575 (>US$200)	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee BDT 10,000 with a monthly instalment of BDT 800 for 3 year to purchase and install a 50W SHS.**
Maximum monthly amount willing to pay for energy	**BDT 200 -300**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	✓		
Commercial/ Business activities	❑		

Other Household uses (What?)	**None**
Other Productive activities (What?)	**None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
4	1	2	1	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
6	4	3	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity ❑		kWh
Solar power ✓	**Illumination, Cooling, Communication, Entertainment.**	6.84 KWh

Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
	Unreliable/ Not stable (frequent power cut and interruption)
3	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **10**

Site Location: **Uttar Para, Shuvolong.**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **6**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
2	2		2			

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
	✓		✓ Carpenter	

Total <u>Monthly</u> household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	**Tk2100 – 4190 (25 – 50)**	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
Tk12585 - 16770 (US$150.1 – 200)	✓	**>Tk12575 (>US$200)**	❑

[Informed: 15,000]

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee BDT 3500 with a monthly instalment of BDT 750 for 3 year to purchase and install a 20W SHS.**
Maximum monthly amount willing to pay for energy	**BDT. 200 -300**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	❑		
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
3	0	3	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
7	4	4	1	0	1	Submersible Pump

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Communication	2.73 KWh
Kerosene	❑		litre

Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
	Unreliable/ Not stable (frequent power cut and interruption)
3	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **11**

Site Location: **Uttar Para, Shuvolong.**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **6**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
2	1	2				1

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
	✓			

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	Tk8386 – 12575 (100.1 – 150) [Informed: BDT. 10,000]	✓
Tk12585 - 16770 (US$150.1 – 200)	❑	>Tk12575 (>US$200)	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee BDT 4000 with a monthly instalment of BDT 540 for 3 years to purchase and install a 30W SHS.**
Maximum monthly amount willing to pay for energy	**BDT. 300**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	✓		
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
4	1	3	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
6	2	0	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Cooling, Communication	4.10 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg

Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
2	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
3	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

User Energy Consumption at Shuvolong, Rangamati

Survey Number **01&02**

Site Location: **Shuvolong Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop & Household

Opens: **7:00 a.m.**

Closing: **8:00 p.m.**

A. Profile of Households in Target Site

Shop Size (Person) **6**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
2		2	2			

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		√ (Telecom & Pharmacy)		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk16770 (>US$200) [Actual: BDT 30,000]**	√

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment of BDT. 44,000 for a 130W, 23,000 for a 100W and another BDT. 14,000 for two 85W SHS to purchase and install.**
Maximum monthly amount willing to pay for energy	**BDT. 1500**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑	**Storage**	❑
	Charging devices	√	**Farming or Fishing**	
	Heating/ Cooling	√	**(e.g. machine and tools)**	❑
	Commercial/ Business activities	√		

Other Household uses (What?) None

Other Productive activities (What?) 2 Computers

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.** None

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
15	2	12	2	0	0	2 Computers

Household electrical devices WANT/ PLAN to own

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
25	3	12	3	0	1	4 Computers CC Camera

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
Generator	None

Energy sources used? (Tick)	Main uses	Approximate Monthly

	(e.g. cooking; illumination, commercial, etc.)	**Consumption**
Electricity ❑		kWh
Solar power √	Illumination, Cooling, Entertainment, Commercial	54.74 KWh
Kerosene ❑		litre
Liquefied petroleum gas ❑		litre
Candle ❑		Kg
Natural gas ❑		
Hydro power ❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	Cooking	Not Available
Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
	Unreliable/ Not stable (frequent power cut and interruption)
3	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **03**

Site Location: **Shuvolong Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop & Household

General Remarks:

- In daytime, 3 lights are used.
- 6 lights are used in night.
- Fan is used for more than 20 hours during summer.
- Fan is not used at all during winter.

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **1**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
				1		

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		✓ Grocery Store		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk16770 (>US$200) [Actual: 20,000- 25,000]**	√

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment of BDT. 45,000 for a 80W and another BDT. 6000 for a 50W SHS to purchase and install it.**
Maximum monthly amount willing to pay for energy	**BDT. 1000 -1500**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑	**Storage**	❑
	Charging devices	√	**Farming or Fishing**	

(e.g. machine and tools) ❑

Heating/ Cooling √

Commercial/ Business activities √

Other Household uses (What?) **Not Available**
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.** Not Available **2.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan (T=Table Fan)	Mobile phones (S= Smart Phone)	TV	Radio	Refrigerator	Others (Specify what)
6	3T	1S	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
6	1	1S	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)

Energy sources used? (Tick)		**Main uses** **(e.g. cooking; illumination, commercial, etc.)**	**Approximate Monthly Consumption**
Electricity	❑		kWh
Solar power	√	Illumination, Cooling, Communication, Commercial	17.79 **K**Wh
Kerosene	❑		litre
Liquefied petroleum gas	√		13 litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	❑		
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **04**

Site Location: **Shuvolong Bazar.**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop & Household

Opens: **5:30 a.m.**

Closing: **9:00 p.m.**

General Remarks:

- In daytime, no lights are used.
- 2 lights are used from evening to 10:00 p.m.
- 1 light is used from midnight to dawn.
- Fan is used whole day during summer.
- Fan is not used at all during winter.
- Users 60W SHS got damaged after 4-5 years.

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **4**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
1		3				

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		✓ Grocery &		

		Workshop		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk16770 (>US$200) [Informed: 30,000-40,000]**	√

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly) — **User uses own solar home system. User paid a down payment of BDT. 25,000 for a 60W and another BDT. 11,000 for a 40W SHS to purchase and install it.**

Maximum monthly amount willing to pay for energy — **BDT. 1000**

Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending — **0 %**

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑	**Storage**	❑
	Charging devices	√	**Farming or Fishing**	
	Heating/ Cooling	√	**(e.g. machine and tools)**	❑

Commercial/ Business activities √

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1. None**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (S=Smart Phone F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
4	2	3S+1F	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones (S=Smart Phone F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
4	2	3S+1F	0	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption

Electricity	❑		kWh
Solar power	√	Illumination, Cooling, Communication, Entertainment, Commercial	5.475KWh
Kerosene	❑		litre
Liquefied petroleum gas	√		12 litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)			
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **05**

Site Location: **Shuvolong Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop & Household

Opens: **6:00 a.m.**

Closing: **6:00 p.m.**

General Remarks:

- In daytime, no lights are used.
- 2 lights are used from evening to dawn.
-

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **2**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
	1		**1**				

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
			√ Clothing Store		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk16770 (>US$200) [Informed: BDT. 40,000]**	√

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee of BDT 500 and monthly instalment of BDT 2000 for 1.5 years to purchase and install a 85W SHS.**
Maximum monthly amount willing to pay for energy	**BDT. 500**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑	**Storage**	❑
	Charging devices	√	**Farming or Fishing**	
	Heating/ Cooling	√	**(e.g. machine and tools)**	❑
	Commercial/ Business activities			

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.** None

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
5	1	1F	1	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
8	2	2	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption

Electricity	❑		kWh
Solar power	√	Illumination, Cooling, Entertainment, Communication, Commercial	11.63KWh
Kerosene	❑		litre
Liquefied petroleum gas	√		6 litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)			
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
	Unreliable/ Not stable (frequent power cut and interruption)
	Not available at night time
	Weak (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **06**

Site Location: **Shuvolong, Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop & Household

Opens: **6:00 a.m.**

Closing: **6:00 p.m.**

General Remarks:

- In daytime, **no lights** are used.
- **4 lights** are used from evening to **10:00 p.m.**.
- **1fan** is used whole day during **summer.**
- Fan is not used at all during winter.
- Refrigerator used by user runs on generator.

A. Profile of Households in Target Site

Household Size (Person) **4**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
	1			**2**			**1**

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
			√ Grocery Store		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200) [Informed: BDT. 15,000- 20,000]	√	**>Tk12575 (>US$200)**	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee of BDT 10,000 and monthly instalment of BDT 800 for 3 years to purchase and install a 65W SHS.**
Maximum monthly amount willing to pay for energy	**BDT. 200**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑	**Storage**	❑
	Charging devices	√	**Farming or Fishing**	
	Heating/ Cooling	√	**(e.g. machine and tools)**	❑
	Commercial/ Business activities	√		

Other Household uses (What?)	**Generator, Refrigerator.**
Other Productive activities (What?)	**None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**1. None**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan (T= Table Fan)	Mobile phones (S= Smart Phone)	TV	Radio	Refrigerator	Other (Specify what)
4	2T	1S	0	0	1	Generator

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan (T= Table Fan)	Mobile phones (S= Smart Phone)	TV	Radio	Refrigerator	
8	2C+2T	1S	0	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
Refrigerator	

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity ❑		kWh

Solar power	√	Illumination, Cooling, Communication, Entertainment, Commercial	8.9 KWh
Kerosene	❑		litre
Liquefied petroleum gas	√	Cooking	4 litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	❑		
Others (specify): Generator	√	Generator	Not Available

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
2	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **07**

Site Location: **Shuvolong Bazar.**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop & Household

Opens: **6:00 a.m.**

Closing: **7:00 p.m.**

General Remarks:

- In daytime, **no lights** are used.
- **Lights** are used only for 2-3 hours daily.
- **Fan** is used for 16 hours during summer.
- **Fan** is not used at all during winter.

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **5**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
2	1	2				

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		√ Restaurant		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 – 16770 (US$150.1 – 200)	√	**>Tk16770 (>US$200)**	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment of BDT. 14,000 for a 50W SHS to purchase and install it.**
Maximum monthly amount willing to pay for energy	**BDT. 500**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑	**Storage**	❑
	Charging devices	√	**Farming or Fishing**	
	Heating/ Cooling		**(e.g. machine and tools)**	❑
	Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1. None** **2.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	
5	2	1	0	0	1	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what?)
6	3	1S+1F	1	0	1	1 Laptop

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity ❑		kWh

Solar power	√	**Illumination, Cooling, Communication, Commercial**	6.84 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)			Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
1	**Weak** (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **08**

Site Location: **Shuvolong, Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop & Household

Opens: **8:00 a.m.**

Closing: **5:00 p.m.**

General Remarks:

- In daytime, **3 lights** are used.
- **Lights** are used only for 2-3 hours daily.
- **Fan** is used for whole during summer.
- **Not interested to connected to the project.** Solar serves his purpose.

Fan is not used at all during winter.

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **1**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
					1		

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Househd business (What?)**	**Employed labour (tick)**	**Others (What?)**
			✓ **Hardware Store**		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	√	**>Tk12575 (>US$200)**	❑
	[Informed: 15,000]			

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee of BDT 1000 and monthly instalment of BDT 3000 for 1.5 years to purchase and install a 100W SHS.**
Maximum monthly amount willing to pay for energy	**0 (Not interested for connection)**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	**√**	**Entertainment**	**√**
	Cooking	❑	**Storage**	❑
	Charging devices	**√**	**Farming or Fishing**	
	Heating/ Cooling	**√**	**(e.g. machine and tools)**	❑
	Commercial/ Business activities	√		

Other Household uses (What?) None

	Other Productive activities (What?) **None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.** None **2.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	
3	**1**	**1**	**0**	**0**	**0**	

Household electrical devices WANT/ PLAN to own (Tick)

	Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	1 laptop
	3	**1**	**1**	**0**	**0**	**0**	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	**None**

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption

Electricity	❑		kWh
Solar power	√	**Illumination, Cooling commercial**	13.68 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)			Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
1	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
3	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **09**

Site Location: **Shuvolong, Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: 2 Shops combined

Opens: **7:00 a.m.**

Closing: **8:00 p.m.**

General Remarks:

- In daytime, **no lights** are used.
- **Fan** is used 4-6 hours during **summer.**
- Fan is not used at all during winter.
- User owns a generator.

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **2**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
		1	1			

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		✓ Workshop &		

		Hardware		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk16770 (>US$200) [Informed: 20,000-30,000]**	√

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment of BDT. 12,000 for a SHS to purchase and install it.**
Maximum monthly amount willing to pay for energy	**BDT. 400**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑	**Storage**	❑
	Charging devices	√	**Farming or Fishing**	
	Heating/ Cooling		**(e.g. machine and tools)**	❑
	Commercial/ Business activities	√		

Other Household uses (What?) None

Other Productive activities (What?) **None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what) Power drilling, grinding machine , welding machine, Generator
6	2	3	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

	Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	
	10	2	3	1	0	0	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination,	Approximate Monthly Consumption

		commercial, etc.)	
Electricity	❑		kWh
Solar power	√	**Illumination, Cooling, Communication,commercial**	8.21 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	√		Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **10**

Site Location: **Shuvolong Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop & Household

Opens: **8:00 a.m.**

Closing: **10:00 p.m.**

General Remarks:

- In daytime, **no lights** are used.
- **7 Lights** are used after evening.
- **3 Fans** are used for whole day during summer.
- **Fan** is not used at all during winter.
- Owns a generator.
- No replacement of Battery of SHS in 5 years.

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **3**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
		3				

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		√ Mobile Servicing		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200) [Informed: 15,000]	√	**>Tk12575 (>US$200)**	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee of BDT 25,000 for 130W SHS and paid another down payment fee of BDT 10,000 with a monthly instalment of BDT 200 for 3 years to purchase and install a130W SHS.**
Maximum monthly amount willing to pay for energy	**BDT. 1000, Diesel cost BDT. 1500**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑	**Storage**	❑
	Charging devices	√	**Farming or Fishing**	
	Heating/ Cooling	√	**(e.g. machine and tools)**	❑
	Commercial/ Business activities	√		

Other Household uses (What?)	None
Other Productive activities (What?)	**None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.** None **2.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	Others(Specify what)
8	4	4	1	0	0	3 laptop. sound box, Hot Glue Gun

Household electrical devices WANT/ PLAN to own (Tick)

	Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	
	15	7	4	1	0	0	Increasing the amount of other devices.

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination,	Approximate Monthly Consumption

		commercial, etc.)	
Electricity	❑		kWh
Solar power	▯	**Illumination, Cooling, Entertainment, Ccommercial**	35.58KWh
Kerosene	❑		litre
Liquefied petroleum gas	▯		12 litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)			Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **11**

Site Location: **Shuvolong, Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop & Household

Opens: **8:00 a.m.**

Closing: **8:00 p.m.**

General Remarks:

- **1 Light** is used whole day daily.
- **2 Lights** are used for whole night.
- **2 Fan** is used for whole day during summer.
- **Fan** is not used at all during winter.

A. Profile of Households in Target Site

Household Size (Person) **04**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
2			2			

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		√Pharmacy		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100) [Informed: 8000]	√	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk12575 (>US$200)**	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment of BDT. 26,000 for a 1300W SHS to purchase and install it.**
Maximum monthly amount willing to pay for energy	**0 (Not interested to pay)**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	**√**	**Entertainment**	**√**

Cooking	❑	**Storage**	❑
Charging devices	√	**Farming or Fishing**	
Heating/ Cooling	√	**(e.g. machine and tools)**	❑
Commercial/ Business activities	√		

Other Household uses (What?) None
Other Productive activities (What?) **None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.** None **2.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	
4	2	2	1	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

	Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	

	4	**2**	**2**	**1**	**0**	**0**	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	**Want/ Plan to own (What?)**
None	**None**

Energy sources used? (Tick)		**Main uses** **(e.g. cooking; illumination, commercial, etc.)**	**Approximate Monthly Consumption**
Electricity	❑		kWh
Solar power	√	**Illumination, Communication, cooing, Commercial**	17.79 KWh
Kerosene	❑		litre
Liquefied petroleum gas	√		6 litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)			Not Available

Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

2	**Costly/ Expensive**
	Unreliable/ Not stable (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **12**

Site Location: **Shuvolong, Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop.

Opens: **5:00 a.m.**

Closing: **10:00 p.m.**

General Remarks:

- In daytime, **no lights** are used.
- **Fan** is used for whole during summer.
- **Fan** is not used at all during winter.
- User spends **BDT.2000-2500** for the fuel of **generator**

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **8**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
	7				**1**	

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		√ Restaurant		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk12575 (>US$200) [Informed: 50,000]**	√

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment of BDT. 30,000 for a 80W, BDT. 7000 for a 20W SHS and another BDT. 10,000 for a 30W SHS to purchase and install it. User spends BDT.2000-2500 for the fuel of generator.**
Maximum monthly amount willing to pay for energy	**BDT. 1100**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑		
	Charging devices	√	**Storage**	❑
	Heating/ Cooling	√	**Farming or Fishing (e.g. machine and tools)**	❑
	Commercial/ Business activities	❑		

Other Household uses (What?)	Not Available
Other Productive activities (What?) **None**	

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	
20	5	10	1	0	1	Generator

Household electrical devices WANT/ PLAN to own (Tick)

	Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	
	25	7	10	1	0	1NF + 1DF	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	**Want/ Plan to own (What?)**
None	**None**

Energy sources used? (Tick)		**Main uses** **(e.g. cooking; illumination, commercial, etc.)**	**Approximate Monthly Consumption**
Electricity	❑		kWh
Solar power	√	**Illumination, commercial**	17.79 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	√		Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **13**

Site Location: **Shuvolong, Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop & Household

A. Profile of Households in Target Site

Household Size (Person) **5**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
1	2	2				

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		√ Mobile Recharge & Watch Store		

Total Monthly household income (1Tk ~ US$0.012) **<Tk2100 (<US$25)** ❑ **Tk2100 – 4190 (25 – 50)** ❑

Tk4200 – 8385	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
(US$50.1 – 100)			
Tk12585 - 16770	√	**>Tk12575 (>US$200)**	❑
(US$150.1 – 200)			
[Informed: 15,000]			

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment of BDT. 7500 and monthly instalment of BDT 900 for 3 years for a 65W as well as another BDT. 2500 down payment and monthly instalment of BDT 300 for 3 years for a 20W SHS to purchase and install it.**
Maximum monthly amount willing to pay for energy	**BDT. 500**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	√	**Entertainment**	√	
	Cooking	❑	**Storage**	❑	
	Charging devices	√	**Farming or Fishing**		
	Heating/ Cooling	√	**(e.g. machine and tools)**	❑	
	Commercial/ Business activities	❑			

Other Household uses (What?) Not Available

Other Productive activities (What?)
None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.** Not Available **2.**

Number of household electrical devices currently owned (Fill in number)

Lights	**Fan**	**Mobile phones** **(F= Feature Phone)**	**TV**	**Radio**	**Refrigerator**	
4	**2**	**4**	**0**	**0**	**0**	

Household electrical devices WANT/ PLAN to own (Tick)

	Lights	**Fan**	**Mobile phones** **(F= Feature Phone)**	**TV**	**Radio**	**Refrigerator**	
	4	**2**	**4**	**0**	**0**	**0**	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	**Want/ Plan to own (What?)**
None	**None**

Energy sources used? (Tick)	**Main uses** **(e.g. cooking; illumination,**	**Approximate Monthly Consumption**

		commercial, etc.)	
Electricity	❑		kWh
Solar power	√	**Illumination, commercial**	11.63 KWh
Kerosene	❑		litre
Liquefied petroleum gas	√		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)			Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **14**

Site Location: **Shuvolong Bazar.**

Researcher: **Sayeef Asrar & Ziadul Islam**

Category: Shop.

Opens 6:00 a.m.

Closing 8:00 p.m.

General Remarks:

- In daytime, no lights and fans are used.
- Lights are only used after evening.
- Fan is used whole day during summer.
- Fan is not used at all during winter.

C. <u>Profile of Households in Target Site</u>

Household Size (Person) **2**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
	1				**1**		

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
			√ Grocery Store		

Total <u>Monthly</u> household **<Tk2100 (<US$25)** ❑ **Tk2100 – 4190 (25 – 50)** ❑

income (1Tk ~ US$0.012)

Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk16770 (>US$200) [Actual: 30,000-35,000]**	√

D. Energy Consumption Information

Actual TOTAL spending on energy (monthly)

User uses own solar home system. User paid a down payment of BDT. 7000 for a 20W and another BDT. 15,000 for a 40W SHS to purchase and install it.

Maximum monthly amount willing to pay for energy

BDT. 300-400

Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending

0 %

Current main uses of energy	**Illumination**	√	**Entertainment**	√
	Cooking	❑		
	Charging devices	√	**Storage**	❑
	Heating/ Cooling	√	**Farming or Fishing (e.g. machine and tools)**	❑
	Commercial/ Business activities	√		

Other Household uses (What?)	**Not Available**

Other Productive activities (What?)	**None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**None**

Number of household electrical devices currently owned (Fill in number)

Lights	**Fan (T= Table Fan)**	**Mobile phones (S= Smart Phone)**	**TV**	**Radio**	**Refrigerator**	**Others (Specify what)**
3	**1T**	**2S**	**0**	**0**	**0**	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	**Fan (C= Ceiling Fan)**	**Mobile phones (S= Smart Phone)**	**TV**	**Radio**	**Refrigerator**	**Others (Specify what)**
5	**2C**	**2S**	**1**	**0**	**1**	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	**Want/ Plan to own (What?)**

Energy sources used? (Tick)	**Main uses (e.g. cooking; illumination, commercial, etc.)**	**Approximate Monthly Consumption**
Electricity ❑		kWh

Solar power	√	Illumination, commercial	8.21 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	√	Cooking	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
2	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
3	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

Survey Number **15**

Site Location: **Shuvolong, Bazar**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. <u>Profile of Households in Target Site</u>

Household (shope)Size (Person) **1**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
				1			

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Househd business (What?)**	**Employed labour (tick)**	**Others (What?)**
			✓ **Black Smith**		

Total <u>Monthly</u> household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770	❑	**>Tk16770 (>US$200)**	√

(US$150.1 – 200) **[Informed: 20,000]**

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment of BDT. 1500 and monthly instalment of BDT 450 for 3 years for a 20W as well as another BDT. 23000 down payment for a 100W SHS to purchase and install it.**
Maximum monthly amount willing to pay for energy	**Tk 600-800**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy	**Illumination**	**√**	**Entertainment**	**√**
	Cooking	**❑**	**Storage**	**❑**
	Charging devices	**√**	**Farming or Fishing**	
	Heating/ Cooling	**√**	**(e.g. machine and tools)**	**❑**
	Commercial/ Business activities	**√**		

Other Household uses (What?) None
Other Productive activities (What?) **None**

The TOP 3 Uses for which willing to	**None**

increase spending, if necessary.	

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	
2	**2**	**1**	**0**	**0**	**0**	

Household electrical devices WANT/ PLAN to own (Tick)

	Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	
	4	**3**	**1**	**0**	**0**	**0**	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	**None**

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	√	**Illumination, commercial**	16.42 KWh

Kerosene ❑		litre
Liquefied petroleum gas ❑		litre
Candle ❑		Kg
Natural gas ❑		
Hydro power ❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)		Not Available
Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply) [Battery got damaged due to thunderstorm]
	Others (specify) battery damage

User Energy Consumption at Killa para,Balukhali,Rangamati

Survey Number **01**

Site Location: **Killapahar, Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **07**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
	1	4			1	1

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
		✓ Fishery & Grocery Store		

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	**Tk2100 – 4190 (25 – 50)**	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
Tk12585 - 16770	❑	**>Tk16770 (>US$200)**	✓

(US$150.1 – 200)

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee of BDT 15,000 for 65W SHS , BDT 20,000 for 100W SHS and with a monthly instalment of BDT 1500 for 3 years bought another SHS of 85W to purchase and install them.**
Maximum monthly amount willing to pay for energy	**Ready to pay any amount.**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	✓		
Commercial/ Business activities	❑		

Other Household uses (What?)

Husking Machine
Other Productive activities (What?) **None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.** **2.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan (T=Table Fan)	Mobile phones (S=Smart Phone F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
14	4T	2S+4F	2	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
20	7	6	3	0	1	Submersible pump

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
	Fridge for business purpose

Energy sources used? (Tick)	**Main uses** **(e.g. cooking; illumination, commercial, etc.)**	**Approximate Monthly Consumption**
Electricity ❑		kWh
Solar power ✓	Illumination, Cooling, Entertainment, Communication.	34.21 KWh
Kerosene ❑		litre
Liquefied petroleum gas ✓		4-6 litre
Candle ❑		Kg
Natural gas ❑		
Hydro power ❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.) ❑		
Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
1	**Weak** (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
	Others (specify)

GCRF small grant 2018: **Feasibility Studies on Deploying a Self-contained Solar-hydraulic Pilot Power Plant in a Rural Area in Bangladesh**

Survey Number **02**

Site Location: **Killapahar,Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **05**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
	1	1				3

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
	✓			

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	Tk8386 – 12575 (100.1 – 150)	❑
Tk12585 - 16770 (US$150.1 – 200)	❑	>Tk16770 (>US$200)	✓

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a one-time down payment fee of BDT 17,000 for 85W SHS to purchase and install it.**
Maximum monthly amount willing to pay for energy	**BDT. 800**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**8%**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
		Storage	❑
Cooking	❑	**Farming or Fishing**	
Charging devices	✓	**(e.g. machine and tools)**	✓
Heating/ Cooling	✓		
Commercial/ Business activities	❑		

Other Household uses (What?)	**None**
Other Productive activities (What?)	**Engine Boat**

The TOP 3 Uses for which willing to increase spending, if necessary.	**None**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
6	1	3	1	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
8	6	3	2	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
Fishing Boat	

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Cooling, Communication, Entertainment.	11.63 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg

Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
2	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
3	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
	Others (specify)

Survey Number **03**

Site Location: **Killapahar,Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **04**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
	1	**1**		**2**			

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
			✓ **Meat Shop**		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk16770 (>US$200) [Informed: BDT. 40,000]**	✓

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a one-time down payment fee of BDT 40,000 for 85W SHS, BDT 35,000 for 200W SHS to purchase and install them.**
Maximum monthly amount willing to pay for energy	**BDT. 1000**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	✓		
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan (T= Table Fan)	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
6	2T	1F	1 (42" LED)	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan (T= Table Fan)	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
6	5T	2F	2	0	1	Submersible Pump

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
	Submersible pump

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity ❑		kWh
Solar power ✓	Illumination, Cooling, Communication,	

		Entertainment.	39.00 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓		Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
	Others (specify)

Survey Number **04 (Shop)**

Site Location: **Killapahar, Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household(Shop) Size (Person) **01**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
				1			

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
			✓ **Tea Stall**		

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770	✓	**>Tk12575 (>US$200)**	❑

(US$150.1 – 200)

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a one-time down payment fee of BDT 7000 for 40W SHS to purchase and install it.**
Maximum monthly amount willing to pay for energy	**BDT. 300**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	❑	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	❑		
Commercial/ Business activities	❑		

Other Household uses (What?)	**None**
Other Productive activities (What?)	**None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
3	0	0	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
5	1	0	0	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity ❑		kWh

Solar power	✓	Illumination.	5.48 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
2	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply
	Others (specify)

Survey Number **05**

Site Location: **Killapahar,Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **05**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
3		1	1			

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
	✓			

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	Tk8386 – 12575 (100.1 – 150)	❑
Tk12585 - 16770 (US$150.1 – 200)	✓	>Tk16770 (>US$200)	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee of BDT 35,000 with a monthly instalment of BDT. 1100 for 3 years for 50W SHS another one-time fee of BDT 28,000 for a 75W SHS to purchase and install them.**
Maximum monthly amount willing to pay for energy	**BDT. 500-900**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
Cooking	❑	**Storage**	❑
Charging devices	✓		
		Farming or Fishing	
Heating/ Cooling	✓	**(e.g. machine and tools)**	❑
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?)None

The TOP 3 Uses for which willing to increase spending, if necessary.	

Number of household electrical devices currently owned (Fill in number)

Lights	Fan (T= Table Fan)	Mobile phones (S= Smart Phone F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)
4	1T	1S + 1T	1 (42' LED)	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan (C=Ceiling Fan T-=Table Fan))	Mobile phones (S= Smart Phone F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what) Submersible Pump
8	1C + 2T	1S+1F	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)	Main uses (e.g. cooking; illumination,	Approximate Monthly Consumption

		commercial, etc.)	
Electricity	❑		kWh
Solar power	✓	**Illumination, Communication, Cooling, Entertainment.**	17.11 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓		Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
	Others (specify)

Survey Number **06**

Site Location: **Killapahar,Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **04**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
	1		**1**				**2**

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
		✓			

Total Monthly household income (1Tk ~ US$0.012)				
	<Tk2100 (<US$25)	✓	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk12575 (>US$200)**	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a one-time down payment fee of BDT 26,000 for 65W SHS to purchase and install it.**
Maximum monthly amount willing to pay for energy	**BDT. 200**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	✓		
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**None**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
4	0	1	1 (22' LED)	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
9	3	2	1	0	0	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Communication, Entertainment.	8.89 Wh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre

Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
	Unreliable/ Not stable (frequent power cut and interruption)
	Not available at night time
3	**Weak** (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
	Others (specify)

Survey Number **07**

Site Location: **Killapahar,Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **04**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
	1	1		2		

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
	✓			

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	Tk8386 – 12575 (100.1 – 150)	✓
Tk12585 - 16770 (US$150.1 – 200)	❑	>Tk12575 (>US$200)	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly) Not Available

Maximum monthly amount willing to pay for energy Not Available

Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending **0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	❑		
Commercial/ Business activities	❑		

Other Household uses (What?) **None**
Other Productive activities (What?)None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1.** Not Available

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones (F= Feature Phone)	TV	Radio	Refrigerator	Others (Specify what)

6	**0**	**4**	**0**	**0**	**0**	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
8	**2**	**4**	**0**	**0**	**0**	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	**None**

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Communication	11.63 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		

Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓		Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
2	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
	Weak (not powerful enough and/or low quality for intended uses)
3	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
	Others (specify)

Survey Number **08**

Site Location: **Killapahar, Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **04**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
	2		2			

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
	✓			

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	Tk2100 – 4190 (25 – 50)	❑
Tk4200 – 8385 (US$50.1 – 100)	✓	Tk8386 – 12575 (100.1 – 150)	❑
Tk12585 - 16770 (US$150.1 – 200)	❑	>Tk12575 (>US$200)	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**Govt. donated a SHS to the user.**
Maximum monthly amount willing to pay for energy	**BDT. 200**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	❑		
Commercial/ Business activities	❑		

Other Household uses (What?) None.
Other Productive activities (What?)None

The TOP 3 Uses for which willing to increase spending, if necessary.	None

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
5	0	2	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
7	2	2	1	0	0	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	**Illumination, Communication.**	Not Available
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		

Hydro power ❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.) ✓		Not Available
Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
2	**Unreliable/ Not stable** (frequent power cut and interruption)
1	**Not available at night time**
3	**Weak** (not powerful enough and/or low quality for intended uses)
	Limited/ unpredictable supply (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
	Others (specify)

Survey Number **09**

Site Location: **Killapahar,Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **03**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
			1				**2**

Sources of Income

Farming (tick)	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
		✓		

Total <u>Monthly</u> household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	❑	**Tk2100 – 4190 (25 – 50)**	❑
Tk4200 – 8385 (US$50.1 – 100)	✓	**Tk8386 – 12575 (100.1 – 150)**	❑

Tk12585 - 16770		**>Tk12575 (>US$200)**	❑
(US$150.1 – 200)	❑		

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**Government donated a SHS to user.**
Maximum monthly amount willing to pay for energy	**BDT. 150**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing**	
Heating/ Cooling	❑	**(e.g. machine and tools)**	❑
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**None**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)

5	**0**	**2**	**0**	**0**	**0**	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	**Fan**	**Mobile phones**	**TV**	**Radio**	**Refrigerator**	**Others (Specify what)**
7	**3**	**3**	**1**	**0**	**1**	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	**Want/ Plan to own (What?)**
None	**None**

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, communication.	Not Available
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		

Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.) ✓	Cooking.	Not Available
Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption

(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
2	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
3	**Weak** (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
	Others (specify)

Survey Number **10**

Site Location: **Killapahar,Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **04**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
	1	**1**	**1**	**1**			

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
		✓			

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	✓	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk12575 (>US$200)**	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)

User uses own solar home system. User paid a one-time down payment fee of BDT 20,000 with a monthly instalment of BDT. 1000 for 3 years to purchase and install a 85W SHS.

Maximum monthly amount willing to pay for energy

BDT. 150

Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending

0 %

Current main uses of energy

Illumination	✓	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	❑	**Farming or Fishing**	
Heating/ Cooling	✓	**(e.g. machine and tools)**	❑

Commercial/ Business activities ❑

Other Household uses (What?) None
Other Productive activities (What?)None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1. None**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
6	1	0	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
8	3	0	1	0	0	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Cooling	11.63 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking.	Not Available

Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
	Others (specify)

Survey Number **11**

Site Location: **Killapahar, Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. Profile of Households in Target Site

Household Size (Person) **02**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
					2		

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
		✓			

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	✓
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk12575 (>US$200)**	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly) — **Government donated a SHS to user.**

Maximum monthly amount willing to pay for energy — **BDT 200**

Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending — **0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing**	
Heating/ Cooling	❑	**(e.g. machine and tools)**	❑
Commercial/ Business activities	❑		

Other Household uses (What?)	**None**
Other Productive activities (What?)	**None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**1. None.**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
3	0	1	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)

5	**2**	**2**	**1**	**0**	**1**	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	**Want/ Plan to own (What?)**
None	**None**

Energy sources used? (Tick)		**Main uses (e.g. cooking; illumination, commercial, etc.)**	**Approximate Monthly Consumption**
Electricity	❑		kWh
Solar power	✓	Illumination, Communication.	5.47 kWh
Kerosene	❑		Litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	✓	Cooking	Not Available
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
3	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
	Others (specify)

Survey Number **12**

Site Location: **Killapahar, Balukhali**

Researcher: **Sayeef Asrar & Ziadul Islam**

A. <u>Profile of Households in Target Site</u>

Household Size (Person) **06**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
		2	**2**			**2**	

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
			✓		

Total <u>Monthly</u> household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	❑	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	✓	**>Tk12575 (>US$200)**	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee of BDT. 20,000 with a monthly instalment of BDT. 1500 for 3 years to purchase and install a 65W SHS.**
Maximum monthly amount willing to pay for energy	**BDT. 200**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	✓	**Entertainment**	✓
Cooking	❑	**Storage**	❑
Charging devices	✓	**Farming or Fishing (e.g. machine and tools)**	❑
Heating/ Cooling	✓		
Commercial/ Business activities	❑		

Other Household uses (What?) None
Other Productive activities (What?) None

The TOP 3 Uses for which willing to increase spending, if necessary.	**1. None**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
5	1	4	1	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
6	2	4	1	0	1	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	✓	Illumination, Cooling, Communication, Entertainment.	8.89 KWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre

Candle ❑		Kg
Natural gas ❑		
Hydro power ❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.) ✓	Cooking	Not Available
Others (specify):		

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

	Costly/ Expensive
2	**Unreliable/ Not stable** (frequent power cut and interruption)
	Not available at night time
	Weak (not powerful enough and/or low quality for intended uses)
1	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use (e.g. to generate and/or apply)
3	**Others (specify)** [Battery got damaged]

User Energy Consumption at Naikhyang Para

Survey Number **01**

Site Location: **Naikhyang Para**

Researcher: **Sayeef Asrar**

A. Profile of Households in Target Site

Household Size (Person) **3**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
		1			**2**		

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
	√				

Total Monthly household Income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	√	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk12575 (>US$200)**	❑

B. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a one-time fee for purchase and installation. The interviewed member was not aware of the SHS size or price.**
Maximum monthly amount willing to pay for energy	**Below BDT 200**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	√	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	❑	**Farmingor Fishing**	
Heating/ Cooling	√	**(e.g. machine and tools)**	❑
Commercial/ Business activities	❑		

Other Household uses (What?) **None**
Other Productive activities (What?) **None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**1. Basket Making**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
4	1	0	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
√	√	√	**0**	**0**	**0**	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	**None**

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate MonthlyConsumption
Electricity	❑		kWh
Solar power	√	Illumination, Cooling	5kWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	√		Not available
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	❑		*state local unit
Others (specify):			

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
	Unreliable/ Not stable(frequent power cut and interruption)
2	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
3	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use(e.g. to generate and/or apply)
	Others (specify)

Survey Number **02**

Site Location: **Naikhyang Para**

Researcher: **Sayeef Asrar**

C. Profile of Households in Target Site

Household Size (Person) **5**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
2	1			2		

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
√				

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	√	**Tk2100 – 4190 (25 – 50)**	❑
Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑

	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk12575 (>US$200)** ❑

D. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment fee of BDT 5000 and monthly fee of BDT 200 for purchase and installation.**
Maximum monthly amount willing to pay for energy	**BDT 200**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0%**

Current main uses of energy

Illumination	√	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	❑	**Farming or Fishing**	
Heating/ Cooling	❑	**(e.g. machine and tools)**	❑
Commercial/ Business activities	❑		

Other Household uses (What?) **None**
Other Productive activities (What?) **None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**2. Basket Making**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
2	0	0	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
√	0	0	0	0	0	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate MonthlyConsumption
Electricity	❑		kWh
Solar power	√	**Illumination**	1kWh
Kerosene	√	**Illumination**	Not available
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	❑		*state local unit
Others (specify): Lumber/Timber		**Cooking**	Not available

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
	Unreliable/ Not stable(frequent power cut and interruption)
	Not available at night time
	Weak (not powerful enough and/or low quality for intended uses)
	Limited/ unpredictable supply (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use(e.g. to generate and/or apply)
	Others (specify)

Survey Number **03**

Site Location: **Naikhyang Para**

Researcher: **Sayeef Asrar**

E. Profile of Households in Target Site

Household Size (Person) **02**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
				2			

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
	√				

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	√	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770	❑	**>Tk12575 (>US$200)**	❑

(US$150.1 – 200)

F. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a down payment of BDT 7000 and monthly instalment of BDT 1500 for 3 years to purchase and install SHS.**
Maximum monthly amount willing to pay for energy	**Below BDT 200**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	√	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	❑	**Farming or Fishing**	
Heating/ Cooling	❑	**(e.g. machine and tools)**	❑
Commercial/ Business activities	❑		

Other Household uses (What?) **None**
Other Productive activities (What?) **None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**3. Basket Making** **4. Stitching Blanket(Kantha)**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
2	0	0	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
√	√	√	0	0	0	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	√	Illumination	1.5kWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	❑		Kg
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	❑		*state local unit
Others (specify):Lumber/Timber		Cooking	Not available

The TOP 3 problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

1	**Costly/ Expensive**
	Unreliable/ Not stable(frequent power cut and interruption)
3	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
2	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use(e.g. to generate and/or apply)
	Others (specify)

Survey Number **04**

Site Location: **Naikhyang Para**

Researcher: **Sayeef Asrar**

G. Profile of Households in Target Site

Household Size (Person) **05**

Age Spread of Members (Fill in number of person)	**<15**	**15-25**	**26-35**	**36-45**	**46-55**	**56-65**	**>65**
	1		**2**			**2**	

Sources of Income	**Farming (tick)**	**Fishing (tick)**	**Household business (What?)**	**Employed labour (tick)**	**Others (What?)**
	√				

Total Monthly household income (1Tk ~ US$0.012)	**<Tk2100 (<US$25)**	√	**Tk2100 – 4190 (25 – 50)**	❑
	Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
	Tk12585 - 16770 (US$150.1 – 200)	❑	**>Tk12575 (>US$200)**	❑

H. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a one-time fee of BDT 33000 for purchase and installation.**
Maximum monthly amount willing to pay for energy	**Below BDT 200**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	√	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	√	**Farmingor Fishing**	
Heating/ Cooling	√	**(e.g. machine and tools)**	❑
Commercial/ Business activities	❑		

Other Household uses (What?) **None**
Other Productive activities (What?) **None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**5. Basket Making**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
5	3	1	0	0	0	

Household electrical devices WANT/ PLANto own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
√	√	√	0	0	√	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	√	Illumination, Cooling	16.5 kWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	√		Not available
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	❑		*state local unit
Others (specify): Lumber/ Timber	√	Cooking	Not Available

The TOP 3problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

2	**Costly/ Expensive**
	Unreliable/ Not stable(frequent power cut and interruption)
1	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
3	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use(e.g. to generate and/or apply)
	Others (specify)

Survey Number **05**

Site Location: **Naikhyang Para**

Researcher: **Sayeef Asrar**

I. Profile of Households in Target Site

Household Size (Person) **3**

Age Spread of Members (Fill in number of person)

<15	15-25	26-35	36-45	46-55	56-65	>65
	1		2			

Sources of Income

Farming (tick)	Fishing (tick)	Household business (What?)	Employed labour (tick)	Others (What?)
√				

❑

Total Monthly household income (1Tk ~ US$0.012)

<Tk2100 (<US$25)	√	**Tk2100 – 4190 (25 – 50)**	
Tk4200 – 8385 (US$50.1 – 100)	❑	**Tk8386 – 12575 (100.1 – 150)**	❑
Tk12585 - 16770	❑	**>Tk12575 (>US$200)**	❑

(US$150.1 – 200)

J. Energy Consumption Information

Actual TOTAL spending on energy (monthly)	**User uses own solar home system. User paid a one-time fee of BDT 33000 for purchase and installation.**
Maximum monthly amount willing to pay for energy	**Below BDT 200**
Percentage of monthly energy spending on productive activities (e.g. farming/ fishing/ commercial) to Total Energy Spending	**0 %**

Current main uses of energy

Illumination	√	**Entertainment**	❑
Cooking	❑	**Storage**	❑
Charging devices	√	**Farmingor Fishing**	
Heating/ Cooling	√	**(e.g. machine and tools)**	❑
Commercial/ Business activities	❑		

Other Household uses (What?) **None**
Other Productive activities (What?) **None**

The TOP 3 Uses for which willing to increase spending, if necessary.	**6. Basket Making**

Number of household electrical devices currently owned (Fill in number)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
4	2	1	0	0	0	

Household electrical devices WANT/ PLAN to own (Tick)

Lights	Fan	Mobile phones	TV	Radio	Refrigerator	Others (Specify what)
√	√	√	0	0	0	

Power equipment/ machines/ tools for productive (e.g. farming/ fishing/ commercial, etc.) uses

Currently owned (What?)	Want/ Plan to own (What?)
None	None

Energy sources used? (Tick)		Main uses (e.g. cooking; illumination, commercial, etc.)	Approximate Monthly Consumption
Electricity	❑		kWh
Solar power	√	Illumination, Cooling	12kWh
Kerosene	❑		litre
Liquefied petroleum gas	❑		litre
Candle	√		Not available
Natural gas	❑		
Hydro power	❑		
Biomass (e.g. firewood; dry leaves; crop residuals; dung cake, etc.)	❑		*state local unit
Others (specify):Lumber/ Timber		Cooking	Not available

The TOP 3problems/ concerns regarding energy consumption
(Choose 3 only and Rank 1, 2, 3, with '1' as the most important problem/concern)

2	**Costly/ Expensive**
	Unreliable/ Not stable(frequent power cut and interruption)
1	**Not available at night time**
	Weak (not powerful enough and/or low quality for intended uses)
3	**Limited/ unpredictable supply** (energy sources sometimes not available)
	Health issues (e.g. smoke/ smell/ other pollutants)
	Difficult to use(e.g. to generate and/or apply)
	Others (specify)

APPENDIX – C

1. Cost and Estimation