Report

On

Survey on the Electrical Lighting Load and Consumption in the Urban Household Sector of Bangladesh

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TABLE OF CONTENTS

LIST OF TABLES

ACRONYMS and ABBREVIATIONS

A.C.	Air Conditioner
BBS	Bangladesh Bureau of Statistics
CDM	Clean Development Mechanism
CEA	Clean Energy Alternatives
DESA	Dhaka Electric Supply Authority
DESCO	Dhaka Electric Supply Company
DSM	Demand Side Management
EB	Electronic Ballast
EE	Energy Efficiency
FTL	Fluorescent Tube Light
GHG	Green House Gases
GTZ	German Technical cooperation
GWH	Gigawatt Hour
H.H	Household
HIES	Household Income and Expenditure Survey
HP	Horse Power
IL	Incandescent Lamp
KW	Kilo Watt
KWh	Kilowatt Hour
MW	Mega Watt
MWh	Mega Watt Hour
MB	Magnetic Ballast
PBS	Polli Biddut Samity (Rural electrification cooperatives under Rural Electrification Board)
PDB	Power Development Board
REB	Rural Electrification Board
TOR	Terms of Reference
WB	World Bank
WZPDCL	Western Zone Power Development Company Ltd.

Executive Summary

Introduction

Although electricity is crucial to the economic development and livelihood prospects of a country, the sector has developed relatively slowly in Bangladesh. Annual generation continues to stagnate at about 22,700 GWH; penetration and coverage at a low 44% percent of the total and 82% of urban households (HIES 2005; BBS); supply continues to be unreliable with rolling blackouts especially in summer; and frequent voltage fluctuations with occasional sharp spikes continue to plague consumers. Peak supply reaches about 4,100 MW while peak demand exceeds 5,000 MW creating a substantial demand and supply gap of about 25%.

Background

Energy efficiency is recognized as a key to achieving sustainable development in both industrialized and developing countries. The most optimum route to sustainable development of the energy system therefore is a “low energy path”, meaning that nations should try “to produce the same level of energy service with as little as half the primary energy currently consumed” [World Commission on Environment and Development, 1987].

In Bangladesh, as in other parts of the world, electricity for lighting contributes a large share to evening peak loads. Of the total connected load, 43% is consumed by households, mostly for lighting purposes. Therefore, end use efficiency measures and programs centering on household electricity consumption could have substantial impacts. Some end use efficiency measures have been undertaken in Bangladesh. However, financial barriers, institutional rigidities and awareness continue to act as deterrents.

Survey Objectives

The major objective of the survey was to obtain reliable up-to-date data that could be used to develop a large scale demand side management (DSM) project to remove barriers to the deployment of end use efficiency measures. The efficiency measures contemplated is the replacement of incandescent bulbs (ILs) with compact fluorescent bulbs (CFLs) and magnetic ballasts (MBs) with electronic ballasts (EB) in Fluorescent Tube lights (FTLs). In addition to this, the database will be used to establish the baseline

for a CDM project and to estimate the amount of carbon emissions that can be avoided by the measures.

Survey Area

CEA was contracted to conduct the survey. A total of 10 areas were surveyed. Among them were the six divisional headquarters, Dhaka, Chittagong, Rajshahi, Sylhet, Khulna and Barisal; only 4 out of 64 Zilla headquarters namely Mymensingh, Comilla, Bogra and Rangpur; and two municipalities namely, Gournadi and Dohar. Although the two municipal areas were not in the TOR, they were nevertheless included in the final survey so that a comparative analysis of urban and peri-urban areas could be undertaken. The purpose was to check for homogeneity in the consumption patterns between large and small urban locales.

Methodology

Households were divided into four frames by income groups on the assumption that the pattern of electricity use varies depending on the income level of the consumer. The four groups were: group A, the poorest household with monthly income less than Tk. 3,125; group B, between Tk. 3,125 and Tk. 9,999; group C, between Tk. 10,000 and Tk. 19,999; and group D with incomes above Tk. 20,000. The number of households in each frame was fixed on the basis of pre-surveys carried out to assess the variability in each group and to ensure an accuracy level of $\pm$ 10% at the 95% confidence level. The distribution of households among income groups was as follows: 15% to 17% in group A, 31% to 33% in group B, 25% to 29% in group C and 25% to 26% in group D.

Household and Respondent Profile

Most respondents in Dhaka, Barisal and Mymensingh were housewives; in Chittagong, Rajshahi, Sylhet, Bogra, Mymensingh and Dohar they were businessmen and in Comilla they were employees of privately held companies. Over 98% of households were connected to domestic metering systems; and about 2% to commercial since the latter were also conducting commercial activities from their households.

The greater majority of households in Dhaka are connected to DESCO with only about 20% to DESA; in Chittagong, Rajshahi, Sylhet, Bogra, Barisal, Comilla, Mymensingh and Rangpur all households are connected to PDB; in Khulna 66% households are connected to REB and 34% with WZPDCL; and in Gournadi, 80% to REB supply, 10% to PDB and 10% to WZPDCL.

Load shedding varies according to seasons. The survey found load shedding during summer to be twice that of winter. The longest summer load shedding period is in Sylhet, up to 9 hours; the shortest period in Rajshahi and Dhaka, up to 3 and 4 hours respectively. Winter load shedding is generally between 1 and 2 hours every day. During load-shedding, most households use candles, rechargeable lights, oil lamps, IPS units and hurricane lamps (in order of declining usage).

Consumption of Electricity in Households

Electrical energy is consumed in a household in different household appliances: light bulbs, television sets, fans, radio/stereo players, air-conditioners, refrigerators, freezers, electric irons, ovens etc. Based on the survey results, the total energy consumed is 5,900 GWH per year in the 10 districts.

The survey also found that, on average, households consumed a total of 136 kwh of electricity per month. Of this 20% or about 27kwh was consumed for lighting. Therefore, total consumption of electricity for lighting purposes is 1,175 GWH per year. It should be noted, however, that there are considerable differences in consumptions among households, varying on average from 46 Kwh per month in small households to 317 Kwh in larger ones.

Urban Rural Consumption Comparisons

When we compare lighting use patterns between urban and rural households, we find a close correspondence with the numbers though not with the types of bulbs used. The survey found that households in less urbanized areas tend to use more incandescent bulbs than those in urbanized areas presumably because of the lower income and lower awareness levels in rural areas.

Willingness to Pay

The survey shows that demand for CFLs is dependent on price, quality and the level of electricity savings. If consumers are assured that CFL bulbs will last about 4 years and the electricity saved around 80%, half the households in the surveyed districts would buy CFLs even at a high price of Tk. 300. The survey also confirmed that as prices fall more buyers will enter the market including those from lower income households until at about a price of Tk. 100 almost all households would switch to CFLs. As expected, the survey also found that price elasticity was more pronounced among lower income groups than at higher. From these findings we can infer that demand will increase with greater awareness.

Awareness of Benefits from CFL and EB

The survey found a consistent pattern with respect to awareness and knowledge of the benefits associated with switching from ILs to CFLs and from MBs to EBs. Almost 3 out 4 or more than 75% of respondents demonstrated a high state of knowledge of the benefits that can be garnered from using CFLs and EBs. This state of knowledge was found among all income levels from the lowest to the highest. For instance, awareness levels ranged from a high of 94% in Rangpur to 60% in Dhaka and 50% in Bogra. Awareness levels are not as high for electronic ballasts (EBs) ranging from 0% in Sylhet to 33% in Dhaka. The survey also found that the state of awareness was higher among more affluent households.

Preference for Source of purchase

One interesting finding was that many households expressed a preference to buy CFLs from wholesalers and/or retailers instead of utilities when asked what their preference was with regard to selling source. There may be many reasons for this but prominently it may be convenience and familiarity, “buy from the neighborhood” store idea.

Assessing Potential for Savings

In the power sector, potential savings from implementing end use efficiency measures can be very large. This can be seen readily from the survey findings. The household survey covered 10 cities that have almost 8 million households. Assuming a 44% electricity penetration rate, we can estimate that there are 3.5 million electrified households in the surveyed area. The total electricity savings resulting from CFLs replacing incandescent lamps will be 1,089 MWh, equivalent to a 317 MW load with an average of 3.44 hours usage at peak hours. The total electricity savings resulting from electronic ballasts (EBs) replacing magnetic ballasts will be 485 MWh, equivalent to a 87 MW load with an average of 5.55 hours usage at peak hours. Savings have been calculated on the basis that CFL consume 70% less energy than incandescent lamps and florescent tube lights fitted with electronic ballast consume 28% less energy than those fitted with magnetic ballasts.

We can extrapolate these findings to the national level. According to HIES 2005, there are about 28 million households in Bangladesh. Of this, 44% or about 12 million households have access to grid power. The survey found that households use 2-3, 40 watt incandescent bulbs on the average. From this and the assumption that 25% of households remain blacked out during peak hours, we can estimate the total peak hour

electricity demand for light at about 1,300 MW in the country. If 70% of this can be saved by using CFLs, then nationwide savings from CFL substitution in households will be about 900 MW. There are many dimensions to this savings but two are significant. Firstly, this saving is equivalent to supplying power from a 1,100 MW generating plant, assuming "systems loss" of 18%, and secondly, CO2 emissions would be reduced by almost 600,000 tons annually from this reduction in use. These avoided CO2 emissions can be traded for about US$ 6 million annually under the Kyoto mechanisms.

Life Cycle of different bulbs in use

Replacement period of different bulbs were found to vary. The survey found that the replacement period of ILs varied from a low of 2.5 to a high of 10 months. FTLs, on the other hand, needed replacement every 10 to 26 months; and CFLs every 2.5 to 28 months.

Causes for low usage of EE devices: CFLs, EBs

Overall, there were multiple responses as to why CFL use is low. The survey found 73% of respondents that is, almost three quarter citing high cost as the reason for not using CFL bulbs and only 7% citing color as the reason. Other reasons such as quality of light not being good or voltage fluctuations or disbelief in savings and longevity claims were less than 10% in each category.

More than half cited the high cost of electronic ballasts as the reason for not using them; a quarter because they thought it has to be replaced frequently; and 13% because of voltage fluctuation.

CHAPTER 1

1.1 Introduction

Electricity is crucial to economic development and livelihood prospects of a country. In spite of this, development of the sector has been relatively slow in Bangladesh. Annual generation continues to stagnate at about 22,700 GWH; penetration and coverage at a low 44% percent of total and 82% of urban households (HIES 2005; BBS); supply continues to be unreliable with rolling blackouts especially in summer; and frequent voltage fluctuations with occasional sharp spikes continue to plague supply. Peak supply reaches about 4,100 MW while peak demand exceeds 5,000 MW creating a substantial demand and supply gap of about 25%. This demand supply gap continues to widen with income and urbanization growing, on the one hand, and increasing degradation of generating capacity and resource constraints, on the other.

It is estimated that the Power Development Board (PDB) is generating, on the average, 3,500 MW, against a peak supply of around 4,100 MW, whereas the name plate capacity stands at around 5,200 MW. Although some load management measures have been undertaken, peak load continues to grow exacerbating the shortages in the grid supply especially during the hours of 6 to 11 PM. For instance Greater Dhaka's demand of 1800 MW is curtailed through regular load shedding of between 700 to 800 MW.

1.2 Background

The most optimum route to sustainable development of the energy system is a "low energy path", meaning that nations should try "to produce the same level of energy service with as little as half the primary energy currently consumed" [World Commission on Environment and Development, 1987]. Energy efficiency is recognized as key to achieving sustainable development in both industrialized and developing countries.

In Bangladesh, as in other parts of the world, electricity for lighting contributes a relatively large share of evening peak loads. According to some studies, the "light load" contributes about 80% to peak demand in Bangladesh. Compared to the overall grid size, the magnitude of the lighting load is considerable at about 1,000 MW. Of the total connected load, 43% is consumed by households, mostly for lighting purposes.

From the preceding it follows that end use efficiency measures and programs centering on household electricity consumption can have substantial impacts. In the past, the path to energy conservation was replacing ILs with FTL's but increasingly CFLs are emerging as a reliable way to reduce electricity consumption without disrupting existing use patterns. CFLs produce light that is more diffuse than incandescent bulbs, so they are very good for area lighting and they use about a quarter of the energy that an incandescent bulb uses to produce the same amount of light. A good comparison ratio takes a 15-watt CFL to replace a traditional 60-watt bulb. The lower wattage equals less energy use and less heat output.

At present about half the consumers in Bangladesh have switched to FTLs but most, about 95%, continue to use the more energy consuming magnetic ballasts. A recent sample survey of feeders in Dhaka city by the Dhaka Electric Supply Authority (DESA) showed that CFL penetration too is dismally low at about 7%. Financial barriers, institutional rigidities and awareness continue to act as deterrents to energy efficiency practices in Bangladesh. For end use efficiency measures to take hold these barriers need to be identified and measures introduced to remove them.

As a first step in the effort to remove barriers to the deployment of end use efficiency measures, the Sustainable Energy Program (SED) of GTZ decided to conduct a survey to estimate the number of incandescent lamps, FTLs and CFLs and the electricity energy consumed for lighting in urban areas of Bangladesh.

1.3 Survey Objectives

The major objective of the survey was to compile reliable up-to-date data that could be used to design a large scale demand side management (DSM) project to remove barriers to the deployment of end use efficiency measures. The efficiency measures contemplated in the project is the replacement of ILs with CFLs and magnetic ballast (MB) with electronic ballasts (EB) in FTLs. In addition, the database is to be used to establish the baseline for an associated Kyoto CDM project and to estimate the amount of carbon emissions that can be avoided by the measures.

CHAPTER 2

METHODOLOGY

The key issues relevant to the methodology and overall implementation the survey is presented below.

2.1 Survey Design

The major components of the survey design are as follows:

2.1.1 Sources of data

The primary objective of the survey was to collect data / information from urban households of the major cities of Bangladesh and major public buildings in these cities on the use parameters of different types of lightings and electricity consuming appliances used by them. Prior to collecting detailed data / information all the relevant sources were scanned for preparing type-wise list of respondents for each category under the survey. This helped in preparing the final sampling frame of respondents for each category. The data regarding the respondents were collected from the latest Statistical Yearbook of Bangladesh and Household Income and Expenditure Survey of Bangladesh (HIES 2005) published by the Bangladesh Bureau of Statistics. Since the population is very large, a pre- survey was carried out to determine the variance with regards to the number of lights used in each frame.

2.1.2 Consultation with stakeholders and production of analysis plan

Before finalizing the sample size and survey design, consultative meeting were held with GTZ. The main focus of the meetings was to identify the issues/areas/parameters, which will be addressed in the survey. Furthermore, the survey team was acquainted with the specific requirements of the survey through these meetings.

Based on the discussions, the study team developed a theoretical framework for conducting the survey and also developed an analysis plan for preparing the report.

2.1.3 Sample design

In the light of the broad objective of the survey, the sample design was constructed in a manner so as to collect data on the light usage parameters of different categories of urban users at a confidence level of 95% and accuracy of ± 10%. The variance was determined with pre-survey data collection on the most important factor of the survey (ie

number of lights used) from about 10 users of each frame in the urban areas of Dhaka, Chittagong and Rajshahi. The questionnaire for pre-survey is attached at Attachment-1.

The sample size of households under different categories was estimated keeping in view the size of the respondent frames. For preliminary sample selection data regarding total number of lamps used were collected from 37 households in Dhaka, 37 households in Chittagong and 40 households in Rajshahi. Four frames were made depending on the income level of the households as given below.

Total number of households to be surveyed has been calculated from the following formula:

Where N' = Number of samples required

N = Number of samples taken

X = Number of electrical lights

$$N' = \left(\frac{20 \sqrt{N \Sigma X^2 - (\Sigma X)^2}}{\Sigma X} \right)^2$$ for 95% confidence level and ± 10% accuracy

The number of samples was calculated from the pre-survey data as shown in the following tables:

Table 2.1: Number of Samples Calculated From Pre-Survey in Dhaka City

Household Income (Tk.)	Number of households surveyed	Total number of lamps used										Σ x	Number of Samples at ± 10% Accuracy
Less than 3,125	10	1	2	1	3	1	1	2	1	1	1	14	90
3,125 – 9,999	7	7	6	9	11	6	7	4				50	35
10,000 – 19,999	10	7	6	5	6	4	9	8	9	9	7	70	23
20,000 and above	10	12	8	7	10	6	8	13	10	12	4	90	38

Table 2.2: Number of Samples Calculated From Pre-Survey in Chittagong City

Household Income (Tk.)	Number of house-holds surveyed	Total number of lamps used										Σ x	Number of Samples at ± 10% Accuracy
Less than 3,125	7	4	4	3	2	2	2	3				20	34
3,125 – 9,999	10	3	6	5	7	6	5	7	4	11	4	58	54
10,000 – 19,999	10	5	8	3	12	7	6	9	6	11	6	73	51
20,000 and above	10	10	4	8	13	12	4	11	5	10	17	94	73

Table 2.3: Number of Samples Calculated in Pre-Survey in Rajshahi City

Household Income (Tk.)	Number of households surveyed	Total number of lamps used										Σ x	Number of Samples at ± 10% Accuracy
Less than 3,125	10	3	3	5	4	2	2	3	3	3	3	31	29
3,125 – 9,999	10	8	8	10	15	6	7	6	8	6	3	77	61
10,000 – 19,999	10	8	8	7	7	9	5	6	8	11	16	85	48
20,000 and above	10	20	7	14	14	9	11	20	7	14	10	126	50

Due to the shortage of time, data from two larger cities and one smaller city was taken. It was assumed that the data from other 7 smaller cities would be very similar to that from Rajshahi.

The total number of samples, thus, surveyed including number of 15 Public Buildings in each city is given in Table 4 below:

Table 2.4: Total Number of Samples Surveyed

Cities	No. of Samples for ± 10% Accuracy
Dhaka	212
Chittagong	185
Rajshahi	188
Other 7 Cities	1,316
Total Households	1,901
Public Buildings	150
Total Samples	2,051

By taking accuracy at ± 10% the total number of electric lamps calculated in 10 cities will be within ± 10% accuracy. In designing the CDM project it is, therefore, recommended that the project be designed assuming the total number of lights 10% less than that arrived at in this survey.

2.1.4 Homogeneity of Data

The homogeneity of data was verified by conducting two additional surveys of Gournadi and Dohar towns which are in the outskirts of Barisal and Dhaka city.

2.1.5 Instruments used for data collection

A combination of observation and interview techniques were used to collect quantitative and qualitative information for the proposed survey.

A questionnaire was administered to collect the data of the selected respondents. The questionnaire was designed so as to document both structured/categorical, and open-ended responses.

A sample questionnaire form is attached as Attachment-2 with this proposal. This questionnaire form was modified, keeping all the required data in tact, in such a manner that the data entry operator can enter data easily and without making many mistakes.

2.2 Survey Implementation Plan

The survey implementation plan is discussed below.

2.2.1 Pre-survey fact-finding field trip

Before the actual survey was undertaken, the survey team made a rapid field trip to the households in Dhaka city. This fact-finding trip made the team more familiar with the field reality in terms of the expectations stated in the TOR. It also helped them in preparing more effective instruments for data collection.

2.2.2 Development of draft data collection instruments

Before finalizing the draft questionnaire the survey team identified the indicators through content analysis of the relevant reports, documents, and literature as well as pre-survey fact-finding field trip in view of the purpose of the survey.

Based on the TOR and theoretical framework prepared after having conducted the content analysis of relevant documents/reports and team's fact-finding trip, draft data collection instruments was finalized in consultation with GTZ.

2.2.3 Field data collection

CEA sent 50 enumerators for the collection of data from the specified locations distributed according to the number of respondents under the survey. In addition 10 persons were selected as field supervisors for proper implementation of the data collection activities. The overall field activities were coordinated by them. The data was collected using a pre-designed questionnaire. The staffing pattern were designed in a manner so as to ensure proper administration of the questionnaires involving the least dislocation of normal activities of respondents.

Each enumerator was provided with an identity card, a set of guidelines for code of conduct and for data collection and overall administration of the survey. The enumerators, after reaching the respondents, carried out the work with self-introduction and described the purpose and objectives of the survey. They collected data as per guidelines and set questionnaire following the techniques, procedures and instructions of training. They recorded the data only after being fully satisfied that they have been able to make the respondents understand the questions and the respondents are offering probable answers according to their perception. They made all efforts to have a friendly and open-minded interaction with the respondents. All questions were asked one by one and data filled-in on the spot and the enumerators put signature in the space provided and preserve carefully for submission to the concerned field supervisor.

2.2.4 Training of Enumerators and Field Supervisor

The field supervisor and enumerators were trained for two days at CEA office. The training was designed and imparted so as to make the trainees (enumerators and field supervisor) conversant with the procedures of data collection. The techniques like lecture, discussion, mock interview, field demonstration, and review of field exercise were extensively used to make the training effective. The training particularly address the following areas:

(i) Purpose and objectives of the survey

(ii) Detailed methodology

(iii) Selection of households

(iv) Procedure for administering the questionnaires

(v) Checking questionnaires and checklists

(vi) Record keeping; and other related issues

The survey coordinator provided the training.

2.2.5 Quality control of data collection

A quality control system was adopted for ensuring effective implementation of the field survey. Only trainees with satisfactory performance were selected for fieldwork. At least two filled-in questionnaires of each field enumerator were re-administered by the field supervisor for maintaining quality control of data collection activities. If any discrepancy was identified in the questionnaires field supervisor discussed on these matters with the concerned field enumerators for minimizing the errors.

A further step for ensuring quality control was to crosscheck filled-in questionnaires of the two field enumerators. In the evening, field enumerators checked each other's filled-in questionnaires to rectify errors, if any.

The survey coordinator supervised the entire data collection activities.

2.3 Data processing

Data Processing will involve (i) checking, editing, and coding of the completed questionnaires, and (ii) data entry and cleaning.

2.3.1 Checking, Editing and Coding

In the case of checking, editing and coding of the filled-in data particular attention was given to: (i) checking identification (ID) number of each questionnaire, (ii) checking inconsistency among the questions, (iii) coding the open-ended questions, and (iv) sample checking of the questionnaires by the survey coordinator. Checking of the collected data was done field supervisors on completion of field activities.

The survey coordinator, before sending the questionnaires for computer entry, randomly select questionnaires and checked those.

2.3.2 Data Entry and Cleaning

Data entry was done in SPSS for Windows and EXCEL. For checking whether the figures are correctly entered, a manual checking involving the services of data entry operators and data checkers for a period of two days was done. All possible logical verifications were done in computer to free the data from all types of inconsistency and errors. In the case of Barisal and Bogra the surveys were repeated since the data showed inconsistencies with a priori determined rational responses.

2.3.3 Analytical framework

In line with the objectives of the study, the analytical framework was designed to assess the responses by the different categories of respondents. In this regard, frequency tables, % distribution and cross tables by sub- categories were made. Prior to analyzing various parameters, table plan was done and dummy tables were prepared to facilitate easy processing of the data.

2.4 Work Plan

The estimated time to complete the survey was about 90 days. The Work Plan was designed on the basis of accepted methods and chronologies. These and the workplan are detailed below:

2.4.1 General

The sequence and chronology of performing the identified activities for implementation of the survey are given below. Different activities need different duration and time frame. The activity list has the following phases of work.

- Planning
- Implementation
- Reporting

2.4.2 Work Schedule

The TOR provides the scope of works for implementation of the proposed survey. In the planning phase, the activities included mobilisation of staff, collection of project-related

documents and secondary data on the usage electric lamps of different types, review of the TOR, proposed methodology, implementation plan, and discussion with GTZ, pre-survey fact-finding field trip, finalising methodology, implementation plan (including operational strategy) and draft questionnaire based on the discussions, training of the data collection teams, finalising data collection instruments and printing.

The implementation phase followed the training of the field staff. The major activities of this phase included collection of primary data through interviews and observations from the selected sample; checking and editing collected data and coding of the open-ended questions of filled-in questionnaires by the field supervisor under the guidance of survey coordinator. Entering the collected data into computers by the data entry operators; cleaning the entered data by the survey coordinator; and data processing, preparation of statistical tables, and data analysis

The reporting phase involved preparation and submission of: (i) draft report; and (ii) a final report.

2.4.3 Survey Implementation Team

The team comprised of the four following key professionals. Ten Field Supervisors, fifty Enumerators, five Data Entry Operators and other staff shown below supported these key professionals.

1.	Team Leader	Iftikhar Hussain
2.	Survey Coordinator	Engr. Iqbal Hussain
3.	Statistical Expert/Database Designer	Dr. Habibur Rahman
4.	Senior Field Supervisor	Mohammad Azaz
5.	ENGAGED DURING SURVEY:	
	a. Field Supervisors	10
	b. Database Supervisor	1
	c. Data Entry Checking Supervisor	1
	d. Data Verifying Supervisor	1
	e. Enumerators – Survey	50
	f. Data Entry Operators	5
	g. Data Entry Checkers	5

CHAPTER 3

FINDINGS

3.1. Dhaka

3.1.1 Sample Size: Number of Households in Survey

252 households were surveyed in Dhaka. Incomes of 45% of these households were below Tk. 3,125 per month; 21% between Tk. 3,125 and Tk. 9,999; 15% between Tk. 10,000 to Tk. 19,999 and 20% above Tk. 20,000. Details are provided below in Table 3.1.1

Table: 3.1.1 Number of Households Surveyed

Household Income	Count
Below Tk. 3,125	113
Tk. 3,125 - Tk. 9,999	52
Tk. 10,000 - Tk. 19,999	36
Above Tk. 20,000	51
Total	252

3.1.2 Professional Background of Respondents

Most respondents, 26%, were housewives; about 22% employees of private companies and about 20% self employed, owning their own business. Details can be seen in Table: 3.1.2

Table: 3.1.2 Professions of Respondents

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Farming	1	.9%	0	.0%	0	.0%	2	3.9%	3	1.2%
Business	14	12.4%	11	21.2%	7	19.4%	17	33.3%	49	19.4%
Govt. Service	0	.0%	2	3.8%	3	8.3%	3	5.9%	8	3.2%
Private Service	25	22.1%	11	21.2%	10	27.8%	9	17.6%	55	21.8%
Housewife	28	24.8%	13	25.0%	9	25.0%	16	31.4%	66	26.2%
Others	45	39.8%	15	28.8%	7	19.4%	4	7.8%	71	28.2%
Total	113	100%	52	100%	36	100%	51	100%	252	100%

3.1.3 Types of Connection

Most households, about 98%, were domestic customers. This is an expected outcome since the survey is of households. A small number, about 2%, were conducting commercial activities from their homes. They, therefore, had commercial connections as well. Details are given below in Table: 3.1.3

Table 3.1.3 Type of Connections

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	110	97.3%	51	98.1%	36	100%	50	98.0%	247	98.0%
Commercial	3	2.7%	1	1.9%	0	.0%	1	2.0%	5	2.0%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	113	100%	52	100%	36	100%	51	100%	252	100%

Conclusion: A vast majority of household connections in Dhaka are domestic

3.1.4 Electricity Utilities

As Table: 3.1.4 below shows, a majority of households in Dhaka, 82%, are supplied by DESCO and about one-fifth by DESA..

Table: 3.1.4 Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESA	22	19.5%	11	21.2%	5	13.9%	9	17.6%	47	18.7%
DESCO	91	80.5%	41	78.8%	31	86.1%	42	82.4%	205	81.3%
REB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
WZPDCL	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	113	100%	52	100%	36	100%	51	100%	252	100%

Conclusion: Four fifth of the households in Dhaka are connected to DESCO, and one fifth to DESA

3.1.5 Load Shedding

Load shedding varies depending on whether it is summer or winter. During summer months there are about two to three hours of blackouts every day but they are not continuous. During winter it is slightly over an hour. Details can be seen below in Table 3.1.5

Table: 3.1.5 – Load Shedding

Load Shedding	Household Income				
	Below Tk. 3,125 Mean (hrs)	Tk. 3,125 - Tk. 9,999 Mean (hrs)	Tk. 10,000 - Tk. 19,999 Mean (hrs)	Above Tk. 20,000 Mean (hrs)	Total Mean (hrs)
Load-Shedding Summer Daytime	2.93	2.68	2.61	2.65	2.78
Load-Shedding Summer Night-time	2.29	2.27	2.22	2.23	2.26
Load-Shedding Winter Daytime	1.53	1.25	1.19	1.07	1.33
Load-Shedding Winter Night-time	1.07	1.12	1.11	1.05	1.08

Conclusion: During Summer load shedding is longer, more than 5 hours, and in winter shorter, around two and half

3.1.6 Electricity Consumption

Electricity consumption by households range from 47 Kwh per month in the lower income and, therefore, smaller households to 243 kwh in the higher, more affluent ones. Details can be seen Table 3.16.

Table: 3.1.6 – Amount of Electricity Used

Household Income	Kwh Used Last Month Mean (Tk.)	Bill Amount Last Month Mean (Tk.)	Kwh Used 2nd Last Month Mean (Tk.)	Bill Amount 2nd Last Month Mean (Tk.)	Kwh Used 3rd Last Month Mean (Tk.)	Bill Amount 3rd Last Month Mean (Tk.)	3 months' Average Kwh Used	3 months' Average Bill Amount (Tk.)
Below Tk. 3,125	47	188.35	46	184.43	47	185.29	46.9	186.02
Tk. 3,125 – Tk. 9,999	123	400.94	126	406.95	128	413.02	125.7	406.97
Tk. 10,000 - Tk. 19,999	130	465.42	131	473.41	129	474.65	130.0	471.16
Above Tk. 20,000	232	848.54	249	926.42	249	929.61	243.1	901.52

Conclusion: In Dhaka, household electricity consumption varies 47 Kwh in smaller households to 243 in larger ones

3.1.7 Alternatives Used During Load Shedding Hours

Most households, about 51%, resort to candle power during load shedding hours; 35% to rechargeable lights, and 22% oil lamps. Details can be seen below in Table 3.1.7

Table: 3.1.7 Lights Used During Load Shedding Hours

Lights Used During Load Shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	21	3			24
	%	18.6%	5.8%			9.6%
Oil Lamp	Count	29	13	5	7	54
	%	25.7%	25.0%	14.3%	13.7%	21.5%
Candle	Count	67	28	16	16	127
	%	59.3%	53.8%	45.7%	31.4%	50.6%
Rechargeable Light	Count	3	24	25	34	86
	%	2.7%	46.2%	71.4%	66.7%	34.3%
IPS	Count	2	1	1	3	7
	%	1.8%	1.9%	2.9%	5.9%	2.8%
Generator	Count				5	5
	%				9.8%	2.0%
Torch Light	Count	1	3	3	8	15
	%	.9%	5.8%	8.6%	15.7%	6.0%
Total Count		113	52	35	51	251
Total %		100%	100%	100%	100%	100%

Conclusion: Most respondents in Dhaka, 51%, use candles during load shedding; 34% use rechargeable lights and22% oil lamps

3.1.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical bulbs and ballasts are provided below in Table: 3.1.8. The survey found that CFL's had the longest life at 23.2 months and incandescent lamps, the lowest at 5.2 months. The survey also found that magnetic ballasts out lasted electronic ones, 16 months to 11 months.

Table: 3.1.8 Estimated Life of Different types of Bulbs

Replacement Time	Mean (months)
Replacement months for Incandescent Lights	5.2
Replacement months for Tube-lights	15.5
Replacement months for CFLs	23.2
Replacement months for Magnetic Ballasts	16.1
Replacement months for Electronic Ballasts	11.6

3.1.9 Savings from Energy Efficient Bulbs

Only about 60% respondents were aware that CFLs save electricity; one fifth, unaware; the rest, one fifth, did not respond. Details provided in Table 3.1.9 below.

Table: 3.1.9 Savings from CFL Bulbs

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	53	46.9%	34	65.4%	22	61.1%	43	84.3%	152	60.3%
No	29	25.7%	9	17.3%	10	27.8%	4	7.8%	52	20.6%
No Response	31	27.4%	9	17.3%	4	11.1%	4	7.8%	48	19.0%
Total	113	100%	52	100%	36	100%	51	100%	252	100%

Conclusion: About two thirds of respondents in Dhaka are aware that using CFLs will result in electricity savings

3.1.10 Savings from Electronic Ballasts

Only a fifth of the respondents in Dhaka were aware that using electronic ballasts instead of magnetic ones would result in electricity savings; one third did not know and about a half had no response. Details can be seen in Table 3.1.10

Table: 3.1.10 Savings from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 – Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	18	15.9%	13	25.0%	6	16.7%	20	39.2%	57	22.6%
No	33	29.2%	22	42.3%	12	33.3%	14	27.5%	81	32.1%
No Response	62	54.9%	17	32.7%	18	50.0%	17	33.3%	114	45.2%
Total	113	100%	52	100%	36	100%	51	100%	252	100%

Conclusion: Only one-fifth of respondents in Dhaka are aware of electricity savings when electronic ballasts are used

3.1.11 Savings from Energy Efficient Motors

Only about one fifth of the respondents were aware that savings in electricity are possible if energy efficient motors are used, one seventh did not know and about two thirds had no response. Details are in Table 3.1.11below.

Table: 3.1.11 – Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	14	12.4%	11	21.2%	6	16.7%	16	31.4%	47	18.7%
No	15	13.3%	4	7.7%	8	22.2%	8	15.7%	35	13.9%
No Response	84	74.3%	37	71.2%	22	61.1%	27	52.9%	170	67.5%
Total	113	100%	52	100%	36	100%	51	100%	252	100%

Conclusion: Only one fifth of respondents in Dhaka are aware that using EE motors saves electricity

3.1.12 Reasons for Not Using Energy Efficient Bulbs

The survey found slightly more than half the respondents citing high cost of energy efficient bulbs as the reason for not using them; one eighth because they did not believe in the savings or in their longevity or both; about one tenth cited poor color as the reason. Details can be seen in Table: 3.1.12 below.

Table: 3.1.12 - Reasons for Not Using Energy Efficient Bulbs

Reasons For Not Using EE Lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	32	21	12	21	86
	%	52.5%	56.8%	52.2%	47.7%	52.1%
Looks Not Good	Count		1		1	2
	%		2.7%		2.3%	1.2%
Not Suitable for Fitting	Count	1		2	2	5
	%	1.6%		8.7%	4.5%	3.0%
Don't Believe in Saving Claims	Count	9	4	2	7	22
	%	14.8%	10.8%	8.7%	15.9%	13.3%
Color of Light Not Good	Count	3	2	3	10	18
	%	4.9%	5.4%	13.0%	22.7%	10.9%
Quality of Light Not Good	Count	1		1	1	3
	%	1.6%		4.3%	2.3%	1.8%
Do not Believe Lamp Life Claims	Count	6	6	1	4	17
	%	9.8%	16.2%	4.3%	9.1%	10.3%
Voltage Fluctuation	Count		1		6	7
	%		2.7%		13.6%	4.2%
Not Sure	Count	5	1	2	2	10
	%	8.2%	2.7%	8.7%	4.5%	6.1%
Other Reasons	Count	11	2		1	14
	%	18.0%	5.4%		2.3%	8.5%
Total Count		61	37	23	44	165
Total %		100%	100%	100%	100%	100%

Conclusion: More than half of Dhaka cited high cost as the reason for not using CFLs; about 13% did not believe in the savings claims and 11% bad color

3.1.13 Reasons for Not Using Electronic Ballasts

About one fifth responded that they did not use electronic ballasts because they are expensive; another one fifth did not believe in the savings claims and extended bulb life; a quarter other reasons. Details are given below in Table: 3.1.13

Table: 3.1.13 - Reasons for Not Using Electronic Ballasts

Reasons For Not Using Electronic Ballasts		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	3	3	2	9	17
	%	9.7%	12.5%	18.2%	33.3%	18.3%
Have to Replace Very Often	Count		1	1		2
	%		4.2%	9.1%		2.2%
Not Suitable for Fitting	Count	2			1	3
	%	6.5%			3.7%	3.2%
Don't Believe in Savings Claim	Count	7	4	2	6	19
	%	22.6%	16.7%	18.2%	22.2%	20.4%
Voltage Fluctuation	Count	1			5	6
	%	3.2%			18.5%	6.5%
Quality of Light Not Good	Count	1		1	1	3
	%	3.2%		9.1%	3.7%	3.2%
Not Sure	Count	10	11	1	2	24
	%	32.3%	45.8%	9.1%	7.4%	25.8%
Other Reasons	Count	9	5	5	6	25
	%	29.0%	20.8%	45.5%	22.2%	26.9%
Count		31	24	11	27	93
%		100%	100%	100%	100%	100%

Conclusion: High Cost and disbelief in the amount of savings were cited as the reasons by an equal number of respondents, about 20% respondents in each category, as the reasons for not using electronic ballasts

3.1.14 Reasons for Not Using Energy Efficient Motors

About a quarter of those surveyed cited high cost as the reason for not using energy efficient motors; a quarter did not believe in the savings claimed; and a quarter gave other reasons. Details are given below in Table: 3.1.14

Table: 3.1.14 - Reasons for Not Using Energy Efficient Motors

Reasons For Not Using EE Motors		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	1	3	2	12	18
	%	3.4%	23.1%	20.0%	60.0%	25.0%
Don't Believe in Saving Claims	Count	4	6	2	5	17
	%	13.8%	46.2%	20.0%	25.0%	23.6%
Not Good Power	Count	1		1		2
	%	3.4%		10.0%		2.8%
Quality Not Good	Count	1			1	2
	%	3.4%			5.0%	2.8%
Don't Believe in Motor Life Claims	Count	6	2	1	2	11
	%	20.7%	15.4%	10.0%	10.0%	15.3%
Not Sure	Count	5	1	1	1	8
	%	17.2%	7.7%	10.0%	5.0%	11.1%
Other Reasons	Count	12	1	3	4	20
	%	41.4%	7.7%	30.0%	20.0%	27.8%
Count		29	13	10	20	72
%		100%	100%	100%	100%	100%

Conclusion: High Costs and disbelief in potential savings cited by most as reasons for not using energy efficient motors

3.1.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

About if a half the respondents were willing to buy energy saving bulbs at Tk. 300 provided savings of about 80% could be achieved; about a third were not; 17% did not respond. Details can be seen in Table: 3.1.15

Table: 3.1.15 Willingness to Buy at the Tk. 300 level

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	42	37.2%	34	65.4%	21	58.3%	31	60.8%	128	50.8%
No	41	36.3%	11	21.2%	13	36.1%	16	31.4%	81	32.1%
No Response	30	26.5%	7	13.5%	2	5.6%	4	7.8%	43	17.1%
Total	113	100%	52	100%	36	100%	51	100%	252	100%

Conclusion: 52% of respondents in Dhaka expressed willingness to buy CFLs at Tk. 300 provided they saved 80% electricity and last for four years

3.1.16 Price and the Willingness to Buy

The survey confirmed the classic inverse relationship between prices and demand: among those unwilling to buy at the Tk 300 level, three quarters were willing to do so at Tk. 100 and about a sixth at Tk 150. As expected, among lower income groups, elasticity was more pronounced than among higher. Details can be seen in Table 3.1.16 below.

Table: 3.1.16 – Price and the willingness to buy

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	1	2.1%	0	.0%	0	.0%	0	.0%	1	1.1%
Tk. 200	1	2.1%	3	21.4%	4	26.7%	2	11.1%	10	10.5%
Tk. 150	6	12.5%	4	28.6%	3	20.0%	2	11.1%	15	15.8%
Tk. 100	40	83.3%	7	50.0%	8	53.3%	14	77.8%	69	72.6%

Conclusion: At Tk. 100, more than 70% would buy CFLs

3.1.17 Price and Quantity

Survey shows willingness of households to buy 2 to 3 energy saving bulbs at the prices as mentioned above. Details are given below in Table: 3.1.17

Table: 3.1.17 Quantity households are willing to buy

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	2
Tk. 3,125 - Tk. 9,999	2
Tk. 10,000 - Tk. 19,999	3
Above Tk. 20,000	3

Conclusion: On average, households with monthly incomes over Tk. 10,000 will buy 3 energy savings bulbs whereas those with monthly incomes less than Tk. 10,000, 2bulbs

3.1.8 Preference for supply sources

Most respondents expressed preferences with regard to sources of supply. They preferred to buy from retailers or wholesalers; a quarter did not have any preferences; only 5% preferred from utilities. Details can be seen below in Table: 3.1.18

Table: 3.1.18 Preference for sources of supply

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	3	6.0%	1	7.1%	1	7.1%	0	.0%	5	5.2%
Retailer or Wholesaler	28	56.0%	11	78.6%	9	64.3%	17	94.4%	65	67.7%
Pay a Person Who Replaces EE Lamps at My House	0	.0%	0	.0%	1	7.1%	1	5.6%	2	2.1%
Pay by 12 Monthly Installments Adjusted Against Bill	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Any Place	19	38.0%	2	14.3%	3	21.4%	0	.0%	24	25.0%
Total	50	100%	14	100%	14	100%	18	100%	96	100%

Conclusion: Most households in Dhaka preferred to buy from retailers or wholesalers

3.2. Chittagong

3.2.1 Sample Size: Number of Households in Survey

242 households were surveyed in Chittagong. Incomes of 17% of these households were below Tk. 3,125 per month; 33% between Tk. 3,125 and Tk. 9,999; 25% between Tk. 10,000 to Tk. 19,999 and 26.5 % above Tk. 20,000. Details are provided below in Table 3.2.1

Table: 3.2.1 – Number of Household Surveyed

Household Income	Count
Below Tk. 3,125	40
Tk. 3,125 - Tk. 9,999	79
Tk. 10,000 - Tk. 19,999	59
Above Tk. 20,000	64
Total	242

3.2.2 Professions of Respondents

Most respondents, 35%, were businessman; 23% employees of private businesses and about 20% housewives. Details can be seen below in Table: 3.2.2

Table: 3.2.2 – Professions of Respondents

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Farming	0	.0%	0	.0%	1	1.7%	3	4.7%	4	1.7%
Business	15	37.5%	23	29.1%	14	23.7%	32	50.0%	84	34.7%
Govt. Service	0	.0%	5	6.3%	14	23.7%	2	3.1%	21	8.7%
Private Service	7	17.5%	23	29.1%	12	20.3%	14	21.9%	56	23.1%
Housewife	13	32.5%	21	26.6%	10	16.9%	5	7.8%	49	20.2%
Others	5	12.5%	7	8.9%	8	13.6%	8	12.5%	28	11.6%
Total	40	100%	79	100%	59	100%	64	100%	242	100%

3.2.3 Types of Connections

Most households, about 99%, were domestic customers. This is to be expected since the survey is of households. An insignificant number, about 1%, were also carrying on commercial activities from their homes. They, therefore, had commercial connections as well. Details are shown below in Table: 3.2.3

Table 3.2.3- Type of Connections

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	40	100%	79	100%	59	100%	62	96.9%	240	99.2%
Commercial	0	.0%	0	.0%	0	.0%	2	3.2%	2	.8%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	79	100%	59	100%	64	100%	242	100%

Conclusion: The vast majority of household connections in Chittagong are domestic

3.2.4 Electricity Utilities

100% of households in Chittagong are connected to PDB. This can be seen below in Table: 3.2.4

Table: 3.2.4 Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	40	100%	79	100%	59	100%	64	100%	242	100%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
WZPDCL	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	79	100%	59	100%	64	100%	242	100%

Conclusion: All the households in Chittagong are supplied electricity by PDB

3.2.5 Load Shedding

Load Shedding varies depending on whether it is summer or winter. During summer months there are about two to three hours of blackouts every day but they are not continuous. During winter it is slightly over an hour. Details can be seen from Table 3.2.5 below.

Table: 3.2.5 – Load Shedding

Load Shedding	Household Income				
	Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	Total
	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)
Summer Daytime	6.48	6.94	6.71	5.98	6.53
Summer Night-time	7.37	7.51	6.54	6.02	6.86
Winter Daytime	1.33	1.37	1.68	2.39	1.69
Winter Night-time	1.42	1.37	1.42	1.67	1.47

Conclusion: During Summer load shedding is longer, more than 12 hours, and in Winter shorter, around three hours

3.2.6 Electricity Used per Household

Average electricity used by households varies from 54 Kwh in the lower income, smaller households to 243 Kwh in the higher, more affluent. Details can be seen below in Table: 3.2.6

Table: 3.2.6 – Amount of Electricity Used

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	3 months' Average Kwh Used	3 months' Average Bill Amount (Tk.)
	Mean (Tk.)	Mean (Tk.)	Mean (Tk.)	Mean (Tk.)	Mean (Tk.)	Mean (Tk.)		
Below Tk. 3,125	54	167.20	54	166.93	54	165.95	54	166.69
Tk. 3,125 - Tk. 9,999	104	303.18	106	308.44	99	291.22	103	300.95
Tk. 10,000 - Tk. 19,999	142	412.73	143	421.05	149	439.00	144	424.26
Above Tk. 20,000	223	688.45	228	703.67	224	695.14	225	695.75

Conclusion: In Chittagong electricity usage varies from 54 for smaller households to 225 for larger households

3.2.7 Alternatives Used During Load Shedding Hours

Most households, about 50%, resort to using rechargeable lights during load shedding hours, 33% to candle power, 33%, and 27% to torch lights. Details can be seen below in Table: 3.2.7

Table: 3.2.7 Alternative Lights Used During Load Shedding

Lights Used During Load Shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	2	1		2	5
	%	5.0%	1.3%		3.3%	2.1%
Kuppi	Count				1	1
	%				1.6%	.4%
Candle	Count	20	18	20	21	79
	%	50.0%	22.8%	33.9%	34.4%	33.1%
Rechargeable Light	Count	25	54	23	17	119
	%	62.5%	68.4%	39.0%	27.9%	49.8%
IPS	Count				1	1
	%				1.6%	.4%
Generator	Count	1	1	7	17	26
	%	2.5%	1.3%	11.9%	27.9%	10.9%
Torch Light	Count		24	23	17	64
	%		30.4%	39.0%	27.9%	26.8%
Total Count		40	79	59	61	239
Total %		100%	100%	100%	100%	100%

Conclusion: During load shedding most respondents, 50% use rechargeable lights; 33% candles and 27% torch lights.

3.2.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical bulbs and ballasts are provided below in Table: 3.2.8. The survey found that CFL's had the longest life at 17.3 months and incandescent lamps the lowest, at 2.8 months. The survey also found that the life of electronic ballasts were lower at 4 months compared to 17.2 for the magnetic ones.

Table: 3.2.8 –Estimated Life of Different types of Bulbs

Replacement Time	Mean (months)
Replacement months for Incandescent Lights	2.8
Replacement months for Tube-lights	12.3
Replacement months for CFLs	17.3
Replacement months for Magnetic Ballasts	17.2
Replacement months for Electronic Ballasts	4.0

3.2.9 Savings from Energy Efficient Bulbs

A vast majority of respondents, 93%, were aware that using CFL's would result in electricity savings; 5% unaware; the rest, about 2%, had no response. Details provided in Table 3.2.9 below.

Table: 3.2.9 – Savings from CFL Bulbs

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	38	95.0%	77	97.5%	54	91.5%	55	85.9%	224	92.5%
No	1	2.5%	0	0.0%	4	6.8%	7	10.9%	12	5.05%
No Response	1	2.5%	2	2.5%	1	1.7%	2	3.1%	6	2.45%
Total	40	100%	79	100%	59	100%	64	100%	242	100%

Conclusion: 93% of respondents in Chittagong are aware that using CFLs will result in electricity savings

3.2.10 Savings from Electronic Ballasts

More than half of the respondents in Chittagong were aware that using electronic ballasts instead of magnetic ones would result in electricity savings; 9% did not know and about 40% had no response. Details can be seen in Table 3.2.10

Table: 3.2.10 Savings from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	13	32.5%	31	39.2%	35	59.3%	50	78.1%	129	52.3%
No	2	5.0%	9	11.4%	3	5.1%	8	12.5%	22	8.5%
No Response	25	62.5%	39	49.4%	21	35.6%	6	9.4%	91	39.2%
Total	40	100%	79	100%	59	100%	64	100%	242	100%

Conclusion: More than half the respondents in Chittagong are aware of electricity savings when electronic ballasts are used

3.2.11 Savings from Energy Efficient Motors

About half the respondents were aware that savings in electricity are possible if energy efficient motors are used; about 7% did not know; over 40% had no response. Details are in Table 3.2.11 below.

Table: 3.2.11 –Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income								Total	
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000			
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	13	32.5%	32	40.5%	33	55.9%	47	73.4%	125	50.6%
No	1	2.5%	2	2.5%	3	5.1%	11	17.2%	17	6.8%
No Response	26	65.0%	45	57.0%	23	39.0%	6	9.4%	100	42.6%
Total	40	100%	79	100%	59	100%	64	100%	242	100%

Conclusion: About half the respondents in Chittagong are aware that using EE Motors saves electricity

3.2.12 Reasons for Not Using Energy Efficient Bulbs

In Chittagong there were multiple responses to this question. The survey found 55% that is, more than half the respondents citing high cost as the reason for not using CFL bulbs and equal number, 55%, citing voltage fluctuations as the reason; about 27% because they did not believe that there would be savings and about 10% because of aesthetics; and only 5% cited poor color as the reason. Details can be seen in Table: 3.2.12 below.

Table: 3.2.12 Reasons for Not Using Energy Efficient Bulbs

Reasons For Not Using EE Lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	28	37	33	28	126
	%	73.7%	46.8%	60.0%	48.3%	54.8%
Looks Not Good	Count	1	12	5	1	19
	%	2.6%	15.2%	9.1%	1.7%	8.3%
Not Suitable for Fitting	Count	1	1	4		6
	%	2.6%	1.3%	7.3%		2.6%
Don't Believe in Saving Claims	Count	5	15	12	29	61
	%	13.2%	19.0%	21.8%	50.0%	26.5%
Color of Light Not Good	Count	3	4	3	1	11
	%	7.9%	5.1%	5.5%	1.7%	4.8%
Quality of Light Not Good	Count		3	1		4
	%		3.8%	1.8%		1.7%
Do not Believe Lamp Life Claims	Count	1	3			4
	%	2.6%	3.8%			1.7%
Voltage Fluctuation	Count	28	37	33	28	126
	%	73.7%	46.8%	60.0%	48.3%	54.8%
Not Sure	Count		2	1		3
	%		2.5%	1.8%		1.3%
Other Reasons	Count		3			3
	%		3.8%			1.3%
Total Count		61	38	79	55	58
Total %		100%	100%	100%	100%	100%

Conclusion: More than half of Chittagong cited high bulb cost as the reason for not using EE Bulbs and another half because of voltage fluctuation

3.2.13 Reasons for Not Using Electronic Ballasts

More than half cited the high cost of electronic ballasts as the reason for not using electronic ballasts; a quarter because they thought it has to be replaced frequently; and 13% because of voltage fluctuation. Details are given below in Table: 3.2.13

Table: 3.2.13 - Reasons for Not Using Electronic Ballasts

Reasons For Not Using Electronic Ballasts		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	7	16	18	29	70
	%	53.8%	51.6%	51.4%	56.9%	53.8%
Have to Replace Very Often	Count	1	7	10	15	33
	%	7.7%	22.6%	28.6%	29.4%	25.4%
Not Suitable for Fitting	Count	1	3		2	6
	%	7.7%	9.7%		3.9%	4.6%
Don't Believe in Savings Claim	Count	3	3	6	5	17
	%	23.1%	9.7%	17.1%	9.8%	13.1%
Voltage Fluctuation	Count			1		1
	%			2.9%		.8%
Quality of Light Not Good	Count	1	2			3
	%	7.7%	6.5%			2.3%
Not Sure	Count					
	%					
Other Reasons	Count					
	%					
Count		13	31	35	51	130
%		100%	100%	100%	100%	100%

Conclusion: Disbelief in savings and High Cost cited by most respondents as the reasons for not using electronic ballasts.

3.2.14 Reasons for Not Using Energy Efficient Motors

More than half of those surveyed cited high cost as the reason for not using energy efficient motors; about 6% did not believe in the savings claimed; and about 11% cited other reasons such as (more details needed). Details are given below in Table: 3.2.14

Table: 3.2.14 - Reasons for Not Using Energy Efficient Motors

Reasons For Not Using EE Motors		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	6	17	20	33	76
	Column %	46.2%	53.1%	60.6%	66.0%	59.4%
Needs Repairs Often	Count			2	5	7
	Column %			6.1%	10.0%	5.5%
Not Suitable for Fitting	Count		2	1	4	7
	Column %		6.3%	3.0%	8.0%	5.5%
Don't Believe in Saving Claims	Count			1		1
	Column %			3.0%		.8%
Not Good Power	Count	1				1
	Column %	7.7%				.8%
Quality Not Good	Count	1	1			2
	Column %	7.7%	3.1%			1.6%
Don't Believe in Motor Life Claims	Count	2		1		3
	Column %	15.4%		3.0%		2.3%
Voltage Fluctuation	Count	1		1	2	4
	Column %	7.7%		3.0%	4.0%	3.1%
Not Sure	Count	1	9	2	2	14
	Column %	7.7%	28.1%	6.1%	4.0%	10.9%
Other Reasons	Count	1	5	5	4	15
	Column %	7.7%	15.6%	15.2%	8.0%	11.7%
Count		13	32	33	50	128
Column %		100.0%	100.0%	100.0%	100.0%	100.0%

Conclusion: High Costs and disbelief in potential savings cited by most as reasons for not using energy efficient motors

3.2.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

About a half of the respondents were willing to buy CFL bulbs at Tk. 300 provided savings of about 80% can be achieved; 33% were not; and the rest, 17%, had no response. Details are given below in Table: 3.2.15

Table: 3.2.15 - Willingness to Buy at Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	40	100%	77	97.5%	58	98.3%	63	98.4%	238	98.3%
No	0	.0%	1	1.3%	0	.0%	0	.0%	1	.4%
No Response	0	.0%	1	1.3%	1	1.7%	1	1.6%	3	1.2%
Total	40	100%	79	100%	59	100%	64	100%	242	100%

Conclusion: Almost all the respondents in Chittagong expressed willingness to buy CFLs at Tk. 300 provided electricity savings are about 80% and they last for 4 years

3.2.16 Price and Willingness to Buy

No response received

3.2.17 How Many Will You Purchase

No response received

3.2.18 Preferred Place of Purchase

No response received

3.3 Rajshahi

3.3.1 Sample Size: Number of Households in Survey

236 households were surveyed in Rajshahi. Incomes of 17% of these households were below Tk. 3,125 per month; 32% between Tk. 3,125 and Tk. 9,999; 25% between Tk. 10,000 to Tk. 19,999 and 26% above Tk. 20,000. Details are provided below in Table 3.3.1

Table: 3.3.1 – Number of Household Surveyed

Household Income	Count
Below Tk. 3,125	40
Tk. 3,125 - Tk. 9,999	76
Tk. 10,000 - Tk. 19,999	59
Above Tk. 20,000	61
Total	236

3.3.2 Professions of Respondents

Most respondents, about 31%, were businessmen; 27% government employees; and about 9% housewives. Details are can be seen in Table: 3.3.2

Table: 3.3.2 – Profession of Respondents

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Farming	6	15.0%	0	.0%	1	1.7%	0	.0%	7	3.0%
Business	12	30.0%	26	34.2%	16	27.1%	20	32.8%	74	31.4%
Govt. Service	3	7.5%	22	28.9%	23	39.0%	16	26.2%	64	27.1%
Private Service	1	2.5%	8	10.5%	6	10.2%	2	3.3%	17	7.2%
Housewife	3	7.5%	10	13.2%	5	8.5%	4	6.6%	22	9.3%
Others	15	37.5%	10	13.2%	8	13.6%	19	31.1%	52	22.0%
Total	40	100%	76	100%	59	100%	61	100%	236	100%

3.3.3 Types of Connections

Most households, about 98%, were domestic customers - an expected outcome since it is household survey. A small number, about 2%, were conducting commercial activities from their homes and so they had commercial connections as well. Details are given below in Table: 3.3.3

Table 3.3.3- Types of Connections

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	40	100.0 %	75	100.0 %	57	96.6%	59	96.7%	231	98.3%
Commercial	0	.0%	0	.0%	2	3.4%	2	3.3%	4	1.7%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	75	100%	59	100%	61	100%	235	100%

Conclusion: A vast majority of household connections in Rajshahi are domestic

3.3.4 Electricity Utilities

As can be seen from Table: 3.3.4, PDB supplies electricity to 100% of households in Rajshahi

Table: 3.3.4 – Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	40	100%	76	100%	59	100%	61	100%	236	100%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
WZPDCL	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	76	100%	59	100%	61	100%	236	100%

Conclusion: All households in Rajshahi are connected to PDB

3.3.5 Load Shedding

Rajshahi is among the lowest load shedding areas in Bangladesh. Like other places, the total hours of load shedding varies depending on whether it is summer or winter. During the former, blackouts take place for about 3 hours per day whereas during the winter, it is for about an hour. Details are provided in Table 3.3.5

Table: 3.3.5 – Load Shedding

Load-Shedding	Mean (hrs)
Summer Daytime	1.27
Summer Night-time	1.71
Winter Daytime	.32
Winter Night-time	.85

Conclusion: Rajshahi is among the lowest load shedding areas in the country. In summer load shedding is longer about 3 hours, and in winter shorter, a little over an hour

3.3.6 Electricity Used per Household

Average electricity used by households varies from 94 Kwh in lower income, small households to 317 Kwh in larger, more affluent ones. Details can be seen below in Table: 3.3.6

Table: 3.3.6 – Amount of Electricity Used

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	3 Months Average Kwh Used	3 Months Average Bill Amount
	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)
Below Tk. 3,125	89	275	96	282	95	277	94	278
Tk. 3,125 - Tk. 9,999	111	334	116	357	109	335	112	342
Tk. 10,000 - Tk. 19,999	159	505	165	554	154	541	159	534
Above Tk. 20,000	312	1002	318	1038	322	1054	317	1031

Conclusion: In Rajshahi household electricity consumption varies from 94 Kwh in smaller ones to 317 in larger households

3.3.7 Alternatives Used During Load Shedding Hours

Most households, about 39%, resort to using oil lamps during load shedding hours; around 33% candle power; and 32% rechargeable lights. Details can be seen below in Table: 3.3.7

Table: 3.3.7 – Lights Used During Load Shedding

Lights Used During Load Shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	5	4	4	1	14
	Column %	12.5	5.3	6.8	1.7	6.0%
Oil Lamp	Count	30	45	14	2	91
	Column %	75.0	59.2	23.7	3.3	38.7%
Candle	Count	8	23	24	23	78
	Column %	20.0	30.3	40.7	38.3	33.2%
Rechargeable Light	Count		9	23	43	75
	Column %		11.8	39.0	71.7	31.9%
IPS	Count				2	2
	Column %				3.3	.9%
Generator	Count				10	10
	Column %				16.7	4.3%
Count		40	76	59	60	235

Conclusion: During load shedding most respondents in Rajshahi use oil lamps followed by candles and then rechargeable lights

3.3.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical lights and ballasts are provided below in Table: 3.1.8. The survey found that Tube Lights had the longest life at 16.2 months and incandescent lamps, the lowest at 8.4 months and CFL's in between at 12.8 months. The survey also found that electronic ballasts lasted the lowest at 1.8 months compared to 14.8 for the magnetic ones. Details are shown below in Table: 3.3.8

Table: 3.3.8 Estimated Life of Different types of Bulbs

Replacement Period	Mean(months)
Incandescent Lights	8.4
Tube-lights	16.2
CFLs	12.8
Magnetic Ballasts	14.8
Electronic Ballasts	1.8

3.3.9 Savings from Energy Efficient Bulbs

A great majority of respondents, 80%, were aware that using CFL's would result in electricity savings; one sixth unaware; the rest, about 5%, had no response. Details provided in Table 3.3.9 below.

Table: 3.3.9 Savings from CFL Bulbs

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	21	52.5%	56	73.7%	54	91.5%	56	91.8%	187	79.2%
No	14	35.0%	18	23.7%	2	3.4%	4	6.6%	38	16.1%
No Response	5	12.5%	2	2.6%	3	5.1%	1	1.6%	11	4.7%
Total	40	100%	76	100%	59	100%	61	100%	236	100%

Conclusion: About four fifths of the respondents in Rajshahi are aware of electricity savings from EE bulbs

3.3.10 Savings from Electronic Ballasts

Only a quarter of the respondents in Rajshahi were aware that using electronic ballasts instead of magnetic ones would result in electricity savings; one third did not know; and about 40% had no response. Details can be seen in Table 3.3.10

Table: 3.3.10 – Savings from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	11	27.5%	25	32.9%	9	15.3%	12	19.7%	57	24.2%
No	8	20.0%	32	42.1%	15	25.4%	31	50.8%	86	36.4%
No Response	21	52.5%	19	25.0%	35	59.3%	18	29.5%	93	39.4%
Total	40	100%	76	100%	59	100%	61	100%	236	100%

Conclusion: A quarter of respondents were aware that electricity could be saved if electronic ballasts were used; about one third did not; and 40% were unresponsive.

3.3.11 Savings from Energy Efficient Motors

Only a fifth of the respondents were aware that savings in electricity are possible if energy efficient motors are used; about 37% did not know; over 40% had no response. Details are in Table 3.2.11 below.

Table: 3.3.11 – Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	11	27.5%	25	32.9%	6	10.2%	7	11.5%	49	20.8%
No	8	20.0%	30	39.5%	16	27.1%	34	55.7%	88	37.3%
No Response	21	52.5%	21	27.6%	37	62.7%	20	32.8%	99	41.9%
Total	40	100%	76	100%	59	100%	61	100%	236	100%

Conclusion: About only one fifth of the respondents in Rajshahi are aware that using EE Motors saves electricity

3.3.12 Reasons for Not Using Energy Efficient Bulbs

In Rajshahi, the survey found seven out eight respondents citing high cost as the reason for not using energy efficient bulbs; and about one tenth citing poor color as the reason. Details can be seen in Table: 3.3.12 below.

Table: 3.3.12 - Reasons for Not Using Energy Efficient Bulbs

Reasons For Not Using EE Lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	29	60	52	55	196
	Column %	74.4	81.1	92.9	98.2	87.1%
Not Suitable for Fitting	Count		2			2
	Column %		2.7			.9%
Don't Believe in Saving Claims	Count				1	1
	Column %				1.8	.4%
Color of Light Not Good	Count		1		15	16
	Column %		1.4		26.8	7.1%
Quality of Light Not Good	Count		2	5	19	26
	Column %		2.7	8.9	33.9	11.6%
Do not Believe Lamp Life Claims	Count	1	2		1	4
	Column %	2.6	2.7		1.8	1.8%
Voltage Fluctuation	Count		1		1	2
	Column %		1.4		1.8	.9%
Not Sure	Count	8	8	1		17
	Column %	20.5	10.8	1.8		7.6%
Other Reasons	Count	3	3	2	2	10
	Column %	7.7	4.1	3.6	3.6	4.4%
Count		39	74	56	56	225

Conclusion: Seven out of eight of the respondents in Rajshahi cited high bulb cost as the reason for not using EE Bulbs

3.3.13 Reasons for Not Using Electronic Ballasts

About three quarters responded that the reason for which they did not use electronic ballasts in place of magnetic ballast is that they are expensive, about a quarter were not sure about the usefulness of using electronic ballasts. Details are given below in Table: 3.3.13

Table: 3.3.13 - Reasons for Not Using Electronic Ballasts

Reasons For Not Using Electronic Ballasts		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	13	23	8	7	51
	Column %	61.9	76.7	88.9	100.0	76.1%
Not Suitable for Fitting	Count		1			1
	Column %		3.3			1.5%
Not Sure	Count	8	6	1		15
	Column %	38.1	20.0	11.1		22.4%
Count		21	30	9	7	67

Conclusion: Most respondents in Rajshahi, 76%, indicated that they did not use electronic ballasts because they were expensive

3.3.14 Reasons for Not Using Energy Efficient Motors

About three quarters of those surveyed cited high cost as the reason for not using energy efficient motors; about 4% did not believe in the savings claimed; and about quarter gave other reasons such as (more details needed). Details are given below in Table: 3.3.14

Table: 3.3.14 - Reasons for Not Using Energy Efficient Motors

Reason For Not Using EE Motors		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	12	20	4	6	42
	Column %	63.2	76.9	80.0	100.0	75.0%
Not Suitable for Fitting	Count		1			1
	Column %		3.8			1.8%
Don't Believe in Motor Life Claims	Count	1				1
	Column %	5.3				1.8%
Not Sure	Count	6	5	1		12
	Column %	31.6	19.2	20.0		21.4%
Count		19	26	5	6	56

Conclusion: Most of the respondents in Rajshahi do not use the energy efficient motors because they are expensive

3.3.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

A large number of respondents, about 63%, expressed willingness to buy CFL bulbs at Tk. 300 provided savings of about 80% can be achieved; about 20% were not willing; and about 17% had no response. Details are given below in Table: 3.3.15

Table: 3.3.15 - Willingness to Buy at Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	16	40.0%	41	53.9%	40	67.8%	51	83.6%	148	62.7%
No	11	27.5%	20	26.3%	13	22.0%	4	6.6%	48	20.3%
No Response	13	32.5%	15	19.7%	6	10.2%	6	9.8%	40	16.9%
Total	40	100%	76	100%	59	100%	61	100%	236	100%

Conclusion: Most respondents, 63%, are willing to buy CFLs if electricity savings are about 80%

3.3.16 Prices and the Willingness to Buy

The survey confirmed the classic inverse relationship between costs and demand: among those unwilling to buy at the Tk 300 level, four out of five were willing to do so at Tk. 100 and about a sixth at Tk 150. The survey also found that price elasticity was more pronounced among lower income groups than at higher. This was to be expected. Details can be seen in Table 3.3.16 below.

Table: 3.3.16 Prices and Quantity

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Tk. 200	0	.0%	0	.0%	1	7.7%	1	25.0%	2	4.1%
Tk. 150	1	8.3%	3	15.0%	4	30.8%	0	.0%	8	16.3%
Tk. 100	11	91.7%	17	85.0%	8	61.5%	3	75.0%	39	79.6%

Conclusion: At Tk. 100, more than 80% would buy CFLs

3.3.17 Price and Quantity

Survey results show erratic responses from households. However, most respondents irrespective of income levels expressed willingness to buy 2 bulbs at their desired prices. Details are given below in Table: 3.3.17

Table: 3.3.17 Quantity households willing to buy

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	2
Tk. 3,125 - Tk. 9,999	2
Tk. 10,000 - Tk. 19,999	3
Above Tk. 20,000	2

Conclusion: Most households would buy 2 CFLs at the desired prices

3.3.18 Preferences for supply sources

More than two thirds of the respondents would prefer to buy the CFLs from a retailer or a wholesaler; about 16% would buy if payments were in installments; 12% from visiting installers. Details are shown below in Table: 3.3.18

Table: 3.3.18 Preference for supply sources

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	0	.0%	0	.0%	1	7.1%	0	.0%	1	2.0%
Retailer or Wholesaler	6	50.0%	15	75.0%	10	71.4%	3	75.0%	34	68.0%
Pay a Person Who Replaces EE Lamps at My House	3	25.0%	2	10.0%	1	7.1%	0	.0%	6	12.0%
Pay by 12 Monthly Installments Adjusted Against Bill	3	25.0%	2	10.0%	2	14.3%	1	25.0%	8	16.0%
Any Place	0	.0%	1	5.0%	0	.0%	0	.0%	1	2.0%
Total	12	100%	20	100%	14	100%	4	100%	50	100%

Conclusion: Most of the households in Rajshahi preferred to buy from retailers and/or wholesalers

3.4. Sylhet

3.4.1 Sample Size: Number of Households in Survey

250 households were surveyed in Sylhet. Incomes of 15% of these households were below Tk. 3,125 per month, 31% between Tk. 3,125 and Tk. 9,999, 30.6% between Tk. 10,000 to Tk. 19,999 and 24% above Tk. 20,000. Details are provided below in Table 3.4.1

Table: 3.4.1 – Number of Households Surveyed

Household Income	Count
Below Tk. 3,125	38
Tk. 3,125 - Tk. 9,999	78
Tk. 10,000 - Tk. 19,999	74
Above Tk. 20,000	60
Total	250

3.4.2 Professions of Respondents

Most respondents, 28%, were businessmen; 26% housewives; and about 33% of mixed professional background. Details are shown below in Table: 3.4.2

Table: 3.4.2 – Professions of Respondents

Main Profession	Household Income				
	Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	Total
	Count	Count	Count	Count	Count
Farming	1	2	0	0	3 (1%)
Business	7	16	26	20	69 (28%)
Govt. Service	0	7	6	2	15 (6%)
Private Service	0	9	6	1	16 (6%)
Housewife	11	22	17	12	62 (26%)
Others	19	22	19	25	85 (33%)
Total	38	78	74	60	250

3.4.3 Types of Connections

All households, 100%, were domestic customers. This is to be expected since the survey is of households. There were no other types of connections in these households. Details are shown below in Table: 3.4.3

Table 3.4.3- Type of Connections

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	38	100%	78	100%	74	100%	60	100%	249	100%
Commercial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	38	100%	78	100%	74	100%	60	100%	250	100%

Conclusion: All electricity connections in Sylhet are domestic

3.4.4 Electricity Utilities

In Sylhet, 100 % of all households are supplied by PDB. This can be seen in Table: 3.4.4 below.

Table: 3.4.4 – Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	38	100%	78	100%	74	100%	60	100%	250	100%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
WZPDCL	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	38	100%	78	100%	74	100%	60	100%	250	100%

Conclusion: All the households in Sylhet are connected to PDB

3.4.5 Load Shedding

Load shedding in Sylhet is among the highest. In summer, it is almost 9 hours every day and in winter more than three and half hours. The details can be seen below in Table 3.4.5

Table: 3.4.5 – Load Shedding

Load-Shedding	Mean (hrs)
Summer Daytime	4.50
Summer Night-time	4.33
Winter Daytime	1.94
Winter Night-time	1.61

Conclusion: In Summer blackouts are for more than 9 hours and in Winter shorter, about 3.5 hours

3.4.6 Electricity Used per Household

Monthly usage of electricity varies from 137 Kwh in lower income, smaller households to 283 Kwh in larger, more affluent ones. Details can be seen below in Table: 3.4.6

Table: 3.4.6 – Amount of Electricity Used

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	3 Months Average Kwh Used	3 Months Average Bill Amount
	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)
Below Tk. 3,125	140	423	124	374	147	444	137	414
Tk. 3,125 - Tk. 9,999	161	488	155	464	149	445	155	466
Tk. 10,000 - Tk. 19,999	225	696	217	680	224	696	222	690
Above Tk. 20,000	292	950	273	855	284	888	283	898

Conclusion: In Sylhet the amount of Kwh of electricity used varies from 137 for smaller households to 283 for larger households

3.4.7 Alternatives Used During Load Shedding Hours

Most households, about 48%, resort to using candle power during load shedding hours; 40% to rechargeable lights; and 12% to hurricane lamps. Details can be seen below in Table: 3.4.7

Table: 3.4.7 – Lights Used During Load Shedding

Lights Used During Load Shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	5	11	6	8	30
	Column %	13.5	14.1	8.1	13.3	12.0%
Oil Lamp	Count	4	4	1		9
	Column %	10.8	5.1	1.4		3.6%
Candle	Count	20	37	31	30	118
	Column %	54.1	47.4	41.9	50.0	47.4%
Rechargeable Light	Count	12	24	38	25	99
	Column %	32.4	30.8	51.4	41.7	39.8%
IPS	Count			1		1
	Column %			1.4		.4%
Generator	Count	9	9	12	17	47
	Column %	24.3	11.5	16.2	28.3	18.9%
Torch Light	Count	1	3	4	5	13
	Column %	2.7	3.8	5.4	8.3	5.2%
Others	Count			1		1
	Column %			1.4		.4%
Count		37	78	74	60	249

Conclusion: During load shedding most households, 48%, use candles; about 40% rechargeable lights; and 19% generators

3.4.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical lights and ballasts are provided below in Table: 3.4.8. The survey found that CFL's had the longest life at 11.6 months and incandescent lamps, the lowest at 2.4 months. There were no responses to magnetic and electronic ballasts questions.

Table: 3.4.8 –Estimated Life of Different types of Bulbs

Replacement Period	Mean(months)
Incandescent Lights	2.4
Tube-lights	11.5
CFLs	11.6
Magnetic Ballasts	.
Electronic Ballasts	.

3.4.9 Savings from Energy Efficient Bulbs

About 75% of respondents were aware that using CFL bulbs would result in electricity savings; about 22% unaware; 3%, had no response. Details are provided below in Table 3.4.9

Table: 3.4.9 Savings from CFL's

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	24	63.2%	54	69.2%	57	77.0%	52	86.7%	187	74.8%
No	14	36.8%	19	24.4%	16	21.6%	7	11.7%	56	22.4%
No Response	0	.0%	5	6.4%	1	1.4%	1	1.7%	7	2.8%
Total	38	100%	78	100%	74	100%	60	100%	250	100%

Conclusion: About three fourths of respondents in Sylhet are aware of electricity savings from EE bulbs

3.4.10 Savings from Electronic Ballasts

Fully 99% of respondents were unaware that using electronic ballasts instead of magnetic ones would result in electricity savings. Details can be seen in Table 3.4.10 below.

Table: 3.4.10 – Savings from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
No	38	100%	76	97.4%	74	100%	60	100%	248	99.2%
No Response	0	.0%	2	2.6%	0	.0%	0	.0%	2	.8%
Total	38	100%	78	100%	74	100%	60	100%	250	100%

Conclusion: Almost all, 99%, are unaware of savings from use of electronic ballasts

3.4.11 Savings from Energy Efficient Motors

Over 99% of the respondents were aware that savings in electricity are possible if energy efficient motors are used; only 1% had no response. Details are in Table 3.4.11 below.

Table: 3.4.11 – Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
No	38	100%	76	97.4%	74	100%	60	100%	248	99.2%
No Response	0	.0%	2	2.6%	0	.0%	0	.0%	2	.8%
Total	38	100%	78	100%	74	100%	60	100%	250	100%

Conclusion: Almost all respondents, 99%, are unaware of any savings that can be derived from using EE Motors

3.4.12 Reasons for Not Using Energy Efficient Bulbs

The survey found seven out of eight respondents citing high cost as the reason for not using CFL bulbs; about 5% because of skepticism regarding longevity claims; and about 1% because of skepticism in savings claimed. Details can be seen in Table: 3.4.12 below.

Table: 3.4.12 - Reasons for Not Using Energy Efficient Bulbs

Reasons For Not Using EE Lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	25	52	54	47	178
	Column %	89.3	83.9	87.1	85.5	86.0%
Don't Believe in Saving Claims	Count	1		1		2
	Column %	3.6		1.6		1.0%
Color of Light Not Good	Count	1	1			2
	Column %	3.6	1.6			1.0%
Quality of Light Not Good	Count	1		1		2
	Column %	3.6		1.6		1.0%
Do not Believe Lamp Life Claims	Count		3	4	4	11
	Column %		4.8	6.5	7.3	5.3%
Not Sure	Count		3		3	6
	Column %		4.8		5.5	2.9%
Other Reasons	Count	1	4	2	2	9
	Column %	3.6	6.5	3.2	3.6	4.3%
Total Count		28	62	62	55	207

Conclusion: Almost seven out of eight respondents cited the high cost as the reason for not using CFLs

3.4.13 Reasons for Not Using Electronic Ballasts

Since respondents were unaware that electronic ballasts save energy there was no response from them.

Conclusion: Households in Sylhet are unaware of any savings from electronic ballasts, hence there were no responses.

3.4.14 Reasons for Not Using Energy Efficient Motors

Since respondents were unaware that there were savings from using energy efficient motors, there was no response.

Conclusion: Households in Sylhet are unaware of any savings from energy efficient motors, hence there were no responses.

3.4.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

About two thirds of respondents expressed willingness to buy CFL bulbs at Tk. 300; about a quarter did not; about 8% had no response. Details are given below in Table: 3.4.15

Table: 3.4.15 Willingness to Buy at Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	23	60.5%	38	48.7%	48	64.9%	50	83.3%	159	63.6%
No	10	26.3%	33	42.3%	21	28.4%	6	10.0%	70	28.0%
No Response	5	13.2%	7	9.0%	5	6.8%	4	6.7%	21	8.4%
Total	38	100%	78	100%	74	100%	60	100%	250	100%

Conclusion: A large majority, 64% expressed willingness to buy CFLs at Tk. 300 if they really saved 80% electricity

3.4.16 Prices and the Willingness to Buy

The survey confirmed the classic inverse relationship between costs and demand: among those unwilling to buy at the Tk 300 level, seven out of eight were willing to do so at Tk. 100 and about one eight at Tk 150. The survey also found that price elasticity was more pronounced among lower income groups than at higher. This was expected. Details can be seen in Table 3.4.16 below.

Table: 3.4.16 Prices and the willingness to buy

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	0	.0%	0	.0%	1	4.5%	0	.0%	1	1.4%
Tk. 200	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Tk. 150	1	10.0%	4	12.1%	3	13.6%	1	16.7%	9	12.7%
Tk. 100	9	90.0%	29	87.9%	18	81.8%	5	83.3%	61	85.9%

Conclusion: At Tk 100 price, the greater majority would buy

3.4.17 Price and Quantity

The survey shows that households are willing to buy about 2 to 3 CFL bulbs at the prices as mentioned above. Details are given below in Table: 3.4.17

Table: 3.4.17 Prices and Quantity

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	2
Tk. 3,125 - Tk. 9,999	2
Tk. 10,000 - Tk. 19,999	3
Above Tk. 20,000	3

Conclusion: Households with monthly incomes over Tk. 10,000 will buy 3 energy savings bulbs, whereas those with incomes less than Tk. 10,000, 2 lamps

3.4.18 Preferences for supply sources

Almost four out of five of the respondents would prefer to buy the CFLs from retailers or wholesaler. Details are shown below in Table: 3.4.18

Table: 3.4.18 Preference for supply sources

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Retailer or Wholesaler	9	90.0%	27	81.8%	17	77.3%	6	100.0 %	59	83.1%
Pay a Person Who Replaces EE Lamps at My House	0	.0%	2	6.1%	5	22.7%	0	.0%	7	9.9%
Pay by 12 Monthly Installments Adjusted Against Bill	1	10.0%	4	12.1%	0	.0%	0	.0%	5	7.0%
Any Place	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	10	100%	33	100%	22	100%	6	100%	71	100%

Conclusion: Most of the households in Sylhet would like to purchase energy saving lamps from retailers or wholesalers

3.5. Bogra

3.5.1 Sample Size: Number of Households in Survey

235 households were surveyed in Bogra. 18 % of these households had incomes below Tk. 3,125 per month, 32% between Tk. 3,125 and Tk. 9,999, 26% between Tk. 10,000 to Tk. 19,999 and 26% above Tk. 20,000. Details are provided below in Table 3.5.1

Table: 3.5.1 – Number of Households Surveyed

Household Income	Count
Below Tk. 3,125	40
Tk. 3,125 - Tk. 9,999	75
Tk. 10,000 - Tk. 19,999	60
Above Tk. 20,000	60
Total	235

3.5.2 Professions of Respondents

Most respondents, 33%, were businessmen; 22% were housewives; about 36% were of other professions. Details are shown below in Table: 3.5.2

Table: 3.5.2 – Professions of Respondents

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Farming	2	5.0%	0	.0%	0	.0%	0	.0%	2	.9%
Business	10	25.0%	25	33.3%	21	35.0%	22	36.7%	78	33.2%
Govt. Service	3	7.5%	2	2.7%	1	1.7%	6	10.0%	12	5.1%
Private Service	2	5.0%	0	.0%	0	.0%	4	6.7%	6	2.6%
Housewife	7	17.5%	17	22.7%	17	28.3%	10	16.7%	51	21.7%
Others	16	40.0%	31	41.3%	21	35.0%	18	30.0%	86	36.6%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

3.5.3 Types of Connections

All households, 100%, had domestic connections. This is to be expected since the survey is of households. Like Sylhet, there were no commercial activities being carried out from these households and hence there were no commercial connections at these households. Details are shown below in Table: 3.5.3

Table 3.5.3- Type of Connections

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	40	100%	75	100%	60	100%	60	100%	235	100%
Commercial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: All electricity connections in Bogra are domestic

3.5.4 Electric Utilities

All households in Bogra are connected to the PDB as can be seen below in Table: 3.5.4

Table: 3.5.4 Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	40	100%	75	100%	60	100%	60	100%	235	100%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
WZPDCL	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: All the households in Bogra are connected to PDB

3.5.5 Load Shedding

Load shedding during the summer months is about 5.5 hours daily whereas during winter it is about 1.5 hours. Details can be seen in Table 3.5.5 below.

Table: 3.5.5 Load Shedding

Load-Shedding	Household Income			
	Below Tk. 3,125 Mean (hrs)	Tk. 3,125 - Tk. 9,999 Mean (hrs)	Tk. 10,000 - Tk. 19,999 Mean (hrs)	Above Tk. 20,000 Mean (hrs)
Summer Daytime	2.90	2.95	3.97	3.21
Summer Night-time	2.41	2.52	3.33	2.24
Winter Daytime	1.51	1.02	1.99	1.24
Winter Night-time	.96	.81	1.24	.19

Conclusion: In Summer load shedding is for more than 5 1/2 hours and in Winter shorter, about 1 ½ hour

3.5.6 Electricity Used per Household

Monthly average usage of electricity varies from 80 Kwh in the lower income smaller households to 181 Kwh in larger more affluent ones. Details can be seen below in Table: 3.5.6

Table: 3.5.6 – Amount of Electricity Used

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	3 Months' Average Kw Used	3 Months' Average Bill Amount
	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)
Below Tk. 3,125	79.73	227.70	80.55	231.53	79.60	228.48	79.96	229.24
Tk. 3,125 - Tk. 9,999	70.44	211.76	87.39	262.15	112.73	337.23	90.19	270.38
Tk. 10,000 - Tk. 19,999	103.85	311.68	113.75	341.25	124.65	374.12	114.08	342.35
Above Tk. 20,000	166.20	501.18	182.37	550.17	193.65	585.05	180.74	545.47

Conclusion: In Bogra the amount of electricity used varies from 80kwh for smaller households to 181 for larger households

3.5.7 Alternatives Used During Load Shedding Hours

Most households, about 66%, resort to using rechargeable lights during load shedding hours, followed by candle power at 30% and hurricane lamps at about 11%. Details can be seen below in Table: 3.5.7

Table: 3.5.7 Lights Used During Load Shedding

Lights Used During Load Shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 – Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	26				26
	Column %	65.0				11.1%
Oil Lamp	Count	17				17
	Column %	42.5				7.2%
Candle	Count	7	48	14	2	71
	Column %	17.5	64.0	23.3	3.3	30.2%
Rechargeable Light	Count	9	72	43	30	154
	Column %	22.5	96.0	71.7	50.0	65.5%
IPS	Count	2	28	29	25	84
	Column %	5.0	37.3	48.3	41.7	35.7%
Generator	Count		1	10	2	13
	Column %		1.3	16.7	3.3	5.5%
Torch Light	Count		2	9	51	62
	Column %		2.7	15.0	85.0	26.4%
Others	Count	1				1
	Column %	2.5				.4%
Count		40	75	60	60	235

Conclusion: During load shedding most of the respondents in Bogra use rechargeable lights followed by IPS and then candles

3.5.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical lights and ballasts are provided below in Table: 3.5.8. The survey found that CFL's had the longest life at 14.5 months; FTLs 9.7; and at 4.6 months incandescent lamps, the lowest. The survey also found that magnetic ballasts needed replacements every 9.7 months. There were no responses regarding electronic ballasts presumably because respondents had no experience in using electronic ballasts.

Table: 3.5.8 Estimated Life of Different types of Bulbs

Replacement Period	Mean(months)
Incandescent Lights	4.6
Tube-lights	9.7
CFLs	14.5
Magnetic Ballasts	9.7
	.

3.5.9 Savings from Energy Efficient Bulbs

Only 54% of respondents were aware that using CFL's would result in electricity savings; 36% unaware; the rest 10% had no response. Details are given in Table 3.5.9

Table: 3.5.9 Saving from EE Bulbs

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	25	62.5%	52	69.3%	21	35.0%	30	50.0%	128	54.5%
No	8	20.0%	18	24.0%	28	46.7%	30	50.0%	84	35.7%
No Response	7	17.5%	5	6.7%	11	18.3%	0	.0%	23	9.8%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: More than half of the respondents in Bogra are aware of electricity savings from EE bulbs

3.5.10 Savings from Electronic Ballasts

Only 4% of the respondents in Bogra were aware that using electronic ballasts instead of magnetic ones would result in electricity savings; fully 4 out five, 81%, did not know; and about 17% had no response. Details can be seen in Table 3.5.10

Table: 3.5.10 – Savings from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	5	12.5%	1	1.3%	0	.0%	2	3.3%	8	3.4%
No	25	62.5%	63	84.0%	43	71.7%	58	96.7%	189	80.4%
No Response	10	25.0%	11	14.7%	17	28.3%	0	.0%	38	16.2%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: Four out of five respondents in Bogra are unaware of electricity savings when electronic ballasts are used instead of magnetic ballast

3.5.11 Savings from Energy Efficient Motors

Only 2% of the respondents were aware that savings in electricity are possible if energy efficient motors are used; more than three quarters, 77%, did not know; over 22% had no response. Details are in Table 3.5.11 below.

Table: 3.5.11 –Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 – Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	3	7.5%	0	.0%	0	.0%	1	1.7%	4	1.7%
No	20	50.0%	61	81.3%	41	68.3%	59	98.3%	181	77.0%
No Response	17	42.5%	14	18.7%	19	31.7%	0	.0%	50	21.3%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: Only about one in fifty in Bogra know that electricity can be saved by the use of energy efficient motors

3.5.12 Reasons for Not Using Energy Efficient Bulbs

The survey found nine out of ten respondents citing high cost as the reason for not using energy efficient lamps; about 2% because they did not believe that there would be savings in electricity or that lamp life would be longer or both; and about 8% cited poor color as the reason. Details can be seen in Table: 3.5.12 below.

Table: 3.5.12 - Reasons for Not Using Energy Efficient Bulbs

Reason for not using EE lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	19	12	8	6	45
	Column %	86.4	100.0	100.0	100.0	93.8%
Don't Believe in Saving Claims	Count	1				1
	Column %	4.5				2.1%
Color of Light Not Good	Count	1			3	4
	Column %	4.5			50.0	8.3%
Quality of Light Not Good	Count				1	1
	Column %				16.7	2.1%
Do not Believe Lamp Life Claims	Count				1	1
	Column %				16.7	2.1%
Not Sure	Count	1				1
	Column %	4.5				2.1%
Other Reasons	Count	1				1
	Column %	4.5				2.1%
Count		22	12	8	6	48

Conclusion: Nine out of ten respondents cited high cost as the reason for not using CFLs

3.5.13 Reasons for Not Using Electronic Ballasts

Two thirds responded that the reason for which they did not use electronic ballasts in place of magnetic ballast is that they are expensive, quarters do not believe in the claims of savings electricity and extended lamp life. Details are
given below in Table: 3.5.13

Table: 3.5.13 - Reasons for Not Using Electronic Ballasts

Reasons for not using EB		Household Income			Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Above Tk. 20,000	
Expensive	Count	3	1	1	5
	Column %	60.0	100.0	50.0	62.5%
Don't Believe in Savings Claim	Count	2			2
	Column %	40.0			25.0%
Not Sure	Count			1	1
	Column %			50.0	12.5%
Count		5	1	2	8

Conclusion: Disbelief in savings and High Cost cited by most respondents as the reasons for not using electronic ballasts.

3.5.14 Reasons for Not Using Energy Efficient Motors

All those surveyed cited high cost as the reason for not using energy efficient motors. Details are given below in Table: 3.5.14

Table: 3.5.14 - Reasons for Not Using Energy Efficient Motors

Reasons for not using EE Motors		Household Income		Total
		Below Tk. 3,125	Above Tk. 20,000	
Expensive	Count	3	2	5
	Column %	100.0	100.0	100.0
Count		3	2	5

Conclusion: All the respondents in Bogra said that they do not use the energy efficient motors because they are expensive

3.5.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

About a half of the respondents are willing to purchase energy saving lamps for Tk. 300 each. About thirty percent do not want to purchase energy saving lamps at Tk. 300 each and the rest did not respond. Details are given below in Table: 3.5.15

Table: 3.5.15 - Willingness to Buy at Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	6	15.0%	58	77.3%	31	51.7%	29	48.3%	124	52.8%
No	22	55.0%	6	8.0%	19	31.7%	20	33.3%	67	28.5%
No Response	12	30.0%	11	14.7%	10	16.7%	11	18.3%	44	18.7%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: Almost half the respondents in Bogra expressed willingness to buy EE bulbs at Tk.300 provided electricity savings is around 80%

3.5.16 Prices and the Willingness to Buy

The survey confirmed the classic inverse relationship between costs and demand: among those unwilling to buy at the Tk 300 level, three quarters were willing to do so at Tk. 100 and about one eight at Tk 150. The survey also found that price elasticity was more pronounced among lower income groups than at higher. This was expected. Details can be seen in Table 3.5.16 below.

Table: 3.5.16 Prices and Quantity

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	1	4.5%	0	.0%	0	.0%	0	.0%	1	1.5%
Tk. 200	7	31.8%	1	16.7%	1	5.3%	0	.0%	9	13.4%
Tk. 150	4	18.2%	2	33.3%	2	10.5%	0	.0%	8	11.9%
Tk. 100	10	45.5%	3	50.0%	16	84.2%	20	100.0%	49	73.1%
Total	22	100%	6	100%	19	100%	20	100%	67	100%

Conclusion: In Bogra a majority of 73% will buy energy saving bulbs if prices were Tk. 100

3.5.17 Price and Quantity

Survey shows that the respondents will purchase 3 to 4 energy saving lamps at the prices as mentioned above. Details are given below in Table: 3.5.17

Table: 3.5.17 Quantity households willing to buy

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	3
Tk. 3,125 - Tk. 9,999	3
Tk. 10,000 - Tk. 19,999	3
Above Tk. 20,000	4

Conclusion: On average, households with incomes in excess of Tk 20,000 are willing to buy 4 bulbs; all others 3 at different prices

3.5.18 Preferences for supply sources

About 95% of the respondents would prefer to purchase the energy saving lamps from retailer or wholesaler. Details are shown below in Table: 3.5.18

Table: 3.5.18 Preference for supply sources

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Retailer or Wholesaler	18	81.8%	6	100%	19	100%	20	100%	63	94.0%
Pay a Person Who Replaces EE Lamps at My House	3	13.6%	0	.0%	0	.0%	0	.0%	3	4.5%
Pay by 12 Monthly Installments Adjusted Against Bill	1	4.5%	0	.0%	0	.0%	0	.0%	1	1.5%

Conclusion: Almost all of the households in Bogra would like to purchase energy saving bulbs from retailers or wholesalers

3.6. Barisal

3.6.1 Sample Size: Number of Households in Survey

235 households were surveyed in Barisal. Incomes of 17% of these households were below Tk. 3,125 per month; 32% between Tk. 3,125 and Tk. 9,999; 26% between Tk. 10,000 to Tk. 19,999; and 26% above Tk. 20,000. Details are provided below in Table 3.6.1

Table: 3.6.1 – Number of Households Surveyed

Household Income	Count
Below Tk. 3,125	40
Tk. 3,125 - Tk. 9,999	75
Tk. 10,000 - Tk. 19,999	60
Above Tk. 20,000	60
Total	235

3.6.2 Professions of Respondents

38% of respondents were housewives; 19% businessmen; and about 31% other professions. Details are shown below in Table: 3.5.2

Table: 3.6.2 – Professions of Respondents

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Farming	2	5.0%	0	.0%	0	.0%	0	.0%	2	.9%
Business	8	20.0%	15	20.0%	7	11.7%	15	25.0%	45	19.1%
Govt. Service	0	.0%	2	2.7%	5	8.3%	4	6.7%	11	4.7%
Private Service	0	.0%	4	5.3%	7	11.7%	5	8.3%	16	6.8%
Housewife	21	52.5%	33	44.0%	19	31.7%	17	28.3%	90	38.3%
Others	9	22.5%	21	28.0%	22	36.7%	19	31.7%	71	30.2%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

3.6.3 Types of Connections

Almost all households, about 100%, were domestic customers. This is to be expected since the survey is of households. An insignificant number, less than 1%, were also conducting commercial activities on their premises and so they had commercial connections as well. Details are shown below in Table: 3.6.3

Table 3.6.3- Type of Connections

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	40	100.0 %	75	100.0 %	59	98.3%	60	100.0 %	234	99.6%
Commercial	0	.0%	0	.0%	1	1.7%	0	.0%	1	.4%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: Almost all the household connections in Barisal are domestic

3.6.4 Electric Utilities

All households in Barisal are connected to PDB as can be seen below in Table: 3.6.4

Table: 3.6.4 – Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	40	100.0%	75	100.0%	60	100.0%	60	100.0%	235	100.0%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
WZPDCL	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: All households in Barisal are connected to PDB

3.6.5 Load Shedding

Load Shedding varies depending on whether it is summer or winter. During summer months, there is about 6 hours of blackouts, in winter the period drops to about two hours. Details can be seen below in Table 3.6.5

Table: 3.6.5 – Load Shedding

Load-Shedding	Mean (hrs)
Summer Daytime	3.21
Summer Night-time	2.66
Winter Daytime	1.47
Winter Night-time	.71

Conclusion: In Summer load shedding is for about 6 hours and in winter around two hours l

3.6.6 Electricity Used per Household

Monthly average usage of electricity varies from 48 Kwh in lower income, small households to 176 Kwh in larger, more affluent ones. Details can be seen below in Table: 3.6.6

Table: 3.6.6 – Amount of Electricity Used

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	3 Months' Average Kw Used	3 Months' Average Bill Amount
	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)
Below Tk. 3,125	45.03	150.18	49.13	157.43	49.65	159.25	47.93	155.62
Tk. 3,125 - Tk. 9,999	74.20	228.47	82.67	246.13	87.15	258.04	81.34	244.21
Tk. 10,000 - Tk. 19,999	90.78	277.90	99.52	308.72	108.63	322.57	99.64	303.06
Above Tk. 20,000	166.15	505.48	179.05	540.30	183.80	559.46	176.33	535.08

Conclusion: In Barisal electricity use varies from 48Kwh in smaller households to 176 in larger ones

3.6.7 Alternatives Used During Load Shedding Hours

Most households in Barisal use multiple sources of power in the same household during load shedding hours. Because of this, there were multiple responses causing aggregate numbers to exceed the total households surveyed. An analysis of the responses,

however, show that the largest number, 76%, resorted to using rechargeable lights followed by IPS systems at 63% and candle power and hurricane lamps at 24% and 17%.. Details can be seen below in Table: 3.6.7

Table: 3.6.7 – Lights Used During Load Shedding

Lamps Used During Load Shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 – Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	39				39
	Column %	97.5				16.6%
Oil Lamps	Count	17				17
	Column %	42.5				7.2%
Candle	Count	5	37	15		57
	Column %	12.5	49.3	25.0		24.3%
Rechargeable Light	Count		75	58	43	176
	Column %		100.0	96.7	71.7	74.9%
IPS	Count		57	43	47	147
	Column %		76.0	71.7	78.3	62.6%
Generator	Count			1	6	7
	Column %			1.7	10.0	3.0%
Torch Light	Count				17	17
	Column %				28.3	7.2%
Count		40	75	60	60	235

Conclusion: During load shedding most households in Barisal use rechargeable lights followed by IPS and then candles

3.6.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical lights and ballasts are provided below in Table: 3.6.8. The survey found that CFL's had the longest life at 15.1 months followed by tubes at 10.1 and incandescents, the lowest, at 4.5 months. There were no responses to the questions regarding ballasts.

Table: 3.6.8 –Estimated Life of Different types of Bulbs

Replacement Period	Mean(months)
Incandescent Lights	4.5
Tube-lights	10.1
CFLs	15.1
Magnetic Ballasts	.
Electronic Ballasts	.

3.6.9 Saving from Energy Efficient Bulbs

A majority of respondents, about 57%, were aware that using CFLs would result in electricity savings; one fifth unaware; the rest, about 25%, had no response. Details are provided in Table 3.6.9

Table: 3.6.9 Savings from EE Bulbs

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	11	27.5%	53	70.7%	26	43.3%	45	75.0%	135	57.4%
No	10	25.0%	5	6.7%	22	36.7%	5	8.3%	42	17.9%
No Response	19	47.5%	17	22.7%	12	20.0%	10	16.7%	58	24.7%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: Close to two thirds of respondents in Barisal are aware of electricity savings from EE bulbs

3.6.10 Savings from Electronic Ballasts

None of the respondents in Barisal were aware that using electronic ballasts instead of magnetic ones would result in electricity savings; fully three quarter, 75%, did not know and about a quarter had no response. Details can be seen in Table 3.6.10

Table: 3.6.10 –Savings from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
No	29	72.5 %	52	69.3 %	49	81.7 %	47	78.3 %	177	75.3 %
No Response	11	27.5 %	23	30.7 %	11	18.3 %	13	21.7 %	58	24.7 %
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: No respondent in Barisal knew that electricity can be saved by using electronic ballasts in place of magnetic ballast

3.6.11 Savings from Energy Efficient Motors

Only one out of 234 respondents which is less than 1% of the respondents were aware that savings in electricity are possible if energy efficient motors are used; about 72% did not know; over 27% had no response. Details are in Table 3.6.11 below.

Table: 3.6.11 – Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	0	.0%	1	1.3%	0	.0%	0	.0%	1	.4%
No	28	70.0%	47	62.7%	49	81.7%	45	76.3%	169	72.2%
No Response	12	30.0%	27	36.0%	11	18.3%	14	23.7%	64	27.4%
Total	40	100%	75	100%	60	100%	59	100%	234	100%

Conclusion: Almost all respondents in Barisal did not know that electricity can be saved by the use of energy efficient motors

3.6.12 Reasons for Not Using Energy Efficient Bulbs

In many households, respondents cited multiple reasons why they were not using energy efficient bulbs. Most, over 60%, cited high cost as the reason for not using them; about 58%, cited the poor quality of light; about 15% did not believe that there would be savings in electricity or that lamp life would be longer or both. Details can be seen in Table: 3.6.12 below.

Table: 3.6.12 - Reasons for Not Using Energy Efficient Bulbs

Reasons for not using EE Lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	10	16	11	2	39
	Column %	100.0	66.7	100.0	10.5	60.9%
Not Suitable for Fitting	Count		1		3	4
	Column %		4.2		15.8	6.3%
Don't Believe in Saving Claims	Count				1	1
	Column %				5.3	1.6%
Color of Light Not Good	Count	2	17		18	37
	Column %	20.0	70.8		94.7	57.8%
Quality of Light Not Good	Count				11	11
	Column %				57.9	17.2%
Do not Believe Lamp Life Claims	Count	1	1		7	9
	Column %	10.0	4.2		36.8	14.1%
Not Sure	Count		1			1
	Column %		4.2			1.6%
Count		10	24	11	19	64

Conclusion: More than half of the respondents in Barisal cited high bulb cost as the reason for not using EE Bulbs

3.6.13 Reasons for Not Using Electronic Ballasts

No response

Conclusion: Reasons for not using electronic ballast is that the respondents in Barisal do not know that it saves energy

3.6.14 Reasons for Not Using Energy Efficient Motors

No response

Conclusion: Reasons for not using EE motors is that the respondents in Barisal do not know that it saves energy

3.6.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

About a half of the respondents are willing to purchase energy saving lamps for Tk. 300 each. About a quarter do not want to purchase energy saving lamps at Tk. 300 each and the rest did not respond. Details are given below in Table: 3.6.15

Table: 3.6.15 - Willingness to Buy at Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	13	32.5%	51	68.0%	15	25.0%	46	76.7%	125	53.2%
No	9	22.5%	9	12.0%	30	50.0%	6	10.0%	54	23.0%
No Response	18	45.0%	15	20.0%	15	25.0%	8	13.3%	56	23.8%
Total	40	100%	75	100%	60	100%	60	100%	235	100%

Conclusion: 53% of respondents in Barisal were willing to buy CFLs at Tk. 300 provided electricity saved was 80%

3.6.16 Prices and the Willingness to Buy

The survey confirmed the classic inverse relationship between costs and demand: among those unwilling to buy at Tk 300, seven out of eight were willing to do so at Tk. 100 and about one twelfth at Tk 150. The survey also found that price elasticity was more pronounced among lower income groups than at higher. This was expected. Details can be seen in Table 3.6.16 below.

Table: 3.6.16 Prices and Quantity

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Tk. 200	1	11.1%	0	.0%	3	10.0%	1	20.0%	5	9.4%
Tk. 150	1	11.1%	0	.0%	3	10.0%	0	.0%	4	7.5%
Tk. 100	7	77.8%	9	100%	24	80.0%	4	80.0%	44	83.0%

Conclusion: At Tk. 100 8 out of ten and at Tk.200 one of ten will buy CFLs in Barisal

3.6.17 Price and Quantity

Survey shows that the on the average households will buy 3 CFLs at the desired price. Details are provided in Table: 3.6.17 below

Table: 3.6.17 Quantity households willing to buy

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	3
Tk. 3,125 - Tk. 9,999	3
Tk. 10,000 - Tk. 19,999	2
Above Tk. 20,000	3

Conclusion: At the desired prices, households in Barisal will buy 3 CFLs on the average

3.6.18 Preference for sources of supply

100% of households expressed preferences to buy CFLs from retailers or wholesalers. Details are shown below in Table: 3.6.18

Table: 3.6.18 Preference for source of supply

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Retailer or Wholesaler	9	100%	9	100%	30	100%	5	100%	53	100%
Pay a Person Who Replaces EE Lamps at My House	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Pay by 12 Monthly Installments Adjusted Against Bill	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%

Conclusion: All households in Barisal prefer buying CFLs from retailers or wholesalers

3.7. Khulna

3.7.1 Sample Size: Number of Household in Survey

235 households were surveyed in Khulna. Incomes of 17% of these households were below Tk. 3,125 per month, 31% between Tk. 3,125 and Tk. 9,999, 27% between Tk. 10,000 to Tk. 19,999 and 25% above Tk. 20,000. Details are provided below in Table 3.7.1

Table: 3.7.1 – Number of Households Surveyed

Household Income	Count
Below Tk. 3,125	40
Tk. 3,125 - Tk. 9,999	73
Tk. 10,000 - Tk. 19,999	64
Above Tk. 20,000	58
Total	235

3.7.2 Professions of Respondents

Most respondents, 45%, in Khulna were businessmen, followed by employees of the government, 26%, 18% were engaged in farming. Details can be seen below in Table: 3.7.2

Table: 3.7.2 – Profession of Respondents

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Farming	40	100%	1	1.4%	0	.0%	0	.0%	41	17.5%
Business	0	.0%	56	76.7%	15	23.4%	35	61.4%	106	45.3%
Govt. Service	0	.0%	3	4.1%	45	70.3%	13	22.8%	61	26.1%
Private Service	0	.0%	0	.0%	0	.0%	1	1.8%	1	.4%
Housewife	0	.0%	4	5.5%	0	.0%	6	10.5%	10	4.3%
Others	0	.0%	9	12.3%	4	6.3%	2	3.5%	15	6.4%
Total	40	100%	73	100%	64	100%	57	100%	234	100%

3.7.3 Types of Connections

Most households, about 89%, were domestic customers. This is to be expected since the survey is of households. About 11% were conducting commercial activities in their homes and so they had commercial connections as well. Details are shown below in Table: 3.7.3

Table 3.7.3- Type of Consumers

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	40	100%	71	97%	60	94%	38	66%	209	89%
Commercial	0	0%	2	3%	4	6%	20	34%	26	11%
Public Sector	0	0%	0	0%	0	0%	0	0%	0	0%
Industrial	0	0%	0	0%	0	0%	0	0%	0	0%
Religious	0	0%	0	0%	0	0%	0	0%	0	0%
Others	0	0%	0	0%	0	0%	0	0%	0	0%
Total	40	100%	73	100%	64	100%	58	100%	235	100%

Conclusion: Most households, 89%, have domestic connections

3.7.4 Electric Utilities

Two thirds of the households are connected to REB, one third are connected to WZPDCL as can be seen below in Table: 3.7.4

Table: 3.7.4 – Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	37	100%	66	91.7%	51	83.6%	0	.0%	154	67.8%
WZPDCL	0	.0%	6	8.3%	10	16.4%	57	100%	73	32.2%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	37	100%	72	100%	61	100%	57	100%	227	100%

Conclusion: Two thirds of the households in Khulna are connected to REB supply, whereas one third are connected to WZPDCL supply

3.7.5 Load Shedding

Load Shedding varies depending on whether it is summer or winter. During the summer, there blackouts occur for almost 8 hours and in winter, about 4 hours. Details can be seen in Table 3.7.5 below.

Table: 3.7.5 – Load Shedding

Load-Shedding	Household Income				
	Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	Total
	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)
Summer Daytime	4.13	4.01	3.91	4.55	4.14
Summer Night-time	3.60	3.37	3.22	3.66	3.44
Winter Daytime	1.95	3.16	2.28	2.23	2.49
Winter Night-time	1.85	1.75	1.83	1.82	1.81

Conclusion: In Summer load shedding lasts almost 8 hours and in winter four hours

3.7.6 Electricity Used per Household

Monthly average usage of electricity varies from 49 Kwh in the lower income, smaller households to 251 Kwh in larger, more affluent ones. Details can be seen below in Table: 3.7.6

Table: 3.7.6 – Amount of Electricity Used

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	3 Months' Average Kw Used	3 Months' Average Bill Amount
	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)
Below Tk. 3,125	33.32	132.97	53.48	149.30	58.84	161.07	48.54	147.78
Tk. 3,125 - Tk. 9,999	49.55	179.67	68.88	194.97	72.04	206.03	63.49	193.56
Tk. 10,000 - Tk. 19,999	154.86	564.41	175.60	592.19	178.18	602.40	169.55	586.33
Above Tk. 20,000	249.53	750.26	249.93	751.70	252.56	765.49	250.68	755.82

Conclusion: In Khulna the amount of Kwh of electricity used varies from 49 for smaller households to 251 for larger households

3.7.7 Alternatives Used During Load Shedding Hours

Most households, about 42%, resort to hurricane lamps for light during load shedding hours, followed by rechargeable lights at 34%, oil lamps at about 24% and candle power at about 10%. Details can be seen below in Table: 3.7.7

Table: 3.7.7 – Lights Used During Load Shedding

Lamps used during load shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	36	45	16	1	98
	Column %	92.3	61.6	25.0	1.7	41.9%
Oil Lamp	Count	30	17	8	1	56
	Column %	76.9	23.3	12.5	1.7	23.9%
Candle	Count	4	7	9	4	24
	Column %	10.3	9.6	14.1	6.9	10.3%
Rechargeable Light	Count		21	42	17	80
	Column %		28.8	65.6	29.3	34.2%
IPS	Count		6	5	6	17
	Column %		8.2	7.8	10.3	7.3%
Generator	Count			1	17	18
	Column %			1.6	29.3	7.7%
Torch Light	Count			2	20	22
	Column %			3.1	34.5	9.4%
Count		39	73	64	58	234

Conclusion: During load shedding most of the respondents in Khulna use hurricane lamps followed by rechargeable lights and then oil lamps

3.7.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical lights and ballasts are provided below in Table: 3.7.8. The survey found that CFL's had the longest life at 25.6 months followed by tube lights at 15.4 and incandescent lamps, the lowest, at 6 months. Electronic ballasts lasted longer than magnetic ballasts, 19.1 months compared to 14.8 months.

Table: 3.7.8 –Estimated Life of Different types of Bulbs

Replacement Period	Mean(months)
Incandescent Lights	6.0
Tube-lights	15.4
CFLs	25.6
Magnetic Ballasts	14.8
Electronic Ballasts	19.1

3.7.9 Savings from Energy Efficient Bulbs

A vast majority of respondents, 85%, were aware that using CFLs would result in electricity savings; one tenth unaware; the rest, about 5%, had no response. Details are provided below in Table 3.7.9

Table: 3.7.9 –Saving from CFL Bulbs

Know the Possibility of Saving Energy by EE bulbs	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	29	72.5%	57	78.1%	57	89.1%	56	96.6%	199	84.7%
No	5	12.5%	15	20.5%	4	6.3%	0	.0%	24	10.2%
No Response	6	15.0%	1	1.4%	3	4.7%	2	3.4%	12	5.1%
Total	40	100%	73	100%	64	100%	58	100%	235	100%

Conclusion: A large majority of the respondents, 85%, are aware that it is possible to save electricity by using CFL bulbs

3.7.10 Savings from Electronic Ballasts

Only 2% of respondents in Khulna were aware that using electronic ballasts instead of magnetic ones would result in electricity savings; a quarter did not know; and a full 73% had no response. Details can be seen in Table 3.7.10

Table: 3.7.10 – Savings from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	0	.0%	1	1.4%	1	1.6%	3	5.2%	5	2.2%
No	14	35.0%	24	33.3%	10	16.4%	11	19.0%	59	25.5%
No Response	26	65.0%	47	65.3%	50	82.0%	44	75.9%	167	72.3%
Total	40	100%	72	100%	61	100%	58	100%	231	100%

Conclusion: Only one in fifty in Khulna is aware that electricity can be saved by using electronic ballasts in place of magnetic ballast

3.7.11 Savings from Energy Efficient Motors

Only 1% of the respondents were aware that savings in electricity are possible if energy efficient motors are used; about 5% did not know; an overwhelming 93% had no response. Details are in Table 3.7.11 below.

Table: 3.7.11 – Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	0	.0%	0	.0%	0	.0%	2	3.4%	2	.9%
No	1	2.5%	5	6.8%	3	5.0%	3	5.2%	12	5.2%
No Response	39	97.5%	68	93.2%	57	95.0%	53	91.4%	217	93.9%
Total	40	100%	73	100%	60	100%	58	100%	231	100%

Conclusion: Only one percent of the respondents in Khulna are aware that electricity can be saved if energy efficient motors are used

3.7.12 Reasons for Not Using Energy Efficient Bulbs

The survey found seven out of eight respondents citing high cost as the reason for not using energy efficient lamps; about 7% citing inability of CFLs to withstand voltage fluctuations and the balance, 6%, a scattering of reasons. Details can be seen in Table: 3.7.12 below.

Table: 3.7.12 - Reasons for Not Using Energy Efficient Bulbs

Reasons for not using EE lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	27	53	48	49	177
	Column %	93.1	93.0	84.2	87.5	88.9%
Not Suitable for Fitting	Count				1	1
	Column %				1.8	.5%
Don't Believe in Saving Claims	Count			3	1	4
	Column %			5.3	1.8	2.0%
Color of Light Not Good	Count		1	1		2
	Column %		1.8	1.8		1.0%
Quality of Light Not Good	Count		1			1
	Column %		1.8			.5%
Voltage Fluctuation	Count	3	5	3	3	14
	Column %	10.3	8.8	5.3	5.4	7.0%
Not Sure	Count			2	2	4
	Column %			3.5	3.6	2.0%
Count		29	57	57	56	199
Total %		100%	100%	100%	100%	100%

Conclusion: Seven out of eight respondents in Khulna do not use CFLs because of their high cost

3.7.13 Reasons for Not Using Electronic Ballasts

Two thirds of households cited high costs of electronic ballasts and a third did not believe in the savings as the reasons for not using them. Details are given below in Table: 3.7.13

Table: 3.7.13 - Reasons for Not Using Electronic Ballasts

Reasons for not using EB		Household Income			Total
		Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	1		2	3
	Column %	100.0		100.0	60.0%
Not Sure	Count		2		2
	Column %		100.0		40.0%
Count		1	2	2	5

Conclusion: Most respondents, 60%, cited high cost and 40% did not believe in savings claim as the reasons for not using electronic ballasts

3.7.14 Reasons for Not Using Energy Efficient Motors

Response was statistically insignificant

Conclusion: Most respondents in Khulna, 99%, are unaware of savings associated with using energy efficient motors

3.7.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

About 70% of respondents were willing to buy CFLs even at Tk. 300 if it resulted in electricity savings of 80%; and about 30% do not. Details are given below in Table: 3.7.15

Table: 3.7.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	33	82.5%	44	60.3%	48	75.0%	39	67.2%	164	69.8%
No	7	17.5%	26	35.6%	15	23.4%	16	27.6%	64	27.2%
No Response	0	.0%	3	4.1%	1	1.6%	3	5.2%	7	3.0%
Total	40	100%	73	100%	64	100%	58	100%	235	100%

Conclusion: Three quarters of the respondents in Khulna are willing to buy CFLs at Tk. 300 if electricity savings is 80% and they last for 4 years

3.7.16 Prices and the Willingness to Buy

The survey confirmed the classic inverse relationship between costs and demand: among those unwilling to buy at the Tk 300 level, three quarters were willing to do so at Tk. 100 and about one eight at Tk 150. The survey also found that price elasticity was more pronounced among lower income groups than at higher. This was expected. Details can be seen in Table 3.7.16 below.

Table: 3.7.16 Price and the willingness to buy

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Tk. 200	0	.0%	0	.0%	0	.0%	1	6.3%	1	1.4%
Tk. 150	1	11.1%	2	6.9%	5	29.4%	6	37.5%	14	19.7%
Tk. 100	8	88.9%	27	93.1%	12	70.6%	9	56.3%	56	78.9%
Total	9	100%	29	100%	17	100%	16	100%	71	100%

Conclusion: Of those in Khulna who do not want to purchase energy saving lamps for Tk. 300 each, a large majority would purchase if the price were Tk. 100 only

3.7.17 Price and Quantity

Survey shows each household, irrespective of their income level, buying 4 CFLs, on the average, at their desired prices. Details provided in Table: 3.7.17 below.

Table: 3.7.17 Quantity Households willing to buy

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	4
Tk. 3,125 - Tk. 9,999	4
Tk. 10,000 - Tk. 19,999	4
Above Tk. 20,000	4

Conclusion: Regardless of income levels, households would buy 4 energy saving lamps at the desired prices

3.7.18 Preferences for Supply sources

Unlike other locations, 60% of respondents in Khulna, preferred monthly installment payments and charged in their electricity bills as the best option. About one fifth would

like to purchase it through retailers and wholesalers. Details are shown below in Table: 3.6.18

Table: 3.7.18 – Preference for sources of supply

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	1	11.1%	0	.0%	1	5.9%	2	12.5%	4	5.6%
Retailer or Wholesaler	1	11.1%	7	24.1%	3	17.6%	4	25.0%	15	21.1%
Pay a Person Who Replaces EE Lamps at My House	0	.0%	2	6.9%	4	23.5%	4	25.0%	10	14.1%
Pay by 12 Monthly Installments Adjusted Against Bill	7	77.8%	20	69.0%	9	52.9%	6	37.5%	42	59.2%
Total	9	100%	29	100%	17	100%	16	100%	71	100%

Conclusion: Most of the households in Khulna would like to purchase energy saving lamps monthly installments adjustable against their monthly bills

3.8. Comilla

3.8.1 Sample Size: Number of Households in Survey

241 households were surveyed in Comilla. Incomes of 17% of these households were below Tk. 3,125 per month, 31% between Tk. 3,125 and Tk. 9,999, 27% between Tk. 10,000 to Tk. 19,999 and 26% above Tk. 20,000. Details are provided below in Table 3.8.1

Table: 3.8.1 – Number of Household Surveyed

Household Income	Count
Below Tk. 3,125	40
Tk. 3,125 - Tk. 9,999	74
Tk. 10,000 - Tk. 19,999	62
Above Tk. 20,000	65
Total	241

3.8.2 Professions of Respondents

Most respondents, 27%, were employed by private companies; 22% businessmen; and about 13% government employees. Details are given below in Table: 3.8.2

Table: 3.8.2 – Profession of Respondents

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Farming	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Business	7	17.5%	10	13.5%	12	19.4%	25	38.5%	54	22.4%
Govt. Service	1	2.5%	12	16.2%	9	14.5%	8	12.3%	30	12.4%
Private Service	18	45.0%	23	31.1%	15	24.2%	8	12.3%	64	26.6%
Others	5	12.5%	19	25.7%	21	33.9%	14	21.5%	59	24.5%
Housewife	9	22.5%	10	13.5%	5	8.1%	10	15.4%	34	14.1%
Total	40	100%	74	100%	62	100%	65	100%	241	100%

3.8.3 Types of Connections

Most households, about 100%, were domestic customers. This is to be expected since the survey is of households. An insignificant number, less than 1%, were also conducting commercial activities from their homes and so they had commercial meters as well. Details provided in Table 3.8.3 below.

Table 3.8.3- Type of Connections

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	39	97.5%	74	100.0 %	62	100.0 %	65	100.0 %	240	99.6%
Commercial	1	2.5%	0	.0%	0	.0%	0	.0%	1	.4%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	74	100%	62	100%	65	100%	241	100%

Conclusion: Almost all connections in Comilla are domestic

3.8.4 Electric Utilities

All households are connected to PDB as can be seen below in Table: 3.8.4

Table: 3.8.4 – Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	40	100.0%	74	100.0%	62	100.0%	65	100.0%	241	100.0%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
WZPDCL	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	74	100%	62	100%	65	100%	241	100%

Conclusion: All the households in Comilla are connected to PDB

3.8.5 Load Shedding

Load Shedding varies depending on whether it is summer or winter. During summer there are over three hours of blackouts and in winter slightly less than one and half hour. Details are provided in Table 3.8.5 below.

Table: 3.8.5 – Load Shedding

Load-Shedding	Household Income				
	Below Tk. 3,125 Mean (hrs)	Tk. 3,125 - Tk. 9,999 Mean (hrs)	Tk. 10,000 - Tk. 19,999 Mean (hrs)	Above Tk. 20,000 Mean (hrs)	Total Mean (hrs)
Summer Daytime	1.45	2.16	1.66	1.65	1.78
Summer Night-time	1.84	1.43	1.85	1.70	1.68
Winter Daytime	.61	.77	.70	.72	.71
Winter Night-time	.86	.86	.90	.90	.88

Conclusion: In Summer load shedding occurs for over 3 hours and in Winter slightly less than one and half hour

3.8.6 Electricity Used per Household

Monthly usage of electricity varies from 62 Kwh in small, low income households to 246 Kwh in larger, more affluent ones. Details can be seen below in Table: 3.8.6

Table: 3.8.6 – Amount of Electricity Used

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	3 Months' Average Kw Used	3 Months' Average Bill Amount
	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)
Below Tk. 3,125	65.83	200.43	63.00	184.00	56.38	173.80	61.73	186.08
Tk. 3,125 - Tk. 9,999	153.12	456.30	161.58	468.91	154.93	461.32	156.55	462.18
Tk. 10,000 - Tk. 19,999	203.63	629.76	195.65	595.79	191.74	581.29	197.01	602.28
Above Tk. 20,000	247.22	783.28	243.92	760.58	246.45	776.35	245.86	773.40

Conclusion: In Comilla the amount of Kwh of electricity used varies from 62 for smaller households to 246 for larger households

3.8.7 Alternatives Used During Load Shedding

Most households in Comilla use multiple sources of power in the same household during load shedding hours. Because of this, there were multiple responses causing aggregate numbers to exceed the total households surveyed. An analysis of the responses, however, show that the largest number, 77%, resorted to using rechargeable lights; 28% candle power; and about 5% hurricane lamps. Details can be seen below in Table: 3.8.7

Table: 3.8.7 Alternatives Used During Load Shedding

Lights Used During Load Shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	5	6	2		13
	Column %	12.5	8.2	3.2		5.4%
Oil Lamp	Count	1	4	1	5	11
	Column %	2.5	5.5	1.6	7.7	4.6%
Candle	Count	21	24	11	11	67
	Column %	52.5	32.9	17.7	16.9	27.9%
Rechargeable Light	Count	16	61	54	53	184
	Column %	40.0	83.6	87.1	81.5	76.7%
Generator	Count			1	6	7
	Column %			1.6	9.2	2.9%
Count		40	73	62	65	240

Conclusion: During load shedding most respondents in Comilla use rechargeable lights followed by candles

3.8.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical lights and ballasts are provided below in Table: 3.7.8. The survey found that CFL's had the longest life at 23.8 months followed by FTLs at 21.6 and incandescents, the lowest, at 10.2 months. Magnetic ballasts lasted longer than electronic ballasts, 26 months compared to 12 months.

Table: 3.8.8 –Estimated Life of Different types of Bulbs

Replacement	Mean(months)
Incandescent Lights	10.2
Tube-lights	21.6
CFLs	23.8
Magnetic Ballasts	26.0
Electronic Ballasts	12.0

3.8.9 Savings from Energy Efficient bulbs

About 71% of respondents were aware that using CFLs would result in electricity savings; one quarter unaware; the rest, about 4%, had no response. Details of findings are provided in Table 3.7.9 below.

Table: 3.8.9 – Savings from EE Bulbs

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	20	50.0%	48	64.9%	53	85.5%	50	76.9%	171	71.0%
No	17	42.5%	21	28.4%	8	12.9%	15	23.1%	61	25.3%
No Response	3	7.5%	5	6.8%	1	1.6%	0	.0%	9	3.7%
Total	40	100%	74	100%	62	100%	65	100%	241	100%

Conclusion: About three quarters of the respondents in Comilla are aware that it is possible to save electricity by using energy saving lamps

3.8.10 Savings from Electronic Ballasts

Only about 4% of the respondents were aware that use of electronic ballasts in place of magnetic ones would result in electricity savings; three quarters were unaware; and the rest almost 20% had no response. Details can be seen in Table 3.8.10 below.

Table: 3.8.10 Savings from Electronic Ballast

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	0	.0%	1	1.4%	4	6.5%	5	7.7%	10	4.1%
No	31	77.5%	56	75.7%	45	72.6%	50	76.9%	182	75.5%
No Response	9	22.5%	17	23.0%	13	21.0%	10	15.4%	49	20.3%
Total	40	100%	74	100%	62	100%	65	100%	241	100%

Conclusion: Only about 4% of the respondents in Comilla do not know that electricity can be saved by using electronic ballasts in place of magnetic ballast

3.8.11 Savings from Energy Efficient Motors

Less than half percent of respondents were aware that there would be electricity savings if energy efficient motors were used; about 29% did not; over 70% had no response. Details are provided in Table 3.8.11 below

Table: 3.8.11 –Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	0	.0%	0	.0%	0	.0%	1	1.5%	1	.4%
No	19	47.5%	14	18.9%	18	29.0%	20	30.8%	71	29.5%
No Response	21	52.5%	60	81.1%	44	71.0%	44	67.7%	169	70.1%
Total	40	100%	74	100%	62	100%	65	100%	241	100%

Conclusion: Less than half percent of the respondents in Comilla were aware that electricity can be saved if energy efficient motors were used

3.8.12 Reasons for Not Using Energy Efficient Bulbs

The survey found half the respondents citing high cost as the reason for not using energy efficient bulbs; about 8% because they did not believe that there would be savings in electricity or that lamp life would be longer or both; and another about 8% cited poor color as the reason. Details can be seen in Table: 3.8.12 below.

Table: 3.8.12 - Reasons for Not Using Energy Efficient Bulbs

Reasons for not using EE Lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	16	23	26	19	84
	Column %	80.0	51.1	50.0	38.0	50.3%
Not Suitable for Fitting	Count	1	4	5	4	14
	Column %	5.0	8.9	9.6	8.0	8.4%
Don't Believe in Saving Claims	Count	1			1	2
	Column %	5.0			2.0	1.2%
Color of Light Not Good	Count		4	2	7	13
	Column %		8.9	3.8	14.0	7.8%
Quality of Light Not Good	Count			5	5	10
	Column %			9.6	10.0	6.0%
Do not Believe Lamp Life Claims	Count	2	1	4		7
	Column %	10.0	2.2	7.7		4.2%
Not Sure	Count		5	3	3	11
	Column %		11.1	5.8	6.0	6.6%
Other Reasons	Count		8	9	11	28
	Column %		17.8	17.3	22.0	16.8%
Count		20	45	52	50	167

Conclusion: About half of the respondents in Comilla do not use energy saving lamps as they think energy saving lamps are very expensive

3.8.13 Reasons for Not Using Electronic Ballasts

About half responded that the reason for which they did not use electronic ballasts in place of magnetic ballast is that they have to replace it very often. Details are given below in Table: 3.8.13

Table: 3.8.13 - Reasons for Not Using Electronic Ballasts

Reasons for not using EB		Household Income			Total
		Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count			1	1
	Column %			20.0	9.1%
Have to Replace Very Often	Count	1	2	3	6
	Column %	50.0	50.0	60.0	54.5%
Don't Believe in Savings Claim	Count	1			1
	Column %	50.0			9.1%
Not Sure	Count		1	1	2
	Column %		25.0	20.0	18.2%
Other Reasons	Count		1		1
	Column %		25.0		9.1%
Count		2	4	5	11

Conclusion: About half of the respondents in Comilla did not use electronic ballasts as they have to replace them very often

3.8.14 Reasons for Not Using Energy Efficient Motors

There was only one response citing high cost of energy efficient motors as the reason for not using them. Details in Table: 3.8.14 below.

Table: 3.8.14 - Reasons for Not Using Energy Efficient Motors

Reasons for not using EE Motors		Household Income	Total
		Above Tk. 20,000	
Expensive	Count	1	1
	Column %	100.0	100.0%
Count		1	1

3.8.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

More than half the respondents, 56%, are willing to purchase energy saving lamps for Tk. 300 provided electricity savings is over 80% and the bulbs last for about 4 years; about a third do not at that price and there was no response from about 16%. Details are given below in Table: 3.8.15

Table: 3.8.15 - Willingness to Buy Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	13	32.5%	34	45.9%	38	61.3%	49	75.4%	134	55.6%
No	19	47.5%	26	35.1%	14	22.6%	9	13.8%	68	28.2%
No Response	8	20.0%	14	18.9%	10	16.1%	7	10.8%	39	16.2%
Total	40	100%	74	100%	62	100%	65	100%	241	100%

Conclusion: Most respondents in Comilla are willing to buy energy saving bulbs at Tk. 300 provided electricity savings is about 80%

3.8.16 Prices and the Willingness to Buy

The survey confirmed the classic inverse relationship between costs and demand: among those unwilling to buy at the Tk 300 level, three quarters were willing to do so at Tk. 100 and about one eight at Tk 150. The survey also found that price elasticity was more pronounced among lower income groups than at higher. This was expected. Details can be seen in Table 3.8.16 below.

Table: 3.8.16 Prices and the willingness to buy

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	0	.0%	1	3.7%	0	.0%	1	10.0%	2	2.9%
Tk. 200	2	10.5%	2	7.4%	5	38.5%	3	30.0%	12	17.4%
Tk. 150	7	36.8%	15	55.6%	4	30.8%	4	40.0%	30	43.5%
Tk. 100	10	52.6%	9	33.3%	4	30.8%	2	20.0%	25	36.2%
Total	19	100%	27	100%	13	100%	10	100%	69	100%

Conclusion: Majority of 44% would buy CFLs at Tk 150 and about a third at Tk 100

3.8.17 Price and Quantity

Survey shows that in higher income households would buy 3 CFLs and among low income about 2 at the desired prices. Details are given below in Table: 3.8.17

Table: 3.8.17 Quantity Households willing to buy

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	1
Tk. 3,125 - Tk. 9,999	2
Tk. 10,000 - Tk. 19,999	2
Above Tk. 20,000	3

Conclusion: As in other locales, higher income households in Comilla are willing to buy 3 CFLs while those in other income households, 2

3.8.18 Preference for sales sources

About four fifths of the respondents would prefer to buy the CFLs from retailers or wholesalers. Details are shown below in Table: 3.8.18

Table: 3.8.18 – Preference for supply source

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Retailer or Wholesaler	19	59.4%	47	83.9%	43	89.6%	43	79.6%	152	80.0%
Pay a Person Who Replaces EE Lamps at My House	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Pay by 12 Monthly Installments Adjusted Against Bill	13	40.6%	9	16.1%	5	10.4%	11	20.4%	38	20.0%
Total	32	100%	56	100%	48	100%	54	100%	190	100%

Conclusion: Most households, 80%, would prefer to buy CFLs from retailers or wholesalers

3.9. Mymensingh

3.9.1 Sample Size: Number of Households in Survey

232 households were surveyed in Mymensingh. Incomes of 16% of these households were below Tk. 3,125 per month; 33% between Tk. 3,125 and Tk. 9,999; 25% between Tk. 10,000 to Tk. 19,999; and 25% above Tk. 20,000. Details are provided below in Table 3.9.1

Table: 3.9.1 – Number of Household Surveyed in Mymensingh

Household Income	Count
Below Tk. 3,125	38
Tk. 3,125 - Tk. 9,999	76
Tk. 10,000 - Tk. 19,999	59
Above Tk. 20,000	59
Total	232

3.9.2 Professions of Respondents

Most respondents, 35%, were housewives; business owners were next at 28%; and government employees 12%. Details are provided below in Table: 3.9.2

Table: 3.9.2 – Profession of Respondents

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Farming	1	2.6%	3	3.9%	1	1.7%	1	1.7%	6	2.6%
Business	12	31.6%	22	28.9%	15	25.4%	16	27.1%	65	28.0%
Govt. Service	0	.0%	4	5.3%	14	23.7%	9	15.3%	27	11.6%
Private Service	4	10.5%	4	5.3%	2	3.4%	4	6.8%	14	6.0%
Housewife	13	34.2%	28	36.8%	18	30.5%	21	35.6%	80	34.5%
Others	8	21.1%	15	19.7%	9	15.3%	8	13.6%	40	17.2%
Total	38	100%	76	100%	59	100%	59	100%	232	100%

3.9.3 Types of Connections

Connections at most households, about 97%, were domestic connections. This is to be expected since the survey is of households. An insignificant number, about 3%, were also conducting commercial activities from their homes and so they had commercial connections as well. Details are shown below in Table: 3.9.3

Table 3.9.3- Types of Connections

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	38	100%	74	97.4%	59	100%	55	93.2%	226	97.4%
Commercial	0	.0%	2	2.6%	0	.0%	4	6.8%	6	2.6%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	38	100%	76	100%	59	100%	59	100.0 %	232	100%

Conclusion: A vast majority of household connections in Mymensingh are domestic

3.9.4 Electric Utilities

All households are connected to PDB as can be seen below in Table: 3.9.4

Table: 3.9.4 – Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	38	100%	76	100%	59	100%	59	100%	232	100%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
WZPDCL	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	38	100%	76	100%	59	100%	59	100%	232	100%

Conclusion: All households in Mymensingh are connected to PDB

3.9.5 Load Shedding

Load Shedding varies depending on whether it is summer or winter. During summer blackouts occur for more than 5 hours every day and in winter blackouts last for about two and a half hours. Details are provided in Table 3.9.5 below.

Table: 3.9.5 – Load Shedding

Load-Shedding	Household Income				
	Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	Total
	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)
Summer Daytime	2.63	2.33	2.52	2.95	2.59
Summer Night-time	2.67	2.68	2.61	2.93	2.73
Winter Daytime	1.31	1.13	1.27	1.12	1.19
Winter Night-time	2.14	1.20	1.26	1.20	1.37

Conclusion: In Summer longer load shedding about 3 hours and in Winter shorter load shedding around one hour is experienced in Mymensingh

3.9.6 Electricity Used per Household

Monthly average usage of electricity varies from 97 Kwh in small, lower income households to 283 Kwh in larger, more affluent ones. Details can be seen below in Table: 3.9.6

Table: 3.9.6 – Amount of Electricity Used

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	Three Months' Average Kw Used	Three Months' Average Bill Amount
	Mean (Tk.)	Mean (Tk.)	Mean (Tk.)	Mean (Tk.)	Mean (Tk.)	Mean (Tk.)	Mean (Tk.)	Mean (Tk.)
Below Tk. 3,125	94	239	95	243	103	262	97	248
Tk. 3,125 - Tk. 9,999	165	502	171	509	167	524	168	511
Tk. 10,000 - Tk. 19,999	199	627	218	703	214	714	210	681
Above Tk. 20,000	282	913	286	927	281	959	283	933

Conclusion: In Mymensingh the amount of electricity used varies from 97kwh in smaller households to 283kwh in larger households

3.9.7 Alternatives Used During Load Shedding Hours

Most households in Mymensingh resort to multiple sources of light during load shedding hours. Because of this, there were multiple responses causing aggregate numbers to exceed the total households surveyed. An analysis of the responses, however, shows that the largest number, 77%, resorted to using candle power during load shedding hours; 63% to rechargeable lights; IPS and hurricane lamps were resorted to by 28% and 13% respectively. Details can be seen below in Table: 3.9.7

Table: 3.9.7 – Lights Used During Load Shedding

Household Income		Lamps Used During Load-Shedding									Total
		Hurricane Lamp	Oil Lamp	Candle	Rechargeable Light	IPS	Generator	Torch Light	Others	No Response	
Below Tk. 3,125	Count	19	13	27	7	10					38
Tk. 3,125 - Tk. 9,999	Count	18	12	60	44	22				2	76
Tk. 10,000 - Tk. 19,999	Count	18	2	48	47	16	2	2			59
Above Tk. 20,000	Count	11	4	43	48	16	6	1	1		59
Total Count		66	31	178	146	64	8	3	1	2	232
Total %		28%	13%	77%	63%	28%	3%	1%	0.5%	1%	100%

Conclusion: During load shedding most of the respondents in Mymensingh use candles followed by rechargeable lights and then IPS and Hurricane lamp

3.9.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical lights and ballasts are provided below in Table: 3.9.8. The survey found that CFL's had the longest life at 25 months followed by tube lights at 17.8 and incandescent lamps, the lowest, at 4 months. Magnetic ballasts lasted longer than electronic ballasts, 20.2 months compared to 12.2 months.

Table: 3.9.8 Estimated Life of Different types of Bulbs

Replacement Time	Mean (months)
Incandescent Lights	4.0
Tube-lights	17.8
CFLs	25.0
Magnetic Ballasts	20.2
Electronic Ballasts	12.2

3.9.9 Savings from Energy Efficient Bulbs

A large majority of respondents, 72%, were aware that using CFL's would result in electricity savings; 25% unaware; the rest, about 3%, had no response. Details provided in Table 3.9.9 below.

Table: 3.9.9 – Savings from EE Bulbs

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	22	57.9%	49	66.2%	44	74.6%	51	86.4%	166	72.2%
No	16	42.1%	22	29.7%	14	23.7%	5	8.5%	57	24.8%
No Response	0	.0%	3	4.1%	1	1.7%	3	5.1%	7	3.0%
Total	38	100%	74	100%	59	100%	59	100%	230	100%

Conclusion: About three quarters of respondents in Mymensingh were aware of electricity savings if energy saving bulbs were used

3.9.10 Savings from Electronic Ballasts

Only a fifth of the respondents in Mymensingh were aware that using electronic ballasts instead of magnetic ones would result in electricity savings; over 80% did not know; and only 2% had no response. Details can be seen in Table 3.9.10

Table: 3.9.10 Savings from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	4	11.1%	10	14.1%	13	22.4%	11	18.6%	38	17.0%
No	32	88.9%	58	81.7%	45	77.6%	46	78.0%	181	80.8%
No Response	0	.0%	3	4.2%	0	.0%	2	3.4%	5	2.2%
Total	36	100%	71	100%	58	100%	59	100%	224	100%

Conclusion: Over four fifths of respondents in Mymensingh were not aware that electricity can be saved by using electronic ballasts whilst only a fifth were

3.9.11 Savings from Energy Efficient Motors

Only a tenth of the respondents were aware that savings in electricity are possible if energy efficient motors are used; the vast majority, over 85% did not know; 6% had no response. Details are in Table 3.9.11 below.

Table: 3.9.11 – Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	0	.0%	4	5.9%	8	13.8 %	8	13.6 %	20	9.1%
No	31	88.6 %	59	86.8 %	48	82.8 %	49	83.1 %	187	85.0%
No Response	4	11.4 %	5	7.4%	2	3.4 %	2	3.4 %	13	5.9%
Total	35	100 %	68	100 %	58	100 %	59	100 %	220	100%

Conclusion: Only 10% of respondents in Mymensingh were aware that if energy efficient motors were used there would be electricity savings

3.9.12 Reasons for Not Using Energy Efficient Bulbs

The survey found 60% citing high cost as the reason for not using CFL bulbs; about 5%, because they did not believe that there would be savings in electricity or that lamp life would be longer or both; and about 21% cited poor color as the reason. Details can be seen in Table: 3.9.12 below.

Table: 3.9.12 - Reasons for Not Using Energy Efficient Bulbs

Reasons for not using EE Lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	14	34	26	21	95
	Column %	63.6	69.4	61.9	47.7	60.5%
Looks Not Good	Count		2			2
	Column %		4.1			1.3%
Not Suitable for Fitting	Count	2	1	2	2	7
	Column %	9.1	2.0	4.8	4.5	4.5%
Don't Believe in Saving Claims	Count		1		1	2
	Column %		2.0		2.3	1.3%
Color of Light Not Good	Count	3	7	5	5	20
	Column %	13.6	14.3	11.9	11.4	12.7%
Quality of Light Not Good	Count		2	6	5	13
	Column %		4.1	14.3	11.4	8.3%
Do not Believe Lamp Life Claims	Count	2	1	2	2	7
	Column %	9.1	2.0	4.8	4.5	4.5%
Voltage Fluctuation	Count		1	1		2
	Column %		2.0	2.4		1.3%
Not Sure	Count	1	2	5	8	16
	Column %	4.5	4.1	11.9	18.2	10.2%
Other Reasons	Count	6	10	10	12	38
	Column %	27.3	20.4	23.8	27.3	24.2%
Total Count		22	49	42	44	157
Total %		14%	31%	26%	28%	100%

Conclusion: About 60% of the respondents in Mymensingh do not use energy saving bulbs because of their high costs

3.9.13 Reasons for Not Using Electronic Ballasts

About half responded that the reason for not using electronic ballasts was their high costs; about one tenth because they did like the quality of light; and about 54% because of other reasons. Details are provided below in Table: 3.9.13

Table: 3.9.13 - Reasons for Not Using Electronic Ballasts in Mymensingh

Reasons for not using Electronic Ballast		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	1	3	4	4	12
	Column %	33.3	60.0	36.4	44.4	42.9%
Have to Replace Very Often	Count	1		1		2
	Column %	33.3		9.1		7.1%
Not Suitable for Fitting	Count				1	1
	Column %				11.1	3.6%
Voltage Fluctuation	Count			2		2
	Column %			18.2		7.1%
Quality of Light Not Good	Count			2	1	3
	Column %			18.2	11.1	10.7%
Not Sure	Count	1	1			2
	Column %	33.3	20.0			7.1%
Other Reasons	Count	2	3	6	4	15
	Column %	66.7	60.0	54.5	44.4	53.6%
Total Count		3	5	11	9	28

Conclusion: Most respondents in Mymensingh, 43%, cited high costs of CFL bulbs as the reason for not using them another 11% because they did not like quality of light

3.9.14 Reasons for Not Using Energy Efficient Motors

About one fifth of those surveyed cited high cost as the reason for not using energy efficient motors; about 10% did not believe in the savings claimed; and about three fourths gave various other reasons. Details are given below in Table: 3.9.14

Table: 3.9.14 - Reasons for Not Using Energy Efficient Motors

Reasons for not using EE Motors		Household Income			Total
		Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count		2	2	4
	Column %		22.2	25.0	20.0%
Not Suitable for Fitting	Count			1	1
	Column %			12.5	5.0%
Don't Believe in Saving Claims	Count	1			1
	Column %	33.3			5.0%
Voltage Fluctuation	Count		1		1
	Column %		11.1		5.0%
Other Reasons	Count	2	7	6	15
	Column %	66.7	77.8	75.0	75.0%
Count		3	9	8	20
Column %		100.0	100.0	100.0	100.0

Conclusion: One fifths of respondents in Mymensingh do not use energy efficient motors because of their high cost

3.9.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

About half the respondents were willing to buy energy saving bulbs at Tk. 300 provided they result in 50% savings in electricity and have longer life; about 40% do not; while the rest 10% did not respond. Details are given below in Table: 3.9.15

Table: 3.9.15 - Willingness to Buy at Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	6	15.8%	38	50.0%	33	55.9%	41	69.5%	118	50.9%
No	27	71.1%	26	34.2%	21	35.6%	15	25.4%	89	38.4%
No Response	5	13.2%	12	15.8%	5	8.5%	3	5.1%	25	10.8%
Total	38	100%	76	100%	59	100%	59	100%	232	100%

Conclusion: About 76% of respondents in Mymensingh are willing to buy energy saving bulbs at Tk. 300 if electricity savings are 80% and they last for more than 4 years

3.9.16 Prices and the Willingness to Buy

The survey showed that the relationship between bulb costs and demand is the classic inverse one. It also found, as is to be expected, that among low income groups price elasticity was particularly pronounced. The survey indicates that more respondents are willing to buy if prices are lowered. About three quarters are willing to buy if the price is Tk. 100 and one tenth at Tk. 150. Details are given below in Table 3.9.16

Table: 3.9.16 Prices and the willingness to buy

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	2	7.1%	1	3.8%	5	19.2%	1	6.7%	9	9.5%
Tk. 200	1	3.6%	0	.0%	3	11.5%	2	13.3%	6	6.3%
Tk. 150	0	.0%	2	7.7%	3	11.5%	5	33.3%	10	10.5%
Tk. 100	25	89.3%	23	88.5%	15	57.7%	7	46.7%	70	73.7%

Conclusion: As prices are lowered more buyers are willing to buy CFLs. 74% of respondents would buy if the price was Tk. 100 and about 11% if it were Tk 150.

3.9.17 Price and Quantity

Survey shows that respondents in mid to higher income categories will buy 3 CFLs and those in lower income 2 at their desired prices. Details are given below in Table: 3.9.17

Table: 3.9.17 Quantity Households willing to buy

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	2
Tk. 3,125 - Tk. 9,999	3
Tk. 10,000 - Tk. 19,999	3
Above Tk. 20,000	3

Conclusion: Mid to higher income households will buy 3 CFLS while those in the lowest income level 2

3.9.18 Preference for sales sources

About half of the respondents would prefer to purchase the energy saving lamps from retailer or wholesaler and 40% would like to purchase on 12 monthly payments adjusted against their bill. Details are shown below in Table: 3.9.18

Table: 3.9.18 – Preferred Source

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	1	3.6%	0	.0%	2	7.4%	0	.0%	3	3.2%
Retailer or Wholesaler	15	53.6%	12	50.0%	17	63.0%	7	43.8%	51	53.7%
Pay a Person Who Replaces EE Lamps at My House	0	.0%	0	.0%	2	7.4%	1	6.3%	3	3.2%
Pay by 12 Monthly Installments Adjusted Against Bill	12	42.9%	12	50.0%	6	22.2%	8	50.0%	38	40.0%
Total	28	100%	24	100%	27	100%	16	100%	95	100%

Conclusion: Most households in Mymensingh, 54%, would like to buy energy saving bulbs from retailers or wholesalers

3.10. Rangpur

3.10.1 Sample Size: Number of Household Surveyed

236 households were surveyed in Rangpur. 17% of these households had incomes below Tk. 3,125 per month, 31% between Tk. 3,125 and Tk. 9,999, 25% between Tk. 10,000 to Tk. 19,999 and 26% above Tk. 20,000. Details are provided below in Table 3.10.1

Table: 3.10.1 – Number of Household Surveyed in Rangpur

Household Income	Count
Below Tk. 3,125	41
Tk. 3,125 - Tk. 9,999	74
Tk. 10,000 - Tk. 19,999	60
Above Tk. 20,000	61
Total	236

3.10.2 Professions of Respondents

Most respondents, 38%, were housewives; 19% owners of businesses; 16% and 13%, government employees and employees of privately owned company. Details can be seen in Table: 3.10.2

Table: 3.10.2 – Professions of Respondents

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Farming	6	15.0%	1	1.4%	1	1.7%	0	.0%	8	3.5%
Business	8	20.0%	12	16.4%	11	18.3%	12	20.7%	43	18.6%
Govt. Service	2	5.0%	14	19.2%	8	13.3%	12	20.7%	36	15.6%
Private Service	9	22.5%	7	9.6%	8	13.3%	6	10.3%	30	13.0%
Housewife	11	27.5%	32	43.8%	23	38.3%	22	37.9%	88	38.1%
Others	4	10.0%	7	9.6%	9	15.0%	6	10.3%	26	11.3%
Total	40	100%	73	100%	60	100%	58	100%	231	100%

3.10.3 Types of Connections

Most households, about 98.7%, had domestic connections. This is to be expected since the survey is of households. An insignificant number, about 1.3%, were also conducting commercial activities from their premises and so had commercial connections as well. Details are shown below in Table: 3.10.3

Table 3.10.3- Types of Connections in Rangpur

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	41	100%	74	100%	59	98.3%	59	96.6%	230	98.7%
Commercial	0	.0%	0	.0%	1	1.7%	2	3.4%	3	1.3%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	41	100%	74	100%	60	100%	61	100%	236	100%

Conclusion: Almost all, 99%, households had domestic connections in Rangpur

3.10.4 Electric Utilities

All of the households are connected to PDB as can be seen below in Table: 3.10.4

Table: 3.10.4 – Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	41	100%	74	100%	60	100%	61	100%	235	100%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
WZPDCL	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	41	100%	74	100%	60	100%	61	100%	236	100%

Conclusion: All the households in Rangpur are connected to PDB

3.10.5 Load Shedding

Load Shedding varies depending on whether it is summer or winter. During the summer months blackouts last for almost 4 hours every day but in winter they last slightly less than 2 ½ hours. Details are provided in Table 3.8.5 below.

Table: 3.10.5 – Load Shedding

Load-Shedding	Household Income				
	Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	Total
	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)
Summer Daytime	1.72	1.58	1.68	1.80	1.68
Summer Night-time	2.12	2.21	2.22	2.39	2.24
Winter Daytime	1.00	.96	.92	1.08	.99
Winter Night-time	1.82	1.25	1.22	1.43	1.39

Conclusion: Summer blackouts are longer at 4 hours but winter ones are shorter, 2 ½ hours

3.10.6 Electricity Used per Household

Monthly average usage of electricity varies from 72 Kwh in small, lower income households to 242 Kwh in larger, more affluent ones. Details can be seen below in Table: 3.10.6

Table: 3.10.6 – Amount of Electricity Used in Rangpur

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	3 Months' Average Kwh	3 Months' Average Bill
	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)
Below Tk. 3,125	73	240	76	246	68	223	72	236
Tk. 3,125 - Tk. 9,999	150	484	157	483	153	470	153	479
Tk. 10,000 - Tk. 19,999	185	576	183	573	173	550	180	566
Above Tk. 20,000	251	800	244	793	232	741	242	778

Conclusion: Electricity used varies from 72kwh in smaller households to 242kwh in larger households

3.10.7 Alternatives Used During Load Shedding Hours

Most households in Rangpur, about 41%, use rechargeable lights as the main replacement power source during load shedding. This is followed by hurricane lamps at about 21% and candle power at about 20%. Details can be seen below in Table: 3.10.7

Table: 3.10.7 Alternative Lights Used During Load Shedding

Lights Used During Load-Shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	26	17	2	3	48
	Column %	66.7	23.3	3.4	5.0	20.8%
Oil Lamp	Count	6	2	2		10
	Column %	15.4	2.7	3.4		4.3%
Candle	Count	9	23	11	3	46
	Column %	23.1	31.5	18.6	5.0	19.9%
Rechargeable Light	Count	2	23	34	35	94
	Column %	5.1	31.5	57.6	58.3	40.7%
IPS	Count	1	5	3		9
	Column %	2.6	6.8	5.1		3.9%
Generator	Count		2	6	15	23
	Column %		2.7	10.2	25.0	10.0%
Torch Light	Count		3	2	5	10
	Column %		4.1	3.4	8.3	4.3%
Total Count		39	73	59	60	231

Conclusion: During load shedding most respondents, 41%, in Rangpur use rechargeable lights followed by hurricane lamps, 21% and candles, 20%

3.10.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical lights and ballasts are provided below in Table: 3.10.8. The survey found that tube lights not CFL's had the longest life at 15.3 months, CFL's 11.8 and incandescent lamps, the lowest, at 6.6 months. Electronic ballasts lasted longer than magnetic ballasts, 27.7 months compared to 12 months.

Table: 3.10.8 – Estimated Life of Different types of Bulbs in Rangpur

Replacement Period	Mean(months)
Incandescent Lights	6.6
Tube-lights	15.3
CFLs	11.8
Magnetic Ballasts	12.0
Electronic Ballasts	27.7

3.10.9 Savings from Energy Efficient Bulbs

Fully 94% of respondents were aware that using CFLs would result in electricity savings; only about 2% unaware; the rest, about 3%, had no response. Details are given in Table 3.10.9 below.

Table: 3.10.9 –Saving from EE Bulbs

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	39	95.1%	68	91.9%	57	95.0%	58	95.1%	222	94.1%
No	2	4.9%	4	5.4%	0	.0%	0	.0%	6	2.5%
No Response	0	.0%	2	2.7%	3	5.0%	3	4.9%	8	3.4%
Total	41	100%	74	100%	60	100%	61	100%	236	100%

Conclusion: About 94% of the respondents in Rangpur are aware of that it is possible to save electricity by using energy saving lamps

3.10.10 Savings from Electronic Ballasts

Only a quarter of the respondents in Rangpur were aware that using electronic ballasts instead of magnetic ones would result in electricity savings; fully 50% did not know; and about 25% had no response. Details can be seen in Table 3.10.10

Table: 3.10.10 Savings from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	4	9.8%	27	36.5%	19	31.7%	8	13.1%	58	24.6%
No	16	39.0%	37	50.0%	29	48.3%	38	62.3%	120	50.8%
No Response	21	51.2%	10	13.5%	12	20.0%	15	24.6%	58	24.6%
Total	41	100%	74	100%	60	100%	61	100%	236	100%

Conclusion: About half the respondents in Rangpur are unaware and about a quarter aware that electricity can be saved by using electronic ballasts

3.10.11 Savings from Energy Efficient Motors

Only a sixth of the respondents were aware that savings in electricity are possible if energy efficient motors are used; a majority of 45% did not know; about 40% had no response. Details are in Table 3.10.11 below.

Table: 3.10.11 – Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	1	2.4%	12	16.2%	11	19.0%	11	18.0%	35	15.0%
No	11	26.8%	36	48.6%	27	46.6%	32	52.5%	106	45.3%
No Response	29	70.7%	26	35.1%	20	34.5%	18	29.5%	93	39.7%
Total	41	100%	74	100%	58	100%	61	100%	234	100%

Conclusion: only 15% of respondents in Rangpur were aware that electricity can be saved if energy efficient motors are used

3.10.12 Reasons for Not Using Energy Efficient Bulbs

The survey found 94% of respondents citing high cost as the reason for not using energy efficient lamps; only 1% because they did not believe that there would be savings in electricity or that lamp life would be longer or both; and about 2% citing poor color as the reason. Details can be seen in Table: 3.10.12 below.

Table: 3.10.12 - Reasons for Not Using Energy Efficient Bulbs

Reason For Not Using EE Lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	39	65	50	57	211
	Column %	97.5	95.6	87.7	96.6	94.2%
Don't Believe in Saving Claims	Count			2		2
	Column %			3.5		.9%
Color of Light Not Good	Count		1			1
	Column %		1.5			.4%
Quality of Light Not Good	Count			1	1	2
	Column %			1.8	1.7	.9%
Do not Believe Lamp Life Claims	Count	1	3	7	1	12
	Column %	2.5	4.4	12.3	1.7	5.4%
Not Sure	Count	1	2	2		5
	Column %	2.5	2.9	3.5		2.2%
Other Reasons	Count			1		1
	Column %			1.8		.4%
Count		40	68	57	59	224

Conclusion: 94% of the respondents in Rangpur cited high costs of CFLs as the reason for not buying them

3.10.13 Reasons for Not Using Electronic Ballasts

Seven out of eight responded that the reason for which they did not use electronic ballasts in place of magnetic ballast is that they are expensive. Details are given below in Table: 3.10.13

Table: 3.10.13 - Reasons for Not Using Electronic Ballasts in Rangpur

Reasons For Not Using Electronic Ballasts		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	15	31	15	17	78
	Column %	100.0	91.2	62.5	94.4	85.7
Don't Believe in Savings Claim	Count		1.0			1.0
	Column %		2.9			1.1
Voltage Fluctuation	Count				1	1.0
	Column %				5.6	1.1
Quality of Light Not Good	Count			1.0		1.0
	Column %			4.2		1.1
Not Sure	Count		1.0	4.0		5.0
	Column %		2.9	16.7		5.5
Other Reasons	Count		1.0	4.0		5.0
	Column %		2.9	16.7		5.5
Count		15	34	24	18	91

Conclusion: Most respondents in Rangpur, 86%, cited high cost of CFLs as the reason for not buying them and only 5% because they did not like the quality of light

3.10.14 Reasons for Not Using Energy Efficient Motors

About half of those surveyed cited high cost as the reason for not using energy efficient motors; about 5% did not believe in the savings claimed; and about 40% gave various other reasons. Details are given below in Table: 3.10.14

Table: 3.10.14 Reasons for Not Using Energy Efficient Motors

Reasons For Not Using EE Motors		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	8	16	11	11	46
	Column %	88.9	51.6	47.8	52.4	54.8%
Don't Believe in Motor Life Claims	Count			2		2
	Column %			8.7		2.4%
Not Sure	Count		1	1	1	3
	Column %		3.2	4.3	4.8	3.6%
Other Reasons	Count	1	14	9	9	33
	Column %	11.1	45.2	39.1	42.9	39.3%
Count		9	31	23	21	84

Conclusion: About 55% respondents in Rangpur cited high cost of energy efficient motors as the reason for not using them

3.10.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

43% of respondents were willing to buy energy saving bulbs at Tk. 300; 30% not. 28% had no response. Details are given below in Table: 3.10.15

Table: 3.10.15 - Willingness to Buy Energy Saving Lamps at Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	7	17.1%	32	43.2%	33	55.0%	29	47.5%	101	42.8%
No	22	53.7%	22	29.7%	12	20.0%	14	23.0%	70	29.7%
No Response	12	29.3%	20	27.0%	15	25.0%	18	29.5%	65	27.5%
Total	41	100%	74	100%	60	100%	61	100%	236	100%

Conclusion: 43% of respondents in Rangpur were willing to buy energy saving bulbs at Tk. 300 each if they saved 80% electricity

3.10.16 Prices and the Willingness to Buy

The survey showed that the relationship between bulb costs and demand is the classic inverse one. It also found, as is to be expected, that among low income groups price elasticity was particularly pronounced. The survey indicates that lowering prices will induce new buyers. At Tk 100, almost 95% are willing to buy. Details are given in Table 3.10.16 below.

Table: 3.10.16 Prices and the willingness to buy

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	2	7.7%	1	2.4%	0	.0%	3	8.6%	6	4.7%
Tk. 200	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Tk. 150	0	.0%	0	.0%	0	.0%	1	2.9%	1	.8%
Tk. 100	24	92.3%	41	97.6%	25	100.0 %	31	88.6%	121	94.5%
Total	26	100%	42	100%	25	100%	35	100%	128	100%

Conclusion: At Tk. 100 95% new buyers would enter the market for CFLs

3.10.17 Price and Quantity

The survey shows that respondents in high income households will buy 4 energy saving bulbs at their desired prices whilst those in all other income categories, 3. Details are given below in Table: 3.10.17

Table: 3.10.17 Quantity Households willing to buy

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	3
Tk. 3,125 - Tk. 9,999	3
Tk. 10,000 - Tk. 19,999	3
Above Tk. 20,000	4

Conclusion: Households in Rangpur with monthly incomes above Tk. 20,000 will buy 4 CFLs whilst those below that income 3 at the desired prices.

3.10.18 Preferences for supply sources

About 40% of respondents would prefer to buy the energy saving bulbs from the person who replaces EE lamps; about 30% did not express any choice; and another 25% against monthly electricity bills in installments. Details are shown below in Table: 3.10.18

Table: 3.10.18 Preference for sources of supply

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	1	3.7%	2	4.8%	3	12.0%	0	.0%	6	4.7%
Retailer or Wholesaler	0	.0%	0	.0%	1	4.0%	0	.0%	1	.8%
Pay a Person Who Replaces EE Lamps at My House	8	29.6%	21	50.0%	9	36.0%	13	38.2%	51	39.8%
Pay by 12 Monthly Installments Adjusted Against Bill	3	11.1%	9	21.4%	6	24.0%	14	41.2%	32	25.0%
Any Place	15	55.6%	10	23.8%	6	24.0%	7	20.6%	38	29.7%
Total	27	100%	42	100%	25	100%	34	100%	128	100%

Conclusion: Most households in Rangpur, 40%, will buy energy saving bulbs from the person who replaces EE lamps; 30% from anywhere and another 25% in installments

3.11. Gournadi

3.11.1 Sample Size: Number of Household Surveyed

229 households were surveyed in Gournadi. 17% of these households had incomes below Tk. 3,125 per month, 32% between Tk. 3,125 and Tk. 9,999, 23% between Tk. 10,000 to Tk. 19,999 and 28% above Tk. 20,000. Details are provided below in Table 3.11.1

Table: 3.11.1 – Number of Household Surveyed in Gournadi

Household Income	Count
Below Tk. 3,125	40
Tk. 3,125 - Tk. 9,999	74
Tk. 10,000 - Tk. 19,999	52
Above Tk. 20,000	63
Total	229

3.11.2 Professions of Respondents

Most respondents, 50%, were owners of their own business; 18% were government employees; and 13% engaged in farming. Details are shown below in Table: 3.11.2

Table: 3.11.2 – Professions of Respondents in Gournadi

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Farming	18	45.0%	11	14.9%	0	.0%	0	.0%	29	12.7%
Business	8	20.0%	31	41.9%	27	51.9%	48	76.2%	114	49.8%
Govt. Service	4	10.0%	11	14.9%	16	30.8%	10	15.9%	41	17.9%
Private Service	0	.0%	2	2.7%	3	5.8%	3	4.8%	8	3.5%
Housewife	0	.0%	1	1.4%	0	.0%	0	.0%	1	.4%
Others	10	25.0%	18	24.3%	6	11.5%	2	3.2%	36	15.7%
Total	40	100%	74	100%	52	100%	63	100%	229	100%

3.11.3 Type of Connections

Most households, about 80%, had domestic connections. This is to be expected since the survey is of households. However, unlike most other places, about 20% were conducting commercial activities from their homes and so had commercial connections as well. Details are shown below in Table: 3.11.3

Table 3.11.3- Type of Connections

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	36	90.0%	53	71.6%	41	78.8%	53	84.1%	183	79.9%
Commercial	4	10.0%	21	28.4%	11	21.2%	10	15.9%	46	20.1%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	74	100%	52	100%	63	100%	229	100%

Conclusion: A vast majority of household connections in Gournadi are domestic

3.11.4 Electric Utilities

Majority of the households are connected to REB, only about 11% are connected to PDB and the rest to WZPDCL as can be seen below in Table: 3.11.4

Table: 3.11.4 – Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	0	.0%	0	.0%	0	.0%	25	39.7%	25	10.9%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	40	100%	74	100%	52	100%	21	33.3%	187	81.7%
WZPDCL	0	.0%	0	.0%	0	.0%	17	27.0%	17	7.4%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	74	100%	52	100%	63	100%	229	100%

Conclusion: Four fifth of the households in Gournadi are connected to REB supply, about 11% to PDB and the rest to WZPDCL

3.11.5 Load Shedding

Load Shedding varies depending on whether it is summer or winter. During summer there are about 6 hours of blackouts and in winter for about 3 hours. Details are provided in Table 3.11.5 below.

Table: 3.11.5 – Load Shedding

Load-Shedding	Household Income				
	Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	Total
	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)
Summer Daytime	3.28	2.78	3.08	2.94	2.97
Summer Night-time	3.06	3.20	3.38	2.90	3.13
Winter Daytime	1.75	1.80	1.42	1.67	1.67
Winter Night-time	1.67	1.86	1.94	1.52	1.75

Conclusion: In Summer load shedding occurs for about 6 hours and in winter about 3 hours

3.11.6 Electricity Used per Household

Monthly average usage of electricity varies from 46 Kwh in small, lower income households to 167 Kwh in larger, more affluent ones. Details can be seen below in Table: 3.11.6

Table: 3.11.6 – Amount of Electricity Used

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	3 Months' Average Kwh	3 Months' Average Bill
	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)
Below Tk. 3,125	43.83	121.76	45.43	127.72	47.63	135.38	45.63	128.29
Tk. 3,125 - Tk. 9,999	55.55	169.88	61.41	177.10	66.84	193.44	61.27	180.14
Tk. 10,000 - Tk. 19,999	140.16	396.02	154.63	444.20	166.47	475.95	153.75	438.72
Above Tk. 20,000	164.48	535.68	166.12	529.97	171.15	536.81	167.25	534.15

Conclusion: In Gournadi, electricity usage varies from 46kwh in smaller households to 167kwh in the larger ones

3.11.7 Alternatives Used During Load Shedding Hours

Most households in Gournadi, about 44%, use rechargeable lights as a power source during load shedding hours; 32%, hurricane lamps; kuppis and candle power about 7% each. These have been detailed in Table: 3.11.7 below.

Table: 3.11.7 Lights Used During Load Shedding

Lights Used During Load Shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	20	50	3		73
	Column %	50.0	67.6	5.8		31.9%
Kuppi	Count	10	5	1	1	17
	Column %	25.0	6.8	1.9	1.6	7.4%
Candle	Count	8	5	2	2	17
	Column %	20.0	6.8	3.8	3.2	7.4%
Rechargeable Light	Count	2	13	38	47	100
	Column %	5.0	17.6	73.1	74.6	43.7%
IPS	Count		3	3	2	8
	Column %		4.1	5.8	3.2	3.5%
Generator	Count			4	9	13
	Column %			7.7	14.3	5.7%
Torch Light	Count			3	2	5
	Column %			5.8	3.2	2.2%
Count		40	74	52	63	229

Conclusion: During load shedding, 44% respondents in Gournadi use rechargeable lights and 32% hurricane lamps

3.11.8 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical lights and ballasts are provided below in Table: 3.11.8. The survey found that CFL's had the longest life at 27.5 months followed by tube lights at 16.1 and incandescent lamps, the lowest, at 3.2 months. Magnetic ballasts out lasted electronic ballasts marginally, 15.2 months compared to 14.6 months.

Table: 3.11.8 –Estimated Life of Different types of Bulbs

Replacement Period	Mean (months)
Incandescent Lights	3.2
Tube-lights	16.1
CFLs	27.5
Magnetic Ballasts	15.2
Electronic Ballasts	14.6

3.11.9 Savings from Energy Efficient Bulbs

The majority of respondents, 60%, were aware that using CFLs would result in electricity savings; one fifth unaware; the rest, about 3%, had no response. The details are shown below in Table 3.11.9

Table: 3.11.9 Savings from EE Bulbs

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	28	70.0%	59	79.7%	46	88.5%	57	90.5%	190	83.0%
No	8	20.0%	14	18.9%	5	9.6%	5	7.9%	32	14.0%
No Response	4	10.0%	1	1.4%	1	1.9%	1	1.6%	7	3.1%
Total	40	100%	74	100%	52	100%	63	100%	229	100%

Conclusion: About two thirds of respondents were aware that there will be savings in electricity if CFLs are used

3.11.10 Savings from Electronic Ballasts

Only a quarter of the respondents in Gournadi were aware that using electronic ballasts instead of magnetic ones would result in electricity savings; only 12% did not know; fully two thirds that is 66% had no response. Details can be seen in Table 3.11.10

Table: 3.11.10 – Savings from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	1	2.5%	7	9.5%	8	15.4%	36	57.1%	52	22.7%
No	3	7.5%	10	13.5%	5	9.6%	9	14.3%	27	11.8%
No Response	36	90.0%	57	77.0%	39	75.0%	18	28.6%	150	65.5%
Total	40	100%	74	100%	52	100%	63	100%	229	100%

Conclusion: Only about 23% of respondents in Gournadi were aware that electricity can be saved if electronic ballasts are used; 12% not aware and 66% had no response.

3.11.11 Savings from Energy Efficient Motors

Only one out of twelve respondents was aware that savings in electricity are possible if energy efficient motors are used; over 16% did not know; an overwhelming 75% had no response. Details are in Table 3.11.11 below.

Table: 3.11.11 Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income								Total	
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000			
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	0	.0%	2	2.7%	7	13.5%	10	15.9%	19	8.3%
No	0	.0%	8	10.8%	0	.0%	29	46.0%	37	16.2%
No Response	40	100%	64	86.5%	45	86.5%	24	38.1%	173	75.5%
Total	40	100%	74	100%	52	100%	63	100%	229	100%

Conclusion: Only one in twelve was aware of savings if energy efficient motors are used

3.11.12 Reasons for Not Using Energy Efficient Bulbs

The survey found 95% respondents citing high cost as the reason for not using energy efficient lamps; only about 2% because they did not believe that there would be savings in electricity or that lamp life would be longer or both; and about 1% citing poor color as the reason. Details can be seen in Table: 3.11.12 below.

Table: 3.11.12 Reasons for Not Using Energy Efficient Bulbs

Reasons for Not Using EE Lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	25	63	42	53	183
	Column %	89.3	100.0	91.3	94.6	94.8%
Not Suitable for Fitting	Count				1	1
	Column %				1.8	.5%
Color of Light Not Good	Count			1		1
	Column %			2.2		.5%
Quality of Light Not Good	Count				1	1
	Column %				1.8	.5%
Do not Believe Lamp Life Claims	Count	1	1	1		3
	Column %	3.6	1.6	2.2		1.6%
Not Sure	Count	2		2	1	5
	Column %	7.1		4.3	1.8	2.6%
Count		28	63	46	56	193

Conclusion: About 95% of the respondents in Gournadi cite high costs as the reason for not using energy saving bulbs

3.11.13 Reasons for Not Using Electronic Ballasts

About 42% responded that high cost was the reason why they did not use electronic ballasts; 53% were unsure; and a small percentage because of skepticism with claims. Details are provided in Table: 3.11.13 below.

Table: 3.11.13 - Reasons for Not Using Electronic Ballasts

Reasons for Not Using Electronic Ballasts		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count		2	2	23	27
	Column %		12.5	15.4	74.2	42.2%
Don't Believe in Savings Claim	Count		1			1
	Column %		6.3			1.6%
Voltage Fluctuation	Count			1		1
	Column %			7.7		1.6%
Not Sure	Count	3	13	10	8	34
	Column %	75.0	81.3	76.9	25.8	53.1%
Other Reasons	Count	1				1
	Column %	25.0				1.6%
Count		4	16	13	31	64

Conclusion: 43% of respondents in Gournadi did not use electronic ballasts because of high cost

3.11.14 Reasons for Not Using Energy Efficient Motors

About 90% of those surveyed were not sure what might be the reasons for not using energy efficient motors; only 3% cited high cost; and another 3% thought they did not provide sufficient power. Details are given below in Table: 3.11.14

Table: 3.11.14 - Reasons for Not Using Energy Efficient Motors

Reason for Not Using EE Motors		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	1				1
	Column %	25.0				2.6%
Not Good Power	Count				1	1
	Column %				6.7	2.6%
Not Sure	Count	3	9	8	14	34
	Column %	75.0	100.0	80.0	93.3	89.5%
Other Reasons	Count			2		2
	Column %			20.0		5.3%
Count		4	9	10	15	38

Conclusion: Most of respondents in Gournadi were not sure of any particular reason why they did not use energy efficient motors

3.11.15 Willingness to Buy Energy Saving Bulbs at Tk. 300

About a third of the respondents were willing to buy energy saving bulbs at Tk. 300 provided electricity savings were 80%; about 45% did not; and the rest, 18%, did not respond. Details are given below in Table: 3.11.15

Table: 3.11.15 Willingness to Buy at Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	22	55.0%	19	25.7%	13	25.0%	30	47.6%	84	36.7%
No	15	37.5%	35	47.3%	25	48.1%	28	44.4%	103	45.0%
No Response	3	7.5%	20	27.0%	14	26.9%	5	7.9%	42	18.3%
Total	40	100%	74	100%	52	100%	63	100%	229	100%

Conclusion: Only a third of the households in Gournadi were willing to buy CFLs at Tk 300 if they saved 80% electricity, but almost half were unwilling.

3.11.16 Prices and Willingness to Buy

The survey showed that the relationship between bulb costs and demand is the classic inverse one. It also found, as is to be expected, that among low income groups price elasticity was particularly pronounced. The survey indicates that lowering prices will induce new buyers into the CFL market. However, the responses were somewhat erratic. At Tk. 100, 45% were willing to buy and at Tk.150 51%. Details are given in Table 3.11.16 below.

Table: 3.11.16 Prices and the willingness to buy

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Tk. 200	0	.0%	0	.0%	5	15.6%	1	3.0%	6	3.5%
Tk. 150	9	22.5%	33	49.3%	14	43.8%	31	93.9%	87	50.6%
Tk. 100	31	77.5%	34	50.7%	13	40.6%	1	3.0%	79	45.9%

Conclusion: In Gournadi 97% respondents would buy CFLs at Tk 100 or Tk 150 prices

3.11.17 Price and Quantity

Survey shows that in income brackets above Tk 10,000, households would buy 5 and at incomes below Tk 10,000 households would buy 3 CFLs at their desired prices. Details are given below in Table: 3.11.17

Table: 3.11.17 Quantity Households willing to buy

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	3
Tk. 3,125 - Tk. 9,999	3
Tk. 10,000 - Tk. 19,999	5
Above Tk. 20,000	5

Conclusions: At Tk 10,000 monthly income and above, households would buy 5 CFLs and at incomes below Tk. 10,000 they would buy 3

3.11.18 Preferences for sales sources

About seven out of eight respondents would prefer to buy energy saving bulbs in monthly installments which could be adjusted against their monthly electricity bills. Details are shown below in Table: 3.6.18

Table: 3.6.18 Preferred Sources

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	0	.0%	0	.0%	1	7.7%	0	.0%	1	1.1%
Retailer or Wholesaler	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Pay a Person Who Replaces EE Lamps at My House	1	5.0%	0	.0%	5	38.5%	4	12.9%	10	11.1%
Pay by 12 Monthly Installments Adjusted Against Bill	19	95.0%	26	100%	7	53.8%	27	87.1%	79	87.8%

Conclusion: Most of the households in Gournadi would like to purchase energy saving lamps on 12 monthly installments adjusted against their bill

3.12. Dohar

3.12.1 Number of Households Surveyed

235 households were surveyed in Gournadi. 17% of these households had incomes below Tk. 3,125 per month; 34% between Tk. 3,125 and Tk. 9,999; 32% between Tk. 10,000 to Tk. 19,999; and 17% above Tk. 20,000. Details are provided below in Table 3.12.1

Table: 3.12.1 – Number of Household Surveyed in Dohar

Household Income	Count
Below Tk. 3,125	40
Tk. 3,125 - Tk. 9,999	80
Tk. 10,000 - Tk. 19,999	75
Above Tk. 20,000	40
Total	235

3.12.2 Profession of the Respondents

Most respondents, 52%, were owners of businesses; 11% employees of privately owned companies; and 8% in farming. Details are shown below in Table: 3.12.2

Table: 3.12.2 – Profession of Respondents

Main Profession	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Farming	8	20.0%	6	7.5%	4	5.3%	0	.0%	18	7.7%
Business	12	30.0%	41	51.3%	51	68.0%	19	47.5%	123	52.3%
Govt. Service	0	.0%	10	12.5%	2	2.7%	2	5.0%	14	6.0%
Private Service	3	7.5%	7	8.8%	12	16.0%	4	10.0%	26	11.1%
Others	9	22.5%	5	6.3%	1	1.3%	1	2.5%	16	6.8%
No Response	8	20.0%	11	13.8%	5	6.7%	14	35.0%	38	16.2%
Total	40	100%	80	100%	75	100%	40	100%	235	100%

3.12.3 Types of Connections

The greatest number of households, 96%, had domestic connections. This is to be expected since this is a household survey. About 3% also had commercial connections since they were also carrying out commercial activities from their homes. Details are shown below in Table: 3.12.3

Table 3.12.3- Types of Consumers

Consumer Type	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Domestic	39	98.7%	77	96.3%	74	98.7%	36	90.0%	226	96.2%
Commercial	1	1.3%	3	3.8%	1	1.3%	4	10.0%	9	3.8%
Public Sector	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Industrial	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Religious	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	80	100%	75	100%	40	100%	234	100%

Conclusion: In Dohar, an overwhelming majority of household connections,96%, are domestic

3.12.4 Electric Utilities

All the households are connected to REB as can be seen below from Table: 3.12.4

Table: 3.12.4 – Electricity Supplier

Electricity Supplier	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
PDB	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESA	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
DESCO	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
REB	40	100%	80	100%	75	100%	40	100%	235	100%
WZPDCL	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Others	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	40	100%	80	100%	75	100%	40	100%	235	100%

Conclusion: All the households in Dohar are connected to REB

3.12.5 Load Shedding

Load Shedding varies in summer and in winter. During summer it is around 7 hours a day and in winter about 4 hours. Details can be seen below in Table 3.12.5

Table: 3.12.5 Load Shedding

Load-Shedding	Household Income				
	Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	Total
	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)
Summer Daytime	4.30	4.31	4.44	4.13	4.32
Summer Night-time	3.53	3.45	3.01	2.48	3.15
Winter Daytime	2.85	2.90	2.72	1.53	2.59
Winter Night-time	1.32	1.52	1.41	1.50	1.45

Conclusion: During summer load shedding occurs for about 7 hours and in winter it is less, around 4 hours

3.12.6 Amount of Electricity Used

Average amount of Electricity used by the households varies from 40 Kwh per month for small, lower income households to 162 Kwh for larger, more affluent households. Details can be seen below in Table: 3.12.6

Table: 3.12.6 – Amount of Electricity Used in Dohar

Household Income	Kwh Used Last Month	Bill Amount Last Month	Kwh Used 2nd Last Month	Bill Amount 2nd Last Month	Kwh Used 3rd Last Month	Bill Amount 3rd Last Month	3 Months' Average Kwh	3 Months' Average Bil Amount
	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)	Mean	Mean (Tk.)
Below Tk. 3,125	40	105	38	99	43	113	40	106
Tk. 3,125 - Tk. 9,999	78	223	74	206	76	218	76	216
Tk. 10,000 - Tk. 19,999	112	308	119	321	122	335	118	321
Above Tk. 20,000	156	512	163	445	167	461	162	472

Conclusion: In Dohar, electricity used varies from 40kwh for smaller households to 162 kwh for larger households

3.12.7 Lights Used During Load Shedding

Most households in Dohar resort to multiple sources of light during load shedding hours. Because of this, there were multiple responses causing aggregate numbers to exceed the total households surveyed. An analysis of responses, however, shows that the largest number, 73%, resorted to using hurricanes during load shedding hours; 55% to rechargeable lights; 44% to candles and 36% to oil lamps. Details can be seen below in Table: 3.12.7

Table: 3.12.7 – Lights Used During Load Shedding

Lights Used During Load Shedding		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Hurricane Lamp	Count	38	66	48	14	166
	Column %	95.0	82.5	70.6	35.0	72.8%
Oil Lamp	Count	29	33	7	13	82
	Column %	72.5	41.3	10.3	32.5	36.0%
Candle	Count	14	28	31	27	100
	Column %	35.0	35.0	45.6	67.5	43.9%
Rechargeable Light	Count	6	44	50	26	126
	Column %	15.0	55.0	73.5	65.0	55.3%
IPS	Count	1	2	2	10	15
	Column %	2.5	2.5	2.9	25.0	6.6%
Generator	Count		1	3	1	5
	Column %		1.3	4.4	2.5	2.2%
Torch Light	Count		9	15	5	29
	Column %		11.3	22.1	12.5	12.7%
Count		40	80	68	40	228

Conclusion: During load shedding most of the respondents in Dohar use hurricane lamps followed by rechargeable lights

3.12.8 Replacement Time

Replacement times of different types of electrical lights and ballasts are provided below in Table: 3.11.8. The survey found that CFL's had the longest life at 13 months; FTLs 9 months; and incandescent bulbs the lowest, at 3 months. Magnetic ballasts lasted 13 months. Details are shown below in Table: 3.12.8

Table: 3.12.8 – Replacement Time

Replacement Period	Mean (months)
Incandescent Lights	3.5
Tube-lights	9.2
CFLs	13.2
Magnetic Ballasts	13.0
Electronic Ballasts	.

3.12.9 Savings from Energy Efficient Bulbs

A vast majority of respondents, 74%, were aware that using CFL's would result in electricity savings; 7% unaware; the rest, about 19%, had no response. Details provided in Table 3.12.9 below.

Table: 3.12.9 Energy Savings from EE bulbs

Know the Possibility of Saving Energy by EE Lamps	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	23	57.5%	64	80.0%	51	68.0%	35	87.5%	173	73.6%
No	4	10.0%	2	2.5%	8	10.7%	3	7.5%	17	7.2%
No Response	13	32.5%	14	17.5%	16	21.3%	2	5.0%	45	19.1%
Total	40	100%	80	100%	75	100%	40	100%	235	100%

Conclusion: About three quarters of the respondents in Dohar were aware that it is possible to save electricity by using energy saving lamps

3.12.10 Savings from Electronic Ballasts

Fully two thirds of the respondents in Dohar were aware that using electronic ballasts instead of magnetic ones would result in electricity savings; only 12% did not know; and 22%, about a quarter, had no response. Details can be seen in Table 3.12.10

Table: 3.12.10 Energy Saving from Electronic Ballasts

Know the Possibility of Saving Energy by Electronic Ballasts	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	22	55.0%	58	72.5%	45	60.0%	29	72.5%	154	65.5%
No	4	10.0%	8	10.0%	9	12.0%	8	20.0%	29	12.3%
No Response	14	35.0%	14	17.5%	21	28.0%	3	7.5%	52	22.1%
Total	40	100%	80	100%	75	100%	40	100%	235	100%

Conclusion: About a third of the respondents in Dohar were aware that using electronic ballasts would save electricity; only 12% were unaware

3.12.11 Savings from Energy Efficient Motors

Only one in ten respondents were aware that using energy efficient motors would save electricity; an overwhelming 88% had no response. Details are shown below in Table 3.12.11

Table: 3.12.11 Savings from Energy Efficient Motors

Know the Possibility of Saving Energy by Efficient Motors	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	3	7.5%	7	8.8%	7	9.3%	8	20.0%	25	10.6%
No	0	.0%	1	1.3%	2	2.7%	0	.0%	3	1.3%
No Response	37	92.5%	72	90.0%	66	88.0%	32	80.0%	207	88.1%
Total	40	100%	80	100%	75	100%	40	100%	235	100%

Conclusion: About only 10% of the respondents in Dohar know that electricity can be saved by the use of energy efficient motors

3.12.12 Reasons for Not Using Energy Efficient Bulbs

More than 96% cited high cost of CFLs as the reason why they are not using them; others gave different reasons. Details of responses are provided in Table: 3.12.12

Table: 3.12.12 - Reasons for Not Using Energy Efficient Bulbs

Reasons for Not Using EE Lamps		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	30	68	59	36	195
	Column %	96.9	95.8	93.7	97.4	95.6%
Not Suitable for Fitting	Count		1			1
	Column %		1.4			.5%
Quality of Light Not Good	Count		1	1		2
	Column %		1.4	1.6		1.0%
Do not Believe Lamp Life Claims	Count		2			2
	Column %		2.8			1.0%
Not Sure	Count	2	6	11	1	20
	Column %	6.3	8.5	17.5	2.6	9.8%
Other Reasons	Count		1	3	1	5
	Column %		1.4	4.8	2.6	2.5%
Count		32	71	63	38	204

Conclusion: About 96% of the respondents in Dohar do not use energy saving lamps because they are very expensive

3.12.13 Reasons for Not Using Electronic Ballasts

About a third cited high cost as the reason for not using electronic ballasts; two thirds did not use them because they were not sure of its usefulness. Details are given below in Table: 3.12.13

Table: 3.12.13 - Reasons for Not Using Electronic Ballasts

Reasons for Not Using EB		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	2	14	21	7	44
	Column %	10.0	29.8	50.0	30.4	33.3%
Don't Believe in Savings Claim	Count		1			1
	Column %		2.1			.8%
Not Sure	Count	18	31	22	16	87
	Column %	90.0	66.0	52.4	69.6	65.9%
Other Reasons	Count		1	7		8
	Column %		2.1	16.7		6.1%
Count		20	47	42	23	132
Column %		100.0	100.0	100.0	100.0	100.0

Conclusion: Majority of the respondents in Dohar did not use electronic ballasts because they were not sure of their effectiveness; one third found them expensive

3.12.14 Reasons for Not Using Energy Efficient Motors

A large majority, 86%, were not sure of the usefulness of using energy efficient motors, hence were not using them; about a quarter did not use them because CFLs were expensive. Details of the survey are given below in Table: 3.12.14

Table: 3.12.14 - Reasons for Not Using Energy Efficient Motors

Reasons for Not Using EE Motors		Household Income				Total
		Below Tk. 3,125	Tk. 3,125 - Tk. 9,999	Tk. 10,000 - Tk. 19,999	Above Tk. 20,000	
Expensive	Count	3	10	14	4	31
	Column %	16.7	22.2	36.8	21.1	25.8%
Don't Believe in Motor Life Claims	Count		1			1
	Column %		2.2			.8%
Not Sure	Count	17	35	34	17	103
	Column %	94.4	77.8	89.5	89.5	85.8%
Count		18	45	38	19	120

Conclusion: Most of the respondents in Dohar were not using energy efficient motors because they were not sure of their usefulness; a quarter found them expensive

3.12.15 Willingness to buy at Tk. 300

Four out of five respondents were willing to buy energy saving bulbs for Tk. 300 if they saved 80% electricity; about a tenth did not. Details are given below in Table: 3.12.15

Table: 3.12.15 – Willingness to Buy at Tk. 300

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	29	72.5%	71	88.8%	53	70.7%	33	82.5%	186	79.1%
No	3	7.5%	7	8.8%	9	12.0%	4	10.0%	23	9.8%
No Response	8	20.0%	2	2.5%	13	17.3%	3	7.5%	26	11.1%
Total	40	100%	80	100%	75	100%	40	100%	235	100%

Conclusion: Most respondents in Dohar, 80%, were willing to buy energy saving bulbs at Tk. 300 provided using them saved 80% electricity and lasted for 4 years

3.12.16 Prices and Willingness to Buy

The survey results indicate a slightly erratic responsiveness with regard to willingness to buy and price decline. In general, more buyers were willing to buy if prices are lowered. Almost half the respondents were willing to buy at Tk. 150; only 24% at Tk. 100 and 20% at Tk. 200. Details are given below in Table 3.12.16

Table: 3.12.16 Prices and the willingness to buy

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	0	.0%	0	.0%	2	22.2%	0	.0%	2	9.5%
Tk. 200	1	25.0%	1	20.0%	1	11.1%	1	33.3%	4	19.0%
Tk. 150	1	25.0%	2	40.0%	5	55.6%	2	66.7%	10	47.6%
Tk. 100	2	50.0%	2	40.0%	1	11.1%	0	.0%	5	23.8%

Conclusion: Almost 50% of the households in Dohar would buy CFLs at Tk. 150 whereas almost equal numbers, about 25%, at Tk 100 and Tk 200.

3.12.17 Price and Quantity

Survey results show somewhat erratic results: at income brackets above Tk 20,000 buyers will buy 4 bulbs and three at other incomes although at the mid income level respondents were willing to buy 4. Details are given below in Table: 3.12.17

Table: 3.12.17 Quantity Households willing to buy

Household Income	How Many Will You Purchase
	Mean
Below Tk. 3,125	3
Tk. 3,125 - Tk. 9,999	4
Tk. 10,000 - Tk. 19,999	3
Above Tk. 20,000	4

Conclusion: Household in Dohar are willing to buy between 3 and 4 bulbs at their desired prices.

3.12.18 Preferences for sources

Majority of respondents, 58%, preferred to buy CFLs from retailers and wholesalers while a third would prefer to get them from the serving utility. Details are shown below in Table: 3.12.18

Table: 3.12.18 – Preferred Source of Supply

From Where Would You Prefer To Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Electricity Supplier	2	50.0%	3	75.0%	1	12.5%	1	33.3%	7	36.8%
Retailer or Wholesaler	2	50.0%	1	25.0%	6	75.0%	2	66.7%	11	57.9%
Pay a Person Who Replaces EE Lamps at My House	0	.0%	0	.0%	1	12.5%	0	.0%	1	5.3%
Pay by 12 Monthly Installments Adjusted Against Bill	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	4	100%	4	100%	8	100%	3	100%	19	100%

Conclusion: Most of the households in Dohar would like to purchase energy saving lamps from wholesalers or retailers

CHAPTER 4
Energy Consumption

4.0 Energy Consumption

Electrical energy is consumed in a household for different purposes and to drive different devices such as electric lights, fans, television, radio/stereo players, air-conditioners, refrigerators, freezers, electric irons, ovens etc. Total energy consumed depends on the wattage of these devices and the amount of time that they are used every day.

This survey listed the different pieces of equipment that are in use in the sampled households, the periods for which they are used and the wattages of the equipment. A weighted average of the number of devices, their usage time and wattage were calculated and recorded. Detailed estimates were then categorized according to income levels and compiled into Tables for each of the ten survey areas. These estimates are discussed below.

Based on the survey results, the total energy consumed in the surveyed area is 5,900 GWH per year. The total electricity savings from switching to CFL from IL use is 1,089 Mwh, which is about 363 MW load assuming that during peak hours duration of use is 3 hours. The total energy consumption for the ten division/districts have been determined from the electricity connectivity data contained in HIES 2005 (BBS). Savings have been calculated on the basis that CFL consume 70% less energy than incandescent lamps and florescent tube lights fitted with electronic ballast consume 28% less energy than those fitted with magnetic ballasts. The total electricity saving in the case if electronic ballasts are used in place of magnetic ballasts will be 485 Mwh, which is about 97 MW load on an average of 5 hours usage at peak hours.

4.1 Electricity Consumption and Savings

Energy consumed by incandescent lamps and florescent tube lights was surveyed by enumerating the number of lights, their wattage and the number of hours of their use in households. Details of the findings are discussed in the ensuing paragraphs.

4.1.1 Potential Savings from EE measures in Dhaka

Table 4.1.1 below details the amount of electricity consumed for lighting and the potential for savings in Dhaka. Major findings of the survey are as follows:

i. ILs consume 45% of the lighting load of households and FTLs 55%;

ii. ILs totally consume 406 Mwh and FTLs 514 Mwh

iii. There are, on average, 2.4 ILs and 1.8 FTLs in households in Dhaka;

iv. Average hours of use of ILs for lighting is 3.1 hours and for FTLs 6.6

v. The average wattage of IL's is 61.9 and FTLs 9.4;

vi. Potential electricity savings from switching to CFLs from ILs is 284Mwh and savings from switching E-ballasts from Magnetics is 144 Mwh

Table: 4.1.1 Electricity Consumption and Potential Savings from Lighting Dhaka

	Particulars	Household income <Tk. 3,125	Household income Tk. 3,125-Tk. 9,999	Household income Tk. 10,000-Tk. 19,999	Household income >Tk. 20,000	Weighted Average
A.	Total Households (HH) in Zila	17,88,520				
B.	Percentage of HH	17%	56%	15%	12%	
C.	Number of HH	3,04,048	10,01,571	2,68,278	2,14,622	
D.	Incandescent Lights					
	Average watts per lamp	65.2	60.3	62.9	55.7	61.9
	Average number of lights per HH	2.3	2.3	2.4	2.6	2.4
	Average hours of use of lamps	3.3	2.6	3.1	2.9	3.1
	Total watt-hours consumed per HH	495	361	468	420	451.1
E.	Total Mega Watt Hours (Mwh) consumed	150	361	126	90	
F.	Total Mwh consumed in Zila	727				
G.	Total Mwh consumed in Zila at 55.78% connectivity	406				
H.	Total savings in Mwh (at 70% savings by CFL)	284				
I.	Florescent Lights					
	Average watts per lamp	40	40	40	33.9	39.4
	Average number of lights per HH	0.4	2.3	2.7	3.6	1.8
	Average hours of use of lights	7.4	6	6.6	5.4	6.6
	Total watt-hours consumed per HH	118	552	713	659	468.1
J.	Total Mega Watt Hours (Mwh) consumed	36	553	191	141	
K.	Total Mwh consumed in Zila	922				
L.	Total Mwh consumed in Zila at 55.78% connectivity	514				
M.	Total savings in Mwh (at 28% savings by Electronic Ballast)	144				

Conclusion: ILs consume 406 MWH in Dhaka with potential savings of 284 MWH; FTLs consume 514 MWH with potential savings of 144 MWH

4.1.2 Potential Savings from EE measures in Chittagong

Table 4.1.2 below details the amount of electricity consumed for lighting and the potential for savings in Chittagong. Major findings of the survey are as follows:

i. ILs consume 45% of the lighting load of households and FTLs 55%;

ii. ILs totally consume 304 Mwh and FTLs 514 Mwh

iii. There are on average 1.2 ILs and 3.1 FTLs in households in Chittagong;

iv. Average hours of use of ILs for lighting is 4.4 hours and for FTLs 6.2

v. The average wattage of IL's is 49.1 and FTLs 31.5;

vi. Potential electricity savings from switching to CFLs from ILs is 108Mwh and savings from switching E-ballasts from Magnetics is 105 Mwh

Table: 4.1.2- Electricity Consumption and Potential Savings in Lightings Chittagong

	Particulars	Household income <Tk. 3,125	Household income Tk. 3,125-Tk. 9,999	Household income Tk. 10,000-Tk. 19,999	Household income >Tk. 20,000	Weighted Average
A.	Total Households (HH) in Zila	1,228,880				
B.	Percentage of HH	17%	56%	15%	12%	
C.	Number of HH	208,910	688,173	184,332	147,466	
D.	Incandescent Lights					
	Average watts per lamp	52.1	54.4	44.8	44.4	49.1
	Average number of lights per HH	1	1	1.13	1.56	1.2
	Average hours of use of lamps	4.6	4.6	4.1	4.3	4.4
	Total watt-hours consumed per HH	240	250	208	298	259.2
E.	Total Mega Watt Hours (Mwh) consumed	50	172	38	44	
F.	Total Mwh consumed in Zila	304				
G.	Total Mwh consumed in Zila at 50.76% connectivity	154				
H.	Total savings in Mwh (at 70% savings by CFL)	108				
I.	Florescent Lights					
	Average watts per lamp	36.2	34.2	29.4	27.1	31.5
	Average number of lights per HH	1	3	3.6	4.3	3.1
	Average hours of use of lights	6	7	5.7	5.2	6.2
	Total watt-hours consumed per HH	217	718	603	606	605.4
J.	Total Mega Watt Hours (Mwh) consumed	45	494	111	89	
K.	Total Mwh consumed in Zila	740				
L.	Total Mwh consumed in Zila at 50.76% connectivity	376				
M.	Total savings in Mwh (at 28% savings by Electronic Ballast)	105				

Conclusion: ILs consume 154 MWH in Chittagong with potential savings of 108 MWH; FTLs consume 376 MWH with potential savings of 105 MWH

4.1.3 Potential Savings from EE measures in Rajshahi

Table 4.1.3 below details the amount of electricity consumed for lighting and the potential for savings in Rajshahi. Major findings of the survey are as follows:

i. ILs consume 56% of the lighting load of households and FTLs 44%;

ii. ILs totally consume 102Mwh and FTLs 81Mwh

iii. There are, on average, 3.2 ILs and 2.4 FTLs in households in Rajshahi;

iv. Average hours of use of ILs for lighting is 4 hours and for FTLs 6.9

v. The average wattage of IL's is 51.4 and FTLs 37.3;

vi. Potential electricity savings from switching to CFLs from ILs is 71Mwh and savings from switching E-ballasts from Magnetics is 23 Mwh

Table: 4.1.3- Electricity Consumption and Potential Savings in Lightings at Rajshahi

	Particulars	Household income <Tk. 3,125	Household income Tk. 3,125-Tk. 9,999	Household income Tk. 10,000-Tk. 19,999	Household income >Tk. 20,000	Weighted Average
A.	Total Households (HH) in Zila	498,020				
B.	Percentage of HH	17%	56%	15%	12%	
C.	Number of HH	84,663	278,891	74,703	59,762	
D.	Incandescent Lights					
	Average watts per lamp	43.5	51	55.5	51.9	51.4
	Average number of lights per HH	3	3.4	3.1	3.3	3.2
	Average hours of use of lamps	4.3	4.2	4.1	3.5	4.0
	Total watt-hours consumed per HH	561	728	705	599	657.9
E.	Total Mega Watt Hours (Mwh) consumed	48	203	53	36	
F.	Total Mwh consumed in Zila	339				
G.	Total Mwh consumed in Zila at 30.06% connectivity	102				
H.	Total savings in Mwh (at 70% savings by CFL)	71				
I.	Florescent Lights					
	Average watts per lamp	39.4	39.4	38.1	32.5	37.3
	Average number of lights per HH	1	1.8	2.5	4	2.4
	Average hours of use of lights	6.3	7.5	8.1	5.6	6.9
	Total watt-hours consumed per HH	248	532	772	728	617.7
J.	Total Mega Watt Hours (Mwh) consumed	21	148	58	44	
K.	Total Mwh consumed in Zila	270				
L.	Total Mwh consumed in Zila at 30.06% connectivity	81				
M.	Total savings in Mwh (at 28% savings by Electronic Ballast)	23				

Conclusion: ILs consume 102 MWH in Rajshahi with potential savings of 71 MWH; FTLs consume 81 MWH with potential savings of 23 MWH

4.1.4 Potential Savings from EE measures in Sylhet

Table 4.1.4 below details the amount of electricity consumed for lighting and the potential for savings in Sylhet. Major findings of the survey are as follows:

i. ILs consume 62% of the lighting load of households and FTLs 38%;

ii. ILs totally consume 189Mwh and FTLs 115Mwh

iii. There are, on average, 3.2 ILs and 4.1 FTLs in households in Sylhet;

iv. Average hours of use of ILs for lighting is 2.8 hours and for FTLs 3.2

v. The average wattage of IL's is 47.1 and FTLs 23.2;

vi. Potential electricity savings from switching to CFLs from ILs is 54Mwh and savings from switching E-ballasts from Magnetics is 13 Mwh

Table: 4.1.4 Electricity Consumption and Potential Savings in Lightings Sylhet

	Particulars	Household income <Tk. 3,125	Household income Tk. 3,125-Tk. 9,999	Household income Tk. 10,000-Tk. 19,999	Household income >Tk. 20,000	Weighted Average
A.	Total Households (HH) in Zila	420,760				
B.	Percentage of HH	17%	56%	15%	12%	
C.	Number of HH	71,529	235,626	63,114	50,491	
D.	Incandescent Lights					
	Average watts per lamp	48.6	51.3	44.4	44	47.1
	Average number of lights per HH	2.8	3.4	3.4	2.8	3.2
	Average hours of use of lamps	3.3	2.8	2.4	3	2.8
	Total watt-hours consumed per HH	449	488	362	370	432.9
E.	Total Mega Watt Hours (Mwh) consumed	32	115	23	19	
F.	Total Mwh consumed in Zila	189				
G.	Total Mwh consumed in Zila at 40.65% connectivity	77				
H.	Total savings in Mwh (at 70% savings by CFL)	54				
I.	Florescent Lights					
	Average watts per lamp	22.6	24.2	23.3	22.4	23.2
	Average number of lights per HH	3.1	3.4	4.5	5.2	4.1
	Average hours of use of lights	3.6	2.9	3	3.5	3.2
	Total watt-hours consumed per HH	252	239	315	408	304.4
J.	Total Mega Watt Hours (Mwh) consumed	18	56	20	21	
K.	Total Mwh consumed in Zila	115				
L.	Total Mwh consumed in Zila at 40.65% connectivity	47				
M.	Total savings in Mwh (at 28% savings by Electronic Ballast)	13				

Conclusion: ILs consume 77 MWH in Sylhet with potential savings of 54 MWH; FTLs consume 47 MWH with potential savings of 13 MWH

4.1.5 Potential Savings from EE measures in Bogra

Table 4.1.5 below details the amount of electricity consumed for lighting and the potential for savings in Bogra. Major findings of the survey are as follows:

i. ILs consume 57% of the lighting load of households and FTLs 43%;

ii. ILs totally consume 110Mwh and FTLs 82Mwh

iii. There are, on average, 2.5 ILs and 2.5 FTLs in households in Bogra;

iv. Average hours of use of ILs for lighting is 3.4 hours and for FTLs 4.6

v. The average wattage of IL's is 65.6 and FTLs 38.5;

vi. Potential electricity savings from switching to CFLs from ILs is 77Mwh and savings from switching E-ballasts from Magnetics is 23 Mwh

Table: 4.1.5 Electricity Consumption and Potential Savings
Bogra

	Particulars	Household income <Tk. 3,125	Household income Tk. 3,125-Tk. 9,999	Household income Tk. 10,000-Tk. 19,999	Household income >Tk. 20,000	Weighted Average
A.	Total Households (HH) in Zila	678,950				
B.	Percentage of HH	17%	56%	15%	12%	
C.	Number of HH	115,422	380,212	101,843	81,474	
D.	Incandescent Lights					
	Average watts per lamp	62.3	63.2	66.8	69.6	65.6
	Average number of lights per HH	2.5	2.4	3.2	2	2.5
	Average hours of use of lamps	3.5	3.2	3.8	3.2	3.4
	Total watt-hours consumed per HH	545	485	812	445	555.1
E.	Total Mega Watt Hours (Mwh) consumed	63	185	83	36	
F.	Total Mwh consumed in Zila	366				
G.	Total Mwh consumed in Zila at 30.06% connectivity	110				
H.	Total savings in Mwh (at 70% savings by CFL)	77				
I.	Florescent Lights					
	Average watts per lamp	39.1	39	37	38.9	38.5
	Average number of lights per HH	1	2.3	2.9	3.1	2.5
	Average hours of use of lights	5	4.7	4.5	4.1	4.6
	Total watt-hours consumed per HH	196	422	483	494	447.5
J.	Total Mega Watt Hours (Mwh) consumed	23	160	49	40	
K.	Total Mwh consumed in Zila	272				
L.	Total Mwh consumed in Zila at 30.06% connectivity	82				
M.	Total savings in Mwh (at 28% savings by Electronic Ballast)	23				

Conclusion: ILs consume 110 MWH in Bogra with potential savings of 77 MWH; FTLs consume 82 MWH with potential savings of 23 MWH

4.1.6 Potential Savings from EE measures in Barisal

Table 4.1.6 below details the amount of electricity consumed for lighting and the potential for savings in Barisal. Major findings of the survey are as follows:

i. ILs consume 58% of the lighting load of households and FTLs 42%;

ii. ILs totally consume 91Mwh and FTLs 65Mwh

iii. There are, on average, 2.8 ILs and 2.4 FTLs in households in Barisal;

iv. Average hours of use of ILs for lighting is 2.8 hours and for FTLs 4.7

v. The average wattage of IL's is 71.2 and FTLs 39.4;

vi. Potential electricity savings from switching to CFLs from ILs is 64Mwh and savings from switching E-ballasts from Magnetics is 18 Mwh

Table: 4.1.6 Electricity Consumption and Potential Savings in Lightings Barisal

	Particulars	Household income <Tk. 3,125	Household income Tk. 3,125-Tk. 9,999	Household income Tk. 10,000-Tk. 19,999	Household income >Tk. 20,000	Weighted Average
A.	Total Households (HH) in Zila	475,680				
B.	Percentage of HH	17%	56%	15%	12%	
C.	Number of HH	80,866	266,381	71,352	57,082	
D.	Incandescent Lights					
	Average watts per lamp	59.6	73.1	75.4	72.1	71.2
	Average number of lights per HH	3.2	3	2.9	2.3	2.8
	Average hours of use of lamps	3	3.1	2.9	2.8	2.9
	Total watt-hours consumed per HH	572	680	634	464	578.1
E.	Total Mega Watt Hours (Mwh) consumed	46	181	45	27	
F.	Total Mwh consumed in Zila	299				
G.	Total Mwh consumed in Zila at 30.44% connectivity	91				
H.	Total savings in Mwh (at 70% savings by CFL)	64				
I.	Florescent Lights					
	Average watts per lamp	40	40	40	37.8	39.4
	Average number of lights per HH	1.6	2.5	2.3	3	2.4
	Average hours of use of lights	5.2	4.9	4.4	4.3	4.7
	Total watt-hours consumed per HH	333	490	405	488	440.2
J.	Total Mega Watt Hours (Mwh) consumed	27	131	29	28	
K.	Total Mwh consumed in Zila	214				
L.	Total Mwh consumed in Zila at 30.44% connectivity	65				
M.	Total savings in Mwh (at 28% savings by Electronic Ballast)	18				

Conclusion: ILs consume 91MWH in Barisal with potential savings of 64 MWH; FTLs consume 65 MWH with potential savings of 18 MWH

4.1.7 Potential Savings from EE measures in Khulna

Table 4.1.7 below details the amount of electricity consumed for lighting and the potential for savings in Barisal. Major findings of the survey are as follows:

i. ILs consume 50% of the lighting load of households and FTLs also 50%;
ii. ILs totally consume 93Mwh and FTLs 94Mwh
iii. There are, on average, 2.6 ILs and 2.3 FTLs in households in Khulna;
iv. Average hours of use of ILs for lighting is 3.2 hours and for FTLs 5.6
v. The average wattage of IL's is 56.1 and FTLs 38.2;

vi. Potential electricity savings from switching to CFLs from ILs is 65Mwh and savings from switching E-ballasts from Magnetics is 26 Mwh

Table: 4.1.7- Electricity Consumption and Potential Savings in Lightings Khulna

	Particulars	Household income <Tk. 3,125	Household income Tk. 3,125-Tk. 9,999	Household income Tk. 10,000-Tk. 19,999	Household income >Tk. 20,000	Weighted Average
A.	Total Households (HH) in Zila	494,800				
B.	Percentage of HH	17%	56%	15%	12%	
C.	Number of HH	84,116	277,088	74,220	59,376	
D.	Incandescent Lights					
	Average watts per lamp	53.6	55.4	60.5	53.9	56.1
	Average number of lights per HH	2.7	2.5	2.6	2.6	2.6
	Average hours of use of lamps	3.3	3.1	3	3.3	3.2
	Total watt-hours consumed per HH	478	429	472	462	459.8
E.	Total Mega Watt Hours (Mwh) consumed	40	119	35	27	
F.	Total Mwh consumed in Zila	222				
G.	Total Mwh consumed in Zila at 42.1% connectivity	93				
H.	Total savings in Mwh (at 70% savings by CFL)	65				
I.	Florescent Lights					
	Average watts per lamp	40	39.7	37.8	35.5	38.2
	Average number of lights per HH	1	1.9	2.6	3.6	2.3
	Average hours of use of lights	5.8	6	5.5	5.2	5.6
	Total watt-hours consumed per HH	232	453	541	665	492.0
J.	Total Mega Watt Hours (Mwh) consumed	20	125	40	39	
K.	Total Mwh consumed in Zila	224				
L.	Total Mwh consumed in Zila at 42.1% connectivity	94				
M.	Total savings in Mwh (at 28% savings by Electronic Ballast)	26				

Conclusion: Ils consume 93MWH in Khulna with potential savings of 65 MWH; FTLs consume 94 MWH with potential savings of 26 MWH

4.1.8 Potential Savings from EE measures in Comilla

Table 4.1.8 below details the amount of electricity consumed for lighting and the potential for savings in Comilla. Major findings of the survey are as follows:

i. ILs consume 45% of the lighting load of households and FTLs 55%;
ii. ILs totally consume 167Mwh and FTLs 204Mwh
iii. There are, on average, 2.2 ILs and 3.2 FTLs in households in Comilla;
iv. Average hours of use of ILs for lighting is 3.2 hours and for FTLs also 3.2
v. The average wattage of IL's is 48.3 and FTLs 34.8;

vi. Potential electricity savings from switching to CFLs from ILs is 117Mwh and savings from switching E-ballasts from Magnetics is 57 Mwh

Table: 4.1.8- Electricity Consumption and Potential Savings in Lightings Comilla

	Particulars	Household income <Tk. 3,125	Household income Tk. 3,125-Tk. 9,999	Household income Tk. 10,000-Tk. 19,999	Household income >Tk. 20,000	Weighted Average
A.	Total Households (HH) in Zila	822,480				
B.	Percentage of HH	17%	56%	15%	12%	
C.	Number of HH	139,822	460,589	123,372	98,698	
D.	Incandescent Lights					
	Average watts per lamp	49.1	52.2	49.7	41.9	48.3
	Average number of lights per HH	2.3	2.4	1.9	2.3	2.2
	Average hours of use of lamps	3.4	3.7	3.2	2.6	3.2
	Total watt-hours consumed per HH	384	464	302	251	340.0
E.	Total Mega Watt Hours (Mwh) consumed	54	213	37	25	
F.	Total Mwh consumed in Zila	329				
G.	Total Mwh consumed in Zila at 5076% connectivity	167				
H.	Total savings in Mwh (at 70% savings by CFL)	117				
I.	Florescent Lights					
	Average watts per lamp	39.6	37.1	33	31.1	34.8
	Average number of lights per HH	1.2	2.9	3.6	4.4	3.2
	Average hours of use of lights	5.6	5	4.2	4.1	4.6
	Total watt-hours consumed per HH	266	538	499	561	512.3
J.	Total Mega Watt Hours (Mwh) consumed	37	248	62	55	
K.	Total Mwh consumed in Zila	402				
L.	Total Mwh consumed in Zila at 50.76% connectivity	204				
M.	Total savings in Mwh (at 28% savings by Electronic Ballast)	57				

Conclusion: Ils consume 167MWH in Khulna with potential savings of 117 MWH; FTLs consume 204 MWH with potential savings of 57 MWH

4.1.9 Potential Savings from EE measures in Mymensingh

Table 4.1.9 below details the amount of electricity consumed for lighting and the potential for savings in Comilla. Major findings of the survey are as follows:

i. ILs consume 55% of the lighting load of households and FTLs 45%;
ii. ILs totally consume 268Mwh and FTLs 218Mwh
iii. There are, on average, 2.6 ILs and also 2.6 FTLs in households in Mymensingh;
iv. Average hours of use of ILs for lighting is 3.2 hours and for FTLs also 5
v. The average wattage of IL's is 55.3 and FTLs 34.1;

vi. Potential electricity savings from switching to CFLs from ILs is 187Mwh and savings from switching E-ballasts from Magnetics is 61 Mwh

Table: 4.1.9- Electricity Consumption and Potential Savings in Lightings Mymensingh

	Particulars	Household income <Tk. 3,125	Household income Tk. 3,125-Tk. 9,999	Household income Tk. 10,000-Tk. 19,999	Household income >Tk. 20,000	Weighted Average
A.	Total Households (HH) in Zila	965,140				
B.	Percentage of HH	17%	56%	15%	12%	
C.	Number of HH	164,074	540,478	144,771	115,817	
D.	Incandescent Lights					
	Average watts per lamp	53.9	55.2	50.4	61	55.3
	Average number of lights per HH	3.1	2.9	1.8	2.7	2.6
	Average hours of use of lamps	3.1	3.4	3.2	3.1	3.2
	Total watt-hours consumed per HH	518	544	290	511	460.1
E.	Total Mega Watt Hours (Mwh) consumed	85	294	42	59	
F.	Total Mwh consumed in Zila	480				
G.	Total Mwh consumed in Zila at 55.78% connectivity	268				
H.	Total savings in Mwh (at 70% savings by CFL)	187				
I.	Florescent Lights					
	Average watts per lamp	33.3	34.4	32.9	35.2	34.1
	Average number of lights per HH	1.3	2.3	3.6	2.7	2.6
	Average hours of use of lights	4.9	5.2	4.1	5.8	5.0
	Total watt-hours consumed per HH	212	411	486	551	443.1
J.	Total Mega Watt Hours (Mwh) consumed	35	222	70	64	
K.	Total Mwh consumed in Zila	391				
L.	Total Mwh consumed in Zila at 55.78% connectivity	218				
M.	Total savings in Mwh (at 28% savings by Electronic Ballast)	61				

Conclusion: Ils consume 268MWH in Mymensingh with potential savings of 187 MWH; FTLs consume 218 MWH with potential savings of 61 MWH

4.1.10 Potential Savings from EE measures in Rangpur

Table 4.1.10 below details the amount of electricity consumed for lighting and the potential for savings in Rangpur. Major findings of the survey are as follows:

i. ILs consume 63% of the lighting load of households and FTLs 37%;
ii. ILs totally consume 87Mwh and FTLs 51Mwh
iii. There are, on average, 2.3 ILs and 3 FTLs in households in Rangpur;
iv. Average hours of use of ILs for lighting is 4.2 hours and for FTLs 4
v. The average wattage of IL's is 44.3 and FTLs 26;
vi. Potential electricity savings from switching to CFLs from ILs is 61Mwh and savings from switching E-ballasts from Magnetics is 14 Mwh

Table: 4.1.10- Electricity Consumption and Potential Savings in Lightings at Rangpur

	Particulars	Household income <Tk. 3,125	Household income Tk. 3,125-Tk. 9,999	Household income Tk. 10,000-Tk. 19,999	Household income >Tk. 20,000	Weighted Average
A.	Total Households (HH) in Zila	5,79,740				
B.	Percentage of HH	17%	56%	15%	12%	
C.	Number of HH	98,556	3,24,654	86,961	69,569	
D.	Incandescent Lights					
	Average watts per lamp	36.9	51.5	46.4	38.4	44.3
	Average number of lights per HH	1.7	2.6	2.5	2.3	2.3
	Average hours of use of lamps	4.6	4.6	4	3.6	4.2
	Total watt-hours consumed per HH	289	616	464	318	427.9
E.	Total Mega Watt Hours (Mwh) consumed	28	200	40	22	
F.	Total Mwh consumed in Zila	291				
G.	Total Mwh consumed in Zila at 30.06% connectivity	87				
H.	Total savings in Mwh (at 70% savings by CFL)	61				
I.	Florescent Lights					
	Average watts per lamp	24.1	27	27.9	24.1	26.0
	Average number of lights per HH	1.5	2.7	3.2	4.2	3.0
	Average hours of use of lights	3.6	4.1	4.4	3.7	4.0
	Total watt-hours consumed per HH	130	299	393	375	312.0
J.	Total Mega Watt Hours (Mwh) consumed	13	97	34	26	
K.	Total Mwh consumed in Zila	170				
L.	Total Mwh consumed in Zila at 30.06% conectivity	51				
M.	Total savings in Mwh (at 28% savings by Electronic Ballast)	14				

Conclusion: ILs consume 87MWH in Rangpur with potential savings of 61 MWH; FTLs 51 MWH with potential savings of 14 MWH

4.2 Other Electrical Loads

Other than for lighting use, there are basically two types of electric loads in households. The first type are those used in households throughout the day during peak and off peak hours such as fans, air-conditioners, refrigerators, televisions and stereo players. The other type includes those loads that are generally not used during peak hours. These are much smaller in terms of numbers as well as load use and used mostly in larger, more affluent households. They are mostly ovens, electric irons, food processors, water pumps, toasters, water heaters, computers etc and some others that have not been covered in the survey.

4.2.1 Ceiling and Stand Fans

Although ceiling and stand fans constitute seasonal loads, they are a significant part of a household's appliance inventory. Fans are widely used in all rooms of a household especially in living and bedrooms and sparingly in some. Kitchens and toilets have no fans. On average there are 2.6 ceiling and 0.17 stand fans per household in the 10 districts surveyed. Fans use 75 watts of electricity and are used for about 9 hours and 5½ hours every day for ceiling and stand fans respectively. Assuming a 25% load shedding factor, ceiling fans consume 4,600 Mwh of electricity every day and stand fans 189 Mwh. Peak hour load will be 528 MW for ceiling fans and 34 MW for stand fans at 25% load-shedding. Table 4.2.1 provides details below:

Table 4.2.1: Ceiling and Stand Fans

Name of Zila	Number of Electrified Households	Ceiling Fans		Stand Fans	
		Average Quantity	Average Hours of Usage	Average Quantity	Average Hours of Usage
Dhaka	997,636	1.92	10.23	0.31	8.93
Chittagong	623,779	2.56	8.72	0.02	2.28
Rajshahi	149,705	3.08	9.48	0.16	6.11
Sylhet	171,039	4.00	7.82	0.12	3.22
Bogra	204,092	2.76	7.11	0.13	4.77
Barisal	144,797	2.69	6.57	0.12	3.25
Khulna	208,311	2.49	7.83	0.22	6.39
Comilla	417,491	3.00	7.96	0.09	4.45
Mymensingh	538,162	2.88	7.84	0.22	4.80
Rangpur	174,270	2.78	9.17	0.10	4.60
Total	3,629,283				
Weighted Average		2.59	8.70	0.17	5.46

Conclusion: Per household, there 2.59 ceiling and 0.17 stand fans. Ceiling fans are used for 8.7 hours and stand fans 5.46 hours a day.

4.2.2 Television and Stereo Players

During the last decade or so, TV watching has gained a great deal of popularity whilst the use of transistor radios, music centers and record players have declined. At present almost 90% of households have a TV set whereas only eight out every 100 household owns a transistor radio or music center or record player. An average TV set uses 75 watts of electricity and an average Stereo about 30 watts. Therefore, total consumption of electricity, assuming a 25% load shedding factor, in the 10 districts are 1,153 Mwh and 19 Mwh per day by TVs and stereos. The peak hour load will be 183 MW for TVs and 19 MW for Stereos at 25% load-shedding. Table 4.2.2 gives details below:

Table 4.2.2: Televisions and Stereos

Name of Zila	Number of Electrified Households	Television		Stereo	
		Average Quantity	Average Hours of Use	Average Quantity	Average Hours of Use
Dhaka	997,636	0.85	6.95	0.10	4.81
Chittagong	623,779	0.88	5.77	0.01	0.79
Rajshahi	149,705	0.97	5.62	0.00	0.68
Sylhet	171,039	0.91	4.47	0.02	3.40
Bogra	204,092	1.00	4.53	0.04	1.85
Barisal	144,797	0.95	3.31	0.02	0.71
Khulna	208,311	0.87	6.81	0.19	4.24
Comilla	417,491	0.93	6.41	0.14	2.54
Mymensingh	538,162	0.93	6.59	0.11	3.42
Rangpur	174,270	0.92	9.26	0.02	2.36
Total Weighted Average	3,629,283	0.90	6.28	0.08	2.39

Conclusions: Televisions are very popular now with 90% of households owning at least one set. Only one house in 12 owns a Transistor radio or music center or a record player.

4.2.3 Air Conditioners and Refrigerators

Over the last few years, air-conditioner and refrigerator use in households have increased as income levels have grown. About 3% of all households use air-conditioners and 54% refrigerators. An average air-conditioner consumes 1250 watts of electricity and an average refrigerator about 300 watts. Assuming a 25% load-shedding factor, total electricity consumed per day by air-conditioners and refrigerators in the 10 zilas are 612 Mwh and 8,175 Mwh respectively. The peak hour load will be 136 MW for air-conditioners and 440 MW for refrigerators at 25% load-shedding. Table 4.2.3 below provides details:

Table 4.2.3: Air-Conditioners and Refrigerators

Name of Zilas	Number of Electrified Households	Air-Conditioners		Refrigerators	
		Average Quantity	Average Hours of Use	Average Quantity	Average Hours of Use
Dhaka	997,636	0.06	1.50	0.52	17.99
Chittagong	623,779	0.02	1.12	0.30	16.55
Rajshahi	149,705			0.57	16.37
Sylhet	171,039	0.04	1.04	0.80	19.11
Bogra	204,092	0.01	1.45	0.66	20.01
Barisal	144,797	0.01	1.28	0.83	20.00
Khulna	208,311	0.09	2.15	0.42	12.56
Comilla	417,491	0.02	14.08	0.69	23.62
Mymensingh	538,162	0.06	12.55	0.57	19.77
Rangpur	174,270	0.01	2.24	0.54	18.35
Total	3,629,283	0.04	4.50	0.54	18.54

Conclusion: About one in 25 houses owns an air-conditioner and slightly over half of the households own refrigerator. Air-conditioners run on an average four and a half hours a day and refrigerators the entire day.

CHAPTER 5
Public Buildings

5.0 Public Building

Public buildings are defined as those buildings where common people have free and unhindered access. For survey purposes, however, only Railway Stations, Bus Terminals, Launch Terminals, Post Offices, Govt. Schools, Judge Courts, Police Stations, Power Utility Offices and Mosques have been defined as public buildings. Buildings that house government offices are by definition not public buildings because ordinary people do not have free and unhindered access to them. Some public buildings like Kamlapur Railway Station, GPO and some Police Stations in Dhaka refused to provide any data for this survey. Findings are discussed in the following chapters.

5.1 Sample Size: Number of Public Buildings Surveyed

In all 139 Public Buildings were surveyed. Detailed breakdown is provided below in Table 5.1

Table: 5.1: Number of Public Buildings Surveyed

Area	Number of Samples									
	Launch Terminal	Judge Court	Police Station	Bus Terminal	Govt. School	Mosque	Post Office	Electricity Utility	Railway Station	Total
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
Dhaka	0	0	0	2	3	3	1	1	1	11
Mymensingh	0	1	3	2	2	3	1	1	1	14
Comilla	0	1	3	2	2	3	1	1	1	14
Sylhet	0	1	3	2	2	3	1	1	1	14
Chittagong	0	1	3	2	3	3	1	1	1	15
Rajshahi	0	1	3	2	3	3	1	1	1	15
Rangpur	0	1	3	2	2	3	1	1	1	14
Bogra	0	1	3	2	2	3	1	1	1	14
Khulna	0	1	3	1	3	3	1	1	1	14
Barisal	1	1	3	2	2	3	1	1	0	14
Total	1	9	27	19	24	30	10	10	9	139

5.2 Electricity Utilities

Majority of Public Buildings in the surveyed areas are supplied power by PDB. This can be seen in Table: 5.2 below.

Table: 5.2 – Electricity Supplier

Building	Electricity Supplier								
	PDB		DESCO		REB		WZPDCL		Total
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
Launch Terminal	0	0.0%	0	0.0%	0	0.0%	1	100%	1
Judge Court	7	77.8%	0	0.0%	0	0.0%	2	22.2%	9
Police Station	17	63.0%	0	0.0%	4	14.8%	6	22.2%	27
Bus Terminal	13	68.4%	2	10.5%	1	5.3%	3	15.8%	19
Govt. School	16	66.7%	3	12.5%	0	0.0%	5	20.8%	24
Mosque	21	70.0%	3	10.0%	1	3.3%	5	16.7%	30
Post Office	7	70.0%	1	10.0%	0	0.0%	2	20.%	10
Power Utility	7	70.0%	1	10.0%	0	0.0%	2	20.%	10
Railway Station	7	77.8%	1	11.1%	0	0.0%	1	11.1%	9
Total	95	68.3%	11	7.9%	6	4.3%	27	19.4%	139

Conclusion: PDB supplies power to the majority of public buildings, about seven out of ten, WZPDCL to about one fifth and a twelfth by DESCO. The balance is by REB

5.3 Load Shedding

Load shedding during summer is double that of winter at Public Buildings. Launch Terminals have the highest and Railway Stations the lowest amount of blackouts. Details can be seen in Table 5.3 below.

Table: 5.3 Load Shedding

Building	Load-Shedding Summer Daytime	Load-Shedding Summer Night-time	Load-Shedding Winter Daytime	Load-Shedding Winter Night-time
	Mean (hrs)	Mean (hrs)	Mean (hrs)	Mean (hrs)
Launch Terminal	6.00	6.00	4.00	3.00
Judge Court	2.00	2.06	.78	1.00
Police Station	3.24	2.94	1.33	1.11
Bus Terminal	4.37	3.53	1.89	1.67
Govt. School	3.29	3.06	1.21	1.17
Mosque	3.58	3.10	1.25	1.23
Post Office	3.80	3.56	1.55	1.67
Power Utility Office	2.00	1.25	.75	.00
Railway Station	1.94	1.72	.88	1.21

Conclusion: Summer load shedding is double that of winter irrespective of day or night.

5.4 Electricity Usage in Public Buildings

Electricity usage varies from 90 Kwh per month in Mosques to 22,464 Kwh in Railway Stations. Details can be seen below in Table: 5.4

Table: 5.4 – Amount of Electricity Used

Building	Kwh Used Last Month	Bill Amount Last Month
	Mean (Kwh)	Mean (Tk.)
Launch Terminal	Not given	Not given
Judge Court	5,103	23,331
Police Station	970	5,488
Bus Terminal	1,078	5,434
Govt. School	1,203	4,426
Mosque	90	337
Post Office	1,229	7,079
Power Utility Office	2,410	13,641
Railway Station	20,464	78,924

Railway Stations are the biggest consumers of electricity, mosques, lowest.

5.5 Alternatives Used During Load Shedding Hours

Most Public Buildings, about 70%, use candles during load shedding hours; 24% rechargeable lights; and 5% hurricane lamps. The percentages add up to more than 100% since there were multiple replies from respondents. Details in Table: 5.5

Table: 5.5 – Lights Used During Load Shedding

Building		Lights Used During Load-Shedding								Total
		Hurricane Lamp	Oil Lamp	Candle	Rechargeable Light	IPS	Own Generator	Torch Light	Others	
Launch Terminal	Count			1				1		1
	Row %			100%				100%		
Judge Court	Count			6	2			5	1	9
	Row %			66.7%	22.2%			55.6%	11.1%	
Police Station	Count			21	5	1	1	11	3	27
	Row %			77.8%	18.5%	3.7%	3.7	40.7%	11.1%	
Bus Terminal	Count	4	2	13	2			5	1	18
	Row %	22.2%	11.1%	72.2%	11.1%			27.8%	5.6%	
Govt. School	Count			12	1		4	1	3	14
	Row %			85.7%	7.1%		28.6	7.1%	21.4%	
Mosque	Count	1		18	17		7	6		30
	Row %	3.3%		60%	56.7%		23.3	20%		
Post Office	Count			7	1			6	1	10
	Row %			70%	10%			60%	10%	
Power Utility office	Count				1		1	3		4
	Row %				25%		25.0	75%		
Railway Station	Count	1		6		1		3	1	7
	Row %	14.3%		85.7%		14.3%		42.9%	14.3%	
Total	Count	6	2	84	29	2	13	41	10	120
	Row %	5%	1.7%	70%	24.2%	1.7%	10.8	34.2%	8.3%	100%

Conclusion: During load shedding, 70% of Public Buildings use candles; 24% rechargeable lights; and 34% Torch Lights.

5.6 Estimated Life of Different types of Bulbs

Replacement times of different types of electrical bulbs and ballasts are provided below in Table: 5.6. The survey found that FTLs and magnetic ballasts had the longest life whereas ILs, the lowest.

Table: 5.6 –Estimated Life of Different types of Bulbs

Buildings	Replacement months for Incandescent Lights	Replacement months for Tube-lights	Replacement months for CFLs	Replacement months for Magnetic Ballasts
	Mean (months)	Mean (months)	Mean (months)	Mean (months)
Launch Terminal	2.0	18.0	12.0	18.0
Judge Court	5.9	17.8	13.3	21.0
Police Station	6.4	17.1	14.6	14.4
Bus Terminal	5.8	14.5	14.3	12.0
Govt. School	7.7	18.6	13.7	19.7
Mosque	5.3	16.6	13.6	15.0
Post Office	5.2	18.0	13.8	20.0
Power Utility	5.6	18.2	13.2	18.0
Railway Station	5.4	11.7	9.7	3.5

Conclusion: Estimated life of FTLs and MB is the longest ranging from 3.5 months to 21 months, while the life of incandescent lamps is the lowest ranging from 2 to 7.7 months.

5.7 Knowledge of Savings from Energy Efficient Bulbs

About 78% of respondents were aware that using CFL bulbs would result in electricity savings; about 1.4% unaware; 21%, had no response. Details are provided below in Table 5.7

Table: 5.7 Savings from CFL's

Building	Know the Possibility of Saving Energy by EE Lamps						
	Yes		No		No Response		Total
	Count	Row %	Count	Row %	Count	Row %	Count
Launch Terminal	1	100.0%	0	.0%	0	.0%	1
Judge Court	8	88.9%	0	.0%	1	11.1%	9
Police Station	26	96.3%	0	.0%	1	3.7%	27
Bus Terminal	10	52.6%	1	5.3%	8	42.1%	19
Govt. School	18	75.0%	0	.0%	6	25.0%	24
Mosque	20	66.7%	0	.0%	10	33.3%	30
Post Office	8	80.0%	0	.0%	2	20.0%	10
Power Utility	9	90.0%	0	.0%	1	10.0%	10
Railway Station	8	88.9%	1	11.1%	0	.0%	9
Total	108	77.7%	2	1.4%	29	20.9%	139

Conclusion: More than three fourths of respondents are aware about electricity savings from EE bulbs

5.8 Knowledge of Savings from Electronic Ballasts

About 44% of respondents were unaware that using electronic ballasts in place of magnetic ones would result in electricity savings, only 8.6% were aware. Details can be seen in Table 5.8 below.

Table: 5.8 – Savings from Electronic Ballasts

Building	Know the Possibility of Saving Energy by Electronic Ballasts						
	Yes		No		No Response		Total
	Count	Row %	Count	Row %	Count	Row %	Count
Launch Terminal	1	100.0%	0	.0%	0	.0%	1
Judge Court	5	55.6%	0	.0%	4	44.4%	9
Police Station	17	63.0%	2	7.4%	8	29.6%	27
Bus Terminal	2	10.5%	3	15.8%	14	73.7%	19
Govt. School	9	37.5%	3	12.5%	12	50.0%	24
Mosque	12	40.0%	0	.0%	18	60.0%	30
Post Office	4	40.0%	3	30.0%	3	30.0%	10
Power Utility	6	60.0%	0	.0%	4	40.0%	10
Railway Station	5	55.6%	1	11.1%	3	33.3%	9
Total	61	43.9%	12	8.6%	66	47.5%	139

Conclusion: Only 8.6% were aware of savings from use of electronic ballasts, the rest were either unaware or did not respond

5.9 Reasons for Not Using Energy Efficient Bulbs

The survey found that almost 100% of the respondents considered EE bulbs expensive and a few, about 1%, thought that the quality of light was not good and some, about 2%, did not believe in the lamp life claims. Details can be seen in Table: 5.9 below.

Table: 5.9 - Reasons for Not Using Energy Efficient Bulbs

Building		Reasons for not Using EE Bulbs			Total
		Expensive	Quality of Light Not Good	Do not Believe Lamp Life Claims	
Launch Terminal	Count	1			1
Judge Court	Count	6			6
Police Station	Count	19		1	19
Bus Terminal	Count	13			13
Govt. School	Count	18		1	18
Mosque	Count	20			20
Post Office	Count	6			6
Power Utility	Count	8	1		8
Railway Station	Count	6			6
Count		97	1	2	97
Row %		100%	1.0%	2.1%	100%

Conclusion: All respondents cited the high cost as the reason for not using CFLs

5.10 Reasons for Not Using Electronic Ballasts

98% of respondents cited high costs as the reason for not using electronic ballasts. Details can be seen in Table 5.10 below.

Table: 5.10 - Reasons for Not Using Electronic Ballasts

Building		Reasons for not Using EBs		Total
		Expensive	Don't Believe in Savings Claim	
Launch Terminal	Count	1		1
Judge Court	Count	3		3
Police Station	Count	7		7
Bus Terminal	Count	7		7
Govt. School	Count	9	1	10
Mosque	Count	10		10
Post Office	Count	5		5
Electricity Supplier	Count	4		4
Power Utility	Count	3		3
Count		49	1	50
Row %		98%	2%	100%

98% respondents cited high cost as the reason for not using electronic ballasts.

5.11 Willingness to Buy Energy Saving Bulbs at Tk. 300

About two thirds of the respondents expressed willingness to buy CFL bulbs at Tk. 300; about a quarter did not; about 8% had no response. Responses are based on the understanding that Details are given below in Table: 5.11

Table: 5.11 Willingness to Buy at Tk.300

Building	Willing to Purchase Energy Saving Lamp for Tk. 300 each							
	Yes		No		No Response		Total	
	Count	Row %	Count	Row %	Count	Row %	Count	Row %
Launch Terminal	1	100.0%	0	.0%	0	.0%	1	100%
Judge Court	5	55.6%	1	11.1%	3	33.3%	9	100%
Police Station	17	63.0%	0	.0%	10	37.0%	27	100%
Bus Terminal	8	42.1%	1	5.3%	10	52.6%	19	100%
Govt. School	12	50.0%	2	8.3%	10	41.7%	24	100%
Mosque	16	53.3%	3	10.0%	11	36.7%	30	100%
Post Office	6	60.0%	0	.0%	4	40.0%	10	100%
Power Utility	8	80.0%	0	.0%	2	20.0%	10	100%
Railway Station	3	33.3%	2	22.2%	4	44.4%	9	100%
Total	76	54.7%	9	6.5%	54	38.8%	139	100%

Conclusion: Majority, 55% expressed willingness to buy CFLs at Tk. 300 if they really saved 80% electricity and lasted 4 years. Only 6.5% did not want to purchase at this price, the rest did not respond

5.12 Prices and the Willingness to Buy

Majority of those who did not want to buy at Tk. 300 would buy at Tk. 150 each. Details can be seen in Table 5.12 below.

Table: 5.12 Prices and the willingness to buy

Building	If no, What Price Would You Purchase									
	Tk. 250		Tk. 200		Tk. 150		Tk. 100		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Launch Terminal	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Judge Court	0	.0%	0	.0%	1	100%	0	.0%	1	100%
Police Station	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Bus Terminal	1	100%	0	.0%	0	.0%	0	.0%	1	100%
Govt. School	0	.0%	0	.0%	1	50%	1	50.0%	2	100%
Mosque	0	.0%	0	.0%	2	66.7%	1	33.3%	3	100%
Post Office	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Power utility	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Railway Station	0	.0%	0	.0%	1	100%	0	.0%	1	100%
Total	1	12.5%	0	.0%	5	62.5%	2	25.0%	8	100%

Conclusion: At Tk 150 price, 63%, a majority, of those who do not want to buy at Tk. 300 are will buyers of CFLs

5.13 Preferences for Supply Sources

Of those who responded, a majority, 50%, preferred to buy CFL bulbs from retailers or wholesalers; about 33% from electricity suppliers; and about 16% from individuals who replace lamps. It should be noted that these respondents are institutional buyers and not individuals. Details are shown below in Table: 5.13

Table: 5.13 Preference for supply sources

Building	From Where Would You Prefer To Purchase									
	Electricity Supplier		Retailer or Wholesaler		Pay a Person Who Replaces EE Lamps at My House		Pay by 12 Monthly Installments Adjusted Against Bill		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Launch Terminal	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Judge Court	0	.0%	0	.0%	1	100%	0	.0%	1	100%
Police Station	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Bus Terminal	1	100%	0	.0%	0	.0%	0	.0%	1	100%
Govt. School	1	50.0%	1	50.0%	0	.0%	0	.0%	2	100%
Mosque	0	.0%	2	100%	0	.0%	0	.0%	2	100%
Post Office	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Power utility	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Railway Station	0	.0%	0	.0%	0	.0%	0	.0%	0	.0%
Total	2	33.3%	3	50.0%	1	16.7%	0	.0%	6	100%

Conclusion: Majority would like to buy energy saving lamps from retailers or wholesalers

5.14 Average Power Consumed and Load by Incandescent Lamps

Railway stations have the highest number of ILs, 71 on average, and Mosques, lowest, 10. Because of the large number of ILs, Railway stations have the highest consumption of electricity per year, 18.9 MWh followed closely by Judges Courts, 17.2 MWh. Mosques consume the least, 3 MWh. Details can be seen below in Table 5.14 .

Table 5.14 – Average Power Consumed and Load at Public Buildings from Incandescent Bulbs

Building	Incandescent Lamp				
	Avg. Wattage (Watts)	Avg. Quantity per Building	Avg. Hrs Used per Day	Avg. Power Consumed per year (MWh)	Avg. Load During Peak Hour (KW)
Launch Terminal	100.0	15.0	12.0	6.6	1.5
Judge Court	81.3	50.0	11.6	17.2	4.1
Police Station	89.9	15.5	11.5	5.9	1.4
Bus Terminal	77.8	31.6	12.6	11.3	2.5
Govt. Schools	73.7	27.3	11.5	8.4	2.0
Mosques	75.9	10.0	10.6	3.0	0.8
Post Offices	86.5	13.3	12.6	5.3	1.2
Power Utility's Office	93.2	22.4	12.4	9.5	2.1
Railway Station	58.5	71.0	12.4	18.9	4.2

Conclusion: Railway Stations have the highest number of ILs and the highest consumption of electricity, about 18.9 MWh/year followed by Judges Court (17.2 MWh/year). Mosques consume the least about 3 MWh/year

5.15 Average Power Consumed and Load by Florescent Tubes

There are on average 470 FTLs at railway stations and about 300 at Judge Courts. Therefore, railway stations consume the most electricity, 99 MWh, and Judges Courts 58 MWH. Other details can be seen below in Table 5.15

Table 5.15- Average Power Consumed and Load by Florescent Tubes

Building	Tube-light with Magnetic Choke				
	Avg. Wattage (Watts)	Avg. Quantity per Building	Avg. Hrs Used per Day	Avg. Power Consumed per year (MWh)	Avg. Load During Peak Hour (KW)
Launch Terminal	40.0	10.0	16.0	2.3	0.4
Judge Court	40.0	308.8	12.9	58.1	12.4
Police Station	40.0	30.2	15.0	6.6	1.2
Bus Terminal	40.0	27.2	12.4	4.9	1.1
Govt. Schools	40.0	39.8	12.1	7.0	1.6
Mosques	40.0	15.9	10.8	2.5	0.6
Post Offices	40.0	18.9	10.1	2.8	0.8
Power Utility's Office	40.0	77.5	12.3	13.9	3.1
Railway Station	40.0	468.6	14.4	98.8	18.7

Conclusion: Railway Stations consume the most electricity, about 98.8 MWh/year followed by Judges Courts (58.1 MWh/year) while Mosques consume the least, 2.5 MWh/year

5.16 Average Power Consumed and Load by CFLs at Public Buildings

In addition to ILs and FTLs, CFLs are also used, albeit in smaller numbers, in public buildings. Judges Courts have the highest number of CFLs, about 50, almost double that of the Power Utility's Office, 25. Consumption by CFL's is also the highest at the Judges Courts, about 2.3 MWh. Other details can be seen below in Table 5.16

Table 5.16 - Average Power Consumed and Load by CFLs in Public Buildings

Building	Energy Saving Lamps				
	Avg. Wattage (Watts)	Avg. Quantity per Building	Avg. Hrs Used per Day	Avg. Power Consumed per year (MWh)	Avg. Load During Peak Hour (KW)
Launch Terminal	19.3	3.0	16.0	0.3	0.1
Judge Court	19.5	49.6	6.4	2.3	1.0
Police Station	20.7	8.7	12.0	0.8	0.2
Bus Terminal	27.2	24.8	6.8	1.7	0.7
Govt. Schools	21.5	23.0	8.4	1.5	0.5
Mosques	23.2	8.9	8.9	0.7	0.2
Post Offices	25.5	8.3	8.3	0.6	0.2
Power Supplier's Office	22.8	24.8	10.0	2.1	0.6
Railway Station	20.6	16.9	10.9	1.4	0.3

Conclusion: Judge Courts have the highest number of CFLs, about 50 on average. They also have the highest consumption from CFL bulb, about 2.3 MWh/year followed by Power Supplier's Office, 2.1 MWh/year.

5.17 Average Power Consumed and Load by Other Types of Bulbs

Though not in large numbers, public buildings have other types of lightings such as Flood Lights, Halogen Lights, Sodium Lights etc. Railway stations are the highest consumers of electricity from these types of lights, about 5 MWh, followed by the Judges Courts, about 2 MWh. Details can be seen below in Table 5.17

Table 5.17 - Average Power Consumed and Load by Other Types of Lamps

Building	Other Types of Lamps				
	Avg. Wattage (Watts)	Avg. Quantity per Building	Avg. Hrs Used per Day	Avg. Power Consumed per year (MWh)	Avg. Load During Peak Hour (KW)
Launch Terminal				0.0	0.0
Judge Court	366.7	2.7	5.0	1.8	1.0
Police Station				0.0	0.0
Bus Terminal	421.0	2.1	3.4	1.1	0.9
Govt. Schools	546.7	0.6	1.6	0.2	0.3
Mosques	520.0	0.3	1.5	0.1	0.2
Post Offices				0.0	0.0
Power Utility's Office	500.0	0.2	0.8	0.0	0.1
Railway Station	320.0	6.7	6.0	4.7	2.1

Conclusion: Public buildings use a small number of other lights such as flood lights, halogen lamps and sodium lamps. Consumption by these is highest at the Railway Station, 4.7 MWh/year.

5.18 Average Power Consumed and Load at Peak Hours by Ceiling Fans at Public Buildings

Ceiling fans are used widely during the summer months. The highest power consumption from this source is at the Judges Courts, 64MWh, followed by Railway Stations at 46MWh. The least, 10MWh is at the Launch Terminals. Ceiling fans are a large contributor to peak load, about 11.7 KW, from each Judge Court and 7.7 KW from each Railway Station. Details can be seen below in Table 5.18

Table 5.18 - Average Power Consumption and Load of Ceiling Fans

Building	Ceiling Fans				
	Avg. Wattage (Watts)	Avg. Quantity per Building	Avg. Hrs Used per Day	Avg. Power Consumed per year (MWh)	Avg. Load During Peak Hour (KW)
Launch Terminal	75.0	20.0	18.0	9.9	1.5
Judge Court	73.6	159.7	14.9	63.8	11.7
Police Station	73.5	27.7	15.9	11.8	2.0
Bus Terminal	74.9	38.6	14.4	15.2	2.9
Govt. Schools	72.7	88.3	12.3	28.7	6.4
Mosques	73.8	54.8	12.4	18.4	4.0
Post Offices	72.7	33.9	13.9	12.5	2.5
Power Utility's Office	73.7	73.0	14.6	28.7	5.4
Railway Station	74.3	103.9	16.2	45.7	7.7

Conclusion: Ceiling fans consume about 64 MWh/year during the summer in the Judges Courts followed by about 46 MWh/year at the Railway Stations.

5.19 Average Power Consumed and Load at Peak Hours by Stand Fans

Although quite common like ceiling fans, stand fans are used in much less numbers. The highest power consumption from stand fans is at Police Stations. Details can be seen below in Table 5.19.

Table 5.19 Average Power Consumed and Load by Stand Fans

Building	Stand Fans				
	Avg. Wattage (Watts)	Avg. Quantity per Building	Avg. Hrs Used per Day	Avg. Power Consumed per year (MWh)	Avg. Load During Peak Hour (KW)
Launch Terminal				0.00	0.00
Judge Court	75.0	1.7	0.8	0.04	0.13
Police Station	111.6	1.2	4.2	0.20	0.13
Bus Terminal	75.0	1.1	1.2	0.04	0.08
Govt. Schools	75.0	0.2	1.4	0.01	0.02
Mosques	75.0	0.3	2.6	0.02	0.02
Post Offices	120.0	0.2	1.8	0.02	0.02
Power Utility's Office	85.7	0.7	1.6	0.04	0.06
Railway Station				0.00	0.00

Conclusion: During summer stand fans consume about 0.2 MWh/year in Police Stations, about 0.04 MWh/year at the Judges Court, Bus Terminal and Power Utility's Office.

5.20 Average Power Consumption and Peak Load by Computers

Computers are becoming quite common. Since they are used after office hours also they contribute to the peak load requirement also. The maximum power consumed by computers is in the Judges Court, about 13 MWh/year followed by the Power Utility's Office where it is 7.3 MWh/year. Details can be seen below in Table 5.20

Table 5.20 Average Power Consumed and Load by Computers

Building	Computers				
	Avg. Wattage (Watts)	Avg. Quantity per Building	Avg. Hrs Used per Day	Avg. Power Consumed per year (MWh)	Avg. Load During Peak Hour (KW)
Launch Terminal				0.0	0.0
Judge Court	128.7	27.3	10.3	13.3	3.5
Police Station	259.4	1.1	4.0	0.4	0.3
Bus Terminal	120.0	1.2	1.3	0.1	0.0
Govt. Schools	122.9	7.3	6.6	2.2	0.0
Mosques				0.0	0.0
Post Offices	180.0	2.5	6.8	1.1	0.5
Power Utility's Office	147.6	14.0	9.7	7.3	2.1
Railway Station	140.8	5.3	9.1	2.5	0.8

Conclusion: Computers consume about 13.3 MWh/year in Judge Court followed by about 7.3 MWh/year from the Power Utility's Office.

5.21 Average Power Consumed and Load at Peak Hours by Air Conditioners

Unlike ceiling fans, air conditioners are used in much lesser numbers. The highest power consumed is at the Power Utility's Office, 19.8 MWh/year; followed by the Judges Court 7.1 MWh/year. Details can be seen below in Table 5.21

Table 5.21 - Average Power Consumed and Load by Air Conditioners

Building	Air Conditioners				
	Avg. Wattage (Watts)	Avg. Quantity per Building	Avg. Hrs Used per Day	Avg. Power Consumed per year (MWh)	Avg. Load During Peak Hour (KW)
Launch Terminal				0.0	0.0
Judge Court	1222.5	1.8	8.9	7.1	2.2
Police Station				0.0	0.0
Bus Terminal				0.0	0.0
Govt. Schools	1350.0	0.1	0.3	0.0	0.0
Mosques				0.0	0.0
Post Offices	1350.0	0.5	4.5	1.1	0.0
Power Utility's Office	1300.2	4.4	9.5	19.8	5.7
Railway Station	1350.0	1.7	8.1	6.7	2.3

Conclusion: Air-conditioners consume about 19.8 MWh/year in the Power Utility's Office, about 7.1 MWh/year at the Judges Court. It also contributes to the peak hour load at about 5.7 KW for each Power Utility's office and 2.3 KW for each Railway Station

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1. SURVEY LOCATIONS AND METHODOLOGY

Among the 10 urban and 2 peri-urban locations surveyed there were six divisional headquarters, Dhaka, Chittagong, Rajshahi, Sylhet, Khulna and Barisal; 4 district headquarters, Mymensingh, Comilla, Bogra and Rangpur; and two municipalities, Gournadi and Dohar. Although the last two were not in the original survey list, they were nevertheless included to determine trends in household use patterns in peri-urban areas and to compare them to those in the urban.

A four frame survey model using income level as the determinant for each frame was developed. The numbers of households in each income frame were determined on the basis of the required confidence and accuracy levels, the Population Census 2001 and the National Report (Provisional) 2003. The household electricity connectivity numbers (percentages) were obtained from the Report of the Household Income & Expenditure Survey 2005, Bangladesh Bureau of Statistics. Table 6.1 below provides key details.

Table 6.1: Distribution of Households by City

City	No. of H/holds	H/holds with electricity %	# of Households Surveyed
Dhaka	1,788,750	56	252
Chittagong	1,228,880	51	242
Rajshahi	498.020	30	236
Sylhet	420,760	41	250
Bogra	204,092	30	235
Barisal	475,680	30	235
Khulna	498,800	42	235
Comilla	822,480	51	241
Mymensingh	965,140	56	232
Rangpur	579,740	30	236
Gournadi (near Barisal)			229
Dohar (near Dhaka)			235
Total:			2,858

6.2 CONCLUSIONS

6.2.1 ELECTRICITY CONSUMPTION IN HOUSEHOLDS

The average monthly consumption for each household was estimated from utility bills for the three months, September, October and November. This period was chosen because it partly covers summer and partly winter, the high and low consumption periods of the year, and hence, the averages are likely to be closer to the expected annual average. The data was compiled for each income frame, averaged for the period and then extrapolated for the year for each district. As can be seen from Table 6.2.1, the highest consumption is in Dhaka, 1,520 GWh and the lowest Khulna, 247 GWh. Total for the 10 districts is 5,900 GWh. The total was estimated by using electricity connectivity figures from HIES 2005 (BBS) and the average consumptions figures estimated from the survey. Further details can be seen in the Table below.

TABLE 6.2.1: HOUSEHOLD ELECTRICITY CONSUMPTION ESTIMATES

Sl	Name of Zila	Average Consumption/ month per HH (Kwh)	# of Households with electricity	Consumption/year (Gwh)
1	Dhaka	127	997,636	1,520
2	Chittagong	115	624,025	861
3	Rajshahi	141	149,705	253
4	Sylhet	177	171,039	363
5	Bogra	103	204,092	252
6	Barisal	90	144,797	156
7	Khulna	99	208,311	247
8	Comilla	157	417,491	786
9	Mymensingh	176	538,355	1,137
10	Rangpur	154	174,270	322
	Weighted Average	136	3,629,721	5,899

6.2.2 COMPARING CONSUMPTIONS AMONG HOUSEHOLDS AND DISTRICTS

In almost every household there are many types of appliances operating on electricity. These range from electric bulbs to television sets, fans, refrigerators, radio/stereo players, air-conditioners, freezers, electric irons, ovens etc. The total energy consumed depends on the number and types of appliances, the amount of time they are used in a household and their wattages. Hence, the survey covered issues related to all the devices used in the households, the duration of their use and wattages.

Table 6.2.2 details the average quantities of electricity used in small and large households in each district. It can be seen from the Table that the differences in consumption between low (small) and high (large) households vary considerably from district to district. The lowest difference is in Sylhet and the highest in Dhaka. In the former, higher income households consume almost twice that of lower income ones and in the latter four times. This may be due to the presence of large middle and high income groups in the population and thus proportionally larger number of consumers in the high income groups.

TABLE 6.2.1: AVERAGE CONSUMPTION ACROSS HOUSEHOLDS

District	Average consumption in Small Households (KWh)	Average consumption in Large Households (KWh)
Dhaka	47	243
Chittagong	54	225
Rajshahi	94	317
Sylhet	137	283
Bogra	80	181
Barisal	48	176
Khulna	49	251
Comilla	62	246
Mymensingh	93	283
Rangpur	72	242
Gournadi	46	167

6.2.3 LOAD USE PATTERN

The survey found that, on average, households consumed 136 kwh of electricity per month. Of this 20% or about 27kwh was consumed for lighting purposes and the balance on other appliances. Detailed breakdown is given below in Table 6.2.3.

TABLE 6.2.3 AVERAGE MONTHLY LIGHTING CONSUMPTION

District	Average Consumption Per month per HH (Kwh)	Average Consumption for Lighting per day	Average Consumption for Lighting per month	Percent of Total Consumption/ month
Dhaka	127	0.92	27.6	21.7%
Chittagong	115	0.864	25.92	22.5%
Rajshahi	141	1.276	38.28	27.1%
Sylhet	177	0.737	22.11	12.5%
Bogra	103	1.003	30.09	29.2%
Barisal	90	1.018	30.54	33.9%
Khulna	99	0.952	28.56	28.8%
Comilla	157	0.852	25.56	16.3%
Mymensingh	176	0.903	27.09	15.4%
Rangpur	154	0.74	22.2	14.4%

Weighted Average	136		27.24	20.0%

6.2.4 URBAN RURAL COMPARISIONS

Table 6.2.4 below compares lighting use patterns in urban households in the 10 districts with those in rural areas. The comparative rural figures have been taken from the survey conducted in 2002 by the Human Development Research Centre (HDRC) in collaboration with NRECA International. According to their report contained in the "Economic and Social Impact Evaluation Study of the Rural Electrification Program in Bangladesh", 2002, a "land ownership household", on average, uses 4 bulbs, 3 ILs and 1 FTL. According to the present survey, this corresponds closely to the number though not the type of bulbs used in a typical household in the Divisional Headquarters, 4.68.

Households in Divisional HQ use the least number of ILs whereas those in the villages, the most. This is to be expected and may be due to income disparities and also the lower awareness levels in rural areas regarding the benefits from CFLs when compared to IL bulbs.

TABLE 6.2.4 URBAN RURAL COMPARISION: BY ILS, CFLS AND FTLS

Sl	Type of Lamps (Weighed Average)	Division Headquarters (All six)	Zila Headquarters (4 cities)	Municipalities (2 municipalities)	Villages (HDRC Study 2002)
1	Incandescent Lamps	2.23	2.66	3.14	3.7
2	Florescent Tube Lights	2.45	2.83	1.93	0.41
3	Total	4.68	5.49	5.07	4.11

Conclusion: Households in less urbanized areas tend to use more incandescent bulbs than those in urbanized areas; FTL use is higher in urbanized than in non- urbanized areas.

The survey results show lower FTL use in divisional headquarters than in districts. This appears to be counter to the expectation that households in the more urbanized Divisional Headquarters should have larger number of FTLs than those in the less urbanized district households. However, such a result may be due to statistical errors arising from the low number of districts surveyed when compared to the total or it may reflect other underlying reasons such as variations in household size or differing space use by households etc.

6.2.5 CAPACITY OF IL'S

Table 6.2.5 details the different wattages of IL bulbs used in households in the 10 districts surveyed. We see that 47% of all bulbs used in households are 60 Watt bulbs and about 25% are 100 Watts and 40 Watts.

TABLE 6.2.5 IL USAGE BY INCOME CATEGORY

Income Category	100W	60W	40W	25W, 20W, 15W
Below Tk. 3,125	229	514	320	136
Tk. 3,125-Tk 9,999	396	920	468	98
Tk. 10,000-Tk 19,999	355	752	413	80
Above Tk. 20,000	323	696	313	83
Total	1303	2882	1514	397
Percent	21%	47%	25%	7%

6.2.6 AWARENESS OF BENEFITS FROM CFL USE

Table 6.2.6 is a weighted aggregation of household responses regarding awareness of potential savings in switching to CFLs. The survey found a consistent, high level of awareness among all urban areas. 3 out 4 households or more than 75% surveyed showed a high state of awareness regarding potential savings.

It should be noted though that the survey showed significant variances in knowledge gaps among different districts. For instance, awareness levels ranged from a high of 94% in Rangpur to 60% in Dhaka and 50% in Bogra. In case of EBs, awareness levels are range from 0% in Sylhet to 33% in Dhaka.

The survey also found a consistent pattern in the level of knowledge among different income levels in each area with awareness increasing along with income levels. Awareness levels among lower income groups ranged mostly in the mid to upper 60 percentile ranges and in the high 70's in the higher income brackets.

TABLE 6.2.6 KNOWLEDGE OF ENERGY SAVINGS FROM CFLs

Knowledge of Energy Savings from CFLs in Divisional HQs	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	176	60%	331	76%	270	77%	307	87%	1084	75%
No	73	23%	66	15%	58	16%	27	8%	224	15%
No Response	62	20%	36	8%	24	7%	20	6%	142	10%
Total	311	100%	433	100%	352	100%	354	100%	1450	100%
Knowledge of Energy Savings from CFLs in	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	

District HQs	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	106	67%	217	73%	175	73%	189	77%	687	73%
No	43	27%	65	22%	50	21%	50	20%	208	22%
No Response	10	6%	15	5%	16	7%	6	2%	47	5%
Total	159	100%	297	100%	241	100%	245	100%	942	100%

Knowledge of Energy Savings from CFLs in Municipalities	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	51	64%	123	80%	97	76%	92	89%	363	78%
No	12	15%	16	10%	13	10%	8	8%	49	11%
No Response	17	21%	15	10%	17	13%	3	3%	52	11%
Total	80	100%	154	100%	127	100%	103	100%	464	100%

6.2.7 WILLINGNESS TO PAY

The survey shows that demand for CFLs is dependent on price, quality and the level of savings. If consumers are assured of the longevity of CFLs and the amount of savings, price would determine the quantity bought. Half the households in the surveyed districts would buy CFLs at a high price of Tk. 300 if they are assured that savings would be in the range of 80% and longevity about 4 years. The survey also found that there were more willing buyers as prices begin to fall until at about Tk. 100 almost all households would switch to CFLs.

From the foregoing and the survey results, we can infer that with increased confidence in the amount of electricity savings and in the expected life of a CFL bulb, the demand for CFL's would increase at all prices. In other words, the demand curve will shift outwards and to the right of the existing curve.

TABLE 6.2.7 WILLINGNESS TO PAY (Overall)

Willing to Purchase Energy Saving Lamp for Tk. 300 each	Household Income									
	Below Tk. 3,125		Tk. 3,125 – Tk. 9,999		Tk. 10,000 – Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Yes	250	45%	537	61%	431	60%	491	70%	1709	60%
No	186	34%	222	25%	192	27%	138	20%	738	26%
No Response	114	21%	127	14%	97	13%	73	10%	411	14%
Total	550	100%	886	100%	720	100%	702	100%	2858	100%

If no, What Price Would You Purchase	Household Income									
	Below Tk. 3,125		Tk. 3,125 - Tk. 9,999		Tk. 10,000 - Tk. 19,999		Above Tk. 20,000		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Tk. 250	6	3%	3	1%	8	4%	5	3%	22	2%
Tk. 200	13	6%	7	3%	23	10%	12	7%	55	6%
Tk. 150	31	14%	67	24%	46	21%	52	32%	196	22%
Tk. 100	177	78%	201	72%	144	65%	96	58%	618	69%
Total	227	100%	278	100%	221	100%	165	100%	891	100%

6.2.8 REASONS FOR THE LOW USE OF CFLS

Respondents cited many reasons as to why CFL use is low. However, upon collating and aggregating the responses, the survey found 73% or almost three quarters of the population citing high cost as the reason for not using CFL bulbs and only 7% citing color as the reason. Other reasons such as the quality of light not being good or voltage fluctuations or disbelief in savings and longevity claims were less than 10% in each category. Table 6.2.8 represents the aggregated responses from all districts.

TABLE 6.2.8 REASONS FOR LOW USE OF CFLS

Reasons For Not Using EE Lamps	Total Count	Percent
Expensive	1,237	73%
Looks Not Good	23	1%
Not Suitable for Fitting	39	2%
Don't Believe in Saving Claims	98	6%
Color of Light Not Good	124	7%
Quality of Light Not Good	73	4%
Do not Believe Lamp Life Claims	63	4%
Voltage Fluctuation	160	9%
Not Sure	74	4%
Other Reasons	102	6%
Total Count	1,686	100%

6.2.9 REASONS FOR THE LOW USE OF EBs

More than half, 57% cited high cost as the reason for not using EBs; about 10% thought they would need frequent replacement making them uneconomic; 10% because they did not believe in the savings claims; and 13% because they were not sure. This can be seen in Table 6.2.9 which aggregates responses from all districts.

TABLE 6.2.9 REASONS FOR LOW USAGE OF EBS

Reasons For Not Using Electronic Ballasts	Total Count	Percent
Expensive	237	57%
Have to replace very often	43	10%
Looks Not Good	0	0%
Not Suitable for Fitting	11	3%
Don't Believe in Saving Claims	40	10%
Color of Light Not Good	0	0%
Quality of Light Not Good	10	2%
Do not Believe Lamp Life Claims	0	0%
Voltage Fluctuation	10	2%
Not Sure	52	13%
Other Reasons	26	6%
Total Count	413	100%

6.2.10 PREFERENCE FOR SOURCES OF PURCHASE

One interesting finding was that most households, over 80%, in all except two districts expressed a preference to buy CFLs from wholesalers and/or retailers instead of utilities when asked what their preference was with regard to selling source. There may be many reasons for this but prominently convenience, familiarity and the comfort engendered by the neighborhood store may be responsible for this type of response.

6.2.11 LOAD SHEDDING

Table 6.2.11 summarizes the average load shedding hours in each District by season and time of day. The highest load shedding during the summer both day and night combined is in Sylhet, about 9 hours and the lowest is in Rajshahi 3 hours. These drop to 3.5 hours in Sylhet and 1.2 hours in Rajshahi during the winter. During summer nights the average load shedding is 2.5 hours and winter 1.1 hours. When combined for all times, day and night, the average load shedding is for 2 hours.

TABLE 6.2.11 Average Load Shedding per Day

Sl.	Area	Load Shedding (hrs per day)				
		Summer Day	Winter Day	Summer Night	Winter Night	Average
1	Dhaka	2.8	1.3	2.3	1.1	1.9
2	Chittagong	6.53	1.7	6.86	1.5	4.1
3	Rajshahi	1.3	0.3	1.7	0.9	1.0
4	Sylhet	4.5	1.9	4.3	1.6	3.1
5	Bogra	3.2	1.2	2.2	0.2	1.7
6	Barisal	3.2	1.5	2.7	0.7	2.0
7	Khulna	4.4	2.5	3.4	1.8	3.0
8	Comilla	1.8	0.7	1.7	0.9	1.3

9	Mymensingh	2.6	1.2	2.7	1.4	2.0
10	Rangpur	1.7	0.9	2.2	1.4	1.6
	Total Average	3.2	1.3	3.0	1.1	2.2

6.2.12 SAVINGS FROM CFL AND EB SUBSTITUTION

Table 6.2.11 provides detailed data on the potential savings that can be derived from substituting CFLs for ILs and EBs for MBs in the 10 districts surveyed. The data in the Table is broken down for each district and then collated by using information from other surveys/censuses such as the HIES 2005 (BBS). The highest and lowest amounts of potential savings from switching to CFLs are 284 MWh in Dhaka and 54 in Sylhet. Same is the case with EB substitutions, the highest being in Dhaka 144 MWh and the lowest in Sylhet 13 MWh.

By extrapolating, we find that the potential for savings from switching to CFLs in the 10 districts can be 1,089 Mwh. This is equivalent to generating 324 MW load assuming that on average electricity is used for 3.44 hours during peak hours. For higher usage, the amount of savings would be higher. The total potential for savings in switching to electronic ballasts will be 485 Mwh, which is equivalent to about 97 MW load based on an average of 5 hours usage at peak hours. These savings calculations are based on 70% reduction in energy consumption in the case of CFLs and 28% in the case of electronic ballasts.

By using information from censuses and extrapolating the survey findings, we can estimate the nationwide savings potential from switching to CFLs. According to HIES 2005, there are about 28 million households in Bangladesh. Of this, 44% or about 12 million households have access to grid power. The survey found that households use 2-3, 40 watt incandescent bulbs on the average. From this and the assumption that 25% of households remain blacked out during peak hours, we can estimate the total peak hour electricity demand for light at about 1,300 MW in the country. If 70% of this can be saved by using CFLs, then nationwide savings from CFL substitution in households will be about 900 MW. There are many dimensions to this savings but two are significant. Firstly, this saving is equivalent to supplying power from a 1,100 MW generating plant, assuming “systems loss” of 18%, and secondly, CO2 emissions would be reduced by almost 600,000 tons annually from this reduction in use. These avoided CO2 emissions can be traded for about US$ 6 million annually at existing rates of USD 10/ton.

TABLE 6.2.12 SAVINGS FROM SUBSTITUTING CFLS AND EBS

City	# of H/holds	H/holds with electricity %	Avg. # of ICLs (average watts)	ICL Usage Hours	Avg. # of FTL/MB (average watts)	FTL/MB Usage Hours	Energy Savings from (MWh)	
							Conversion to CFLs	Conversion to EBs
Dhaka	1,788,750	56	2.4 (62)	3.1	1.8 (39.4)	6.6	284	144
Chittagong	1,228,880	51	1.2 (49)	4.4	3.1 (31.5)	6.2	108	105
Rajshahi	498.020	30	3.2 (51.4)	4.0	2.4 (37.3)	6.9	71	23
Sylhet	420,760	41	3.2 (47.1)	2.8	4.1 (23.2)	3.2	54	13
Bogra	678,950	31	2.5 (65.6)	3.4	2.5 (38.5)	3.4	77	23
Barisal	475,680	30	2.8 (71.2)	2.9	2.4 (39.4)	4.7	64	18
Khulna	498,800	42	2.6 (56.1)	3.2	2.3 (38.2)	5.6	65	26
Comilla	822,480	51	2.2 (48.3)	3.2	3.2 (34.8)	4.6	117	57
Mymensingh	965,140	56	2.6 (55.3)	3.2	2.6 (34.1)	5.0	187	61
Rangpur	579,740	30	2.3 (44.3)	4.2	3.0 (26.0)	4.0	61	14
Total Weighted Average	7,946,960		2.3 (55.43)	3.44	2.59 (35.11)	5.55	1,088	484

6.2.13 CONCLUSIONS FROM PUBLIC BUILDINGS (INSTITUTIONAL)

In all 139 Public Buildings were surveyed in 10 Zilas. These are mostly government owned large buildings housing institutions. The survey showed that in most cases the findings corresponded to those found in households except on a larger scale. These findings are noted in the following paragraphs.

The survey found that the average monthly consumption in Public Buildings is 4,068 KWh. Railway Stations are the biggest consumers (20,464 KWh) of electricity, whereas mosques the least, (90 KWh).

In public buildings the wattages of ILs were higher than those used in households, about 81.9 watts per lamp. The average number of IL bulbs and the daily consumption were also higher, about 28.5 and 12.5 hrs. The average wattage of FTLs, on the other hand, is 40; the number of FTLs in each building about 111 which are in use for 13 hours daily. The estimated average life of FTLs is highest at public buildings, about 16.7 months while the corresponding figure for magnetic ballasts is 15.7 months. CFLs last for 13.1 months while ILs 5.5 months.

Awareness regarding electricity savings, like in households, was high, about 78%. Only 1% were not with about 21% not respond. On the other hand, less than half, 44%, were aware of savings from electronic ballasts, about 9% were not aware and the rest did not respond.

The survey also found that almost all cited high cost as the reason for not using CFLs and the same was the case with electronic ballasts. However, a majority, 55% expressed willingness to buy CFLs at Tk. 300 if 80% of electricity was saved. A majority, 63%, of those who would not buy CFLs at Tk. 300, were willing to do so at Tk 150, one quarter at Tk. 100 and the rest at Tk. 250. The greater majority of institutional buyers would prefer to buy CFLs from retailers and wholesalers.