

**A REPORT ON
DETAILED ENERGY AUDIT
OF
ELECTRICAL UTILITIES**

**AT
TEZPUR UNIVERSITY
NAPAM
TEZPUR, ASSAM**

Audited on: JULY 2019

Submitted by:

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DETAILED ENERGY AUDIT REPORT

Report Accepted by the University on 16.08.2019

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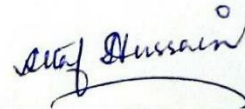
MD, Eric Energy, Ghy-21

BE, M. Tech, CEA (BEE)

Forwarding Certificate

This is to certify that the Detailed Energy Audit in Electrical Utilities has been carried out by me in Tezpur University, Napam, Tezpur, Assam; in order to identify the energy consumption patterns in various departments/sections, and accordingly to find out the conservation potentials & opportunities.

Signature



(Altaf Hussain)

Place: TEZU, Napam

Date: 29-07-2019

CEA Reg. No: EA - 8694

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We also like to acknowledge Ramyata Baruah, Anisha Hazarika and Sweety Gogoi, Students of BVoc in Renewable Energy Management, for their dedications towards collection of valuable data from various sections of the University.

Altaf Hussain

Certified Energy Auditor

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ABSTRACT

An energy audit is an inspection survey and an analysis of energy flows for energy conservation in a building. In commercial and industrial real estate, an energy audit is the first step in identifying opportunities to reduce energy expense and carbon footprint. It has positive approach aiming at continuous improvement in energy utilisation in contrast to financial audit which stresses to maintain regularity. It provides the vital information base for overall energy conservation programme covering essentially energy utilization analysis and evaluation of energy conservation measures. A detailed audit has been prepared for the Department, Hostels and the Commercial Areas of the Tezpur University campus and compared the consumption for the summer and the winter seasons for the year 2017, 2018 and 2019 and thereby providing suggestion to improve the energy efficiency.

CHAPTER 1

INTRODUCTION

Energy is defined as the capacity of a physical system to perform work. In other words, it can be explained as the ability to perform or complete any type of work whether it is physical or mental activity. Energy conservation is a very crucial step that needs to be practised in every part of the world. If we try looking at the conventional energy scenario of 20 years ago, energy conservation would have been considered a good step in the long run. But now looking at the present condition we can easily conclude that conservation has become the first and most important step for a sustainable growth.

There could be many possible issues that include danger to human body health, dangerous impact on environment like rising sea levels, and major changes in vegetation growth levels. Coal emits sulphur dioxide when burned into the air and therefore, it reacts with water and oxygen in the clouds and as a result forms acid rain. Acid rain kills fish and trees and also damage limestone buildings and monuments. These types of global problems can be resolved through less use of fossil fuels and other kind of non-renewable resources. Here comes the need of knowledge and implementation of energy conserving methods. As per the data of United States calculated per year, we found that the average family's energy uses produces over 11,200 pounds of air pollutants. Therefore, if we can lessen the use of even one unit of kilowatt of electricity, we can diminish the harsh environmental impact of energy use. There are many ways through which energy can be conserved like improving efficiency, using technology for better substitutes, switching to green energy, reducing wastage etc. which we shall discuss in detail later. The main objective of this report is to collect data from the Hostels, Departments and the Commercial Areas of Tezpur University and to calculate the bills and to find out which of them had the highest and the lowest energy consumption and provide remedies for the energy conservation.

1.1 ENERGY SCENARIO OF INDIA

India has the 5th largest electricity generating capacity and is the 6th largest energy consumer amounting for around 3.4 % of global energy consumption. India's energy demand has grown at 3.6 % pa over the past 30 years. Thermal power plants constitute 68% of the installed capacity, hydroelectric about 16%, and rest being a combination of wind, small hydro, biomass, waste and electricity and nuclear. India generated 855 BU electricity during 2011-12 fiscal. The consumption of the energy is directly proportional to the progress of manpower with ever growing population, improvement in the living standard of the humanity and industrialization of the developing countries. Very recently smart grid technology can attribute important role in energy scenario. Smart grid refers to electric power system that enhances grid reliability and efficiency by automatically responding to system disturbances. Energy conservation is the methods for the reduction in energy consumption by way of elimination of wastage and promotion of efficiency. we know that due to the vast gap between demand and supply, lot of capital investment is done to bridge the gap in terms of generation of more electricity which requires lot of and apart from it creates lot of environmental concerns.

1.2 ENERGY CONSERVATION ACT

Salient features of the Energy Conservation Act 2001

The Act empowers the Central Government and, in some instances, State Governments to:

- specify energy consumption standards for notified equipment and appliances;
- direct mandatory display of label on notified equipment and appliances;
- prohibit manufacture, sale, purchase and import of notified equipment and appliances not conforming to energy consumption standards;
- notify energy intensive industries, other establishments, and commercial buildings as designated consumers;
- establish and prescribe energy consumption norms and standards for designated consumers;
- prescribe energy conservation building codes for efficient use of energy and its conservation in new commercial buildings having a connected load of 500 kW or a contract demand of 600 kVA and above;

Direct designated consumers

- designate or appoint certified energy manager in charge of activities for efficient use of energy and its conservation;
- get an energy audit conducted by an accredited energy auditor in the specified manner and interval of time;
- furnish information about energy consumed and action taken on the recommendation of the accredited energy auditor to the designed agency;
- comply with energy consumption norms and standards;
- prepare and implement schemes for efficient use of energy and its conservation if the prescribed energy consumption norms and standards are not fulfilled;
- get energy audit of the building conducted by an accredited energy auditor in this specified manner and intervals of time.

1.3 ENERGY AUDIT

Energy audit is the key to systematic approached decision making in the area of energy management. It is an inspection survey and analysis of energy flow in a

building process or system with the objective of understanding energy dynamic of the system under study. It is conducted in order to reduce the amount energy input into the system without negatively affecting output. The different types of energy audit performed depends upon - Functional and type of industry, need of final audit and potential and level of cost reduction achievable. The Energy audit can be classified into the following two types, such as Preliminary energy audit and Detailed energy audit. The preliminary audit spots energy waste spots and recommends short, intermediate and long term solutions. It should adopt step by step and cautious approach for improvements and new techniques of energy management and control system. Detailed Energy Audit. Energy Audit is defined as “the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption”. The three steps of detailed energy audit are Building and Utility Data Analysis, Walk-Through Survey and Baseline for Building Energy Use.

The methodology adopted for this audit was:

- Formation of audit groups for specific areas and end use
- Visual inspection and data collection
- Observations on the general condition of the facility and equipment and quantification
- Identification / verification of energy consumption and other parameters by measurements
- Detailed calculations, analyses and assumptions
- Validation
- Potential energy saving opportunities
- Implementation

The following groups were formed with specific target areas and end uses assigned

Team 1: Electricity consumed in Departments of Tezpur university

Team 2: Electricity consumed in Hostels of Tezpur university

Team 3: Electricity consumed in Commercial areas of Tezpur university

Team 4: Past Data Collection from electric power house of university campus

The groups were allowed the use of various measuring instruments to assist in the auditing activity.

1.4 Benchmarking

Energy Benchmarking is a method used to determine whether a building is using more or less energy than its peer facilities with similar occupancies, climates, and sizes. Benchmarking is done by taking a building's total energy use and dividing by the building's total area. This number is frequently referred to as the Energy Usage Intensity or EUI, is then compared to buildings of the same use type (ex. Office Space) to determine how efficiently the building is utilizing energy. Through energy benchmarking, building auditing can then be pursued more effectively when determining which buildings are inefficiently using energy.

CHAPTER 2

ENERGY CONSERVATION IN THE DEPARTMENTS OF UNIVERSITY

2.1 Introduction

Tezpur University consists of several Schools such as School of Engineering, School of Science, School of Humanities and Social Sciences and School of Management Sciences. Each School has various academic departments.

- The School of Engineering consists of: The Deans Building, Department of Civil Engineering, Department of Mechanical Engineering, the Mechanical Workshop, Department of Computer Science and Engineering, Department of Electrical Engineering and the Department of Energy.
- The School of Humanities and Social Sciences consists of: Department of Cultural Studies, Department of English and Foreign Languages, Department of Mass Communication and Journalism, Department of Sociology, Department of Hindi, Department of Social Work, Department of Education and the Department of Law.
- The School of Management Sciences consists of: Department of Business Administration, Department of Commerce and the Centre of Disaster Management.
- The School of Sciences consists of: Department of Chemical Sciences, Department of Environmental Sciences, Department of Mathematical Sciences, Department of Molecular Biology and Biotechnology and the Department of Physics.

Information is also collected for Kalaguru Bishnu Rabha Auditorium, Council Hall, and Library. The details of the loads connected like Tube light, CFL, Ceiling Fan, Exhaust Fan, Sockets and Air Conditioners, their quantities and their ratings(inwatt) are recorded. Energy consumption of the Departments depends on the parameters such as:Lights, Fans, the different Laboratory equipment available in the departments.The main objective is to collect data from the Department and to calculate the bills and to find which of the Departments had the highest and the lowest consumption and provide remedies for the energy conservation in the Departments.

TABLE 1: Number of people in the departments

DEPARTMENTS	Number of people
Computer Science and Engineering	488
Civil Engineering	230
Electronics and Communication Engineering	318
Energy	175
Food Engineering and Technology	215
Mechanical Engineering	255
Electrical Engineering	36
Cultural Studies	117
English and Foreign Languages	72
Mass Communication and Journalism	119
Sociology	92
Hindi	15
Social Work	23
Education	154
Business Administration	108
Commerce	81
Chemical Sciences	230
Environmental Science	64
Mathematical Sciences	268
Molecular Biology and Biotechnology	224
Physics	224

2.2 Loads estimation in the Departments

DEPARTMENT OF CHEMICAL SCIENCE

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	120	40	4800
CFL	300	18	5400
CEILING FAN	134	60	8040
EXHAUST FAN	11	60	660
6A SOCKET	525	100	52500
16A SOCKET	299	1000	299000
AC (1.5Tr)	23	2250	51750
TOTAL			422150

DEPARTMENT OF ENERGY

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	95	40	3800
CFL	155	18	2790
CEILING FAN	96	60	5760
EXHAUST FAN	10	60	600
6A SOCKET	435	100	43500
16A SOCKET	156	1000	156000
AC (1.5Tr)	7	2250	15750
TOTAL			228200

DEPARTMENT OF CIVIL ENGINEERING

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	525	40	21000
CFL	195	36	7020
CEILING FAN	286	60	17160
EXHAUST FAN	20	60	1200
6A SOCKET	327	100	32700
16A SOCKET	193	1000	193000
AC (1.5Tr)	3	2250	6750
Total			278830

HIGH MAST LIGHTING

Type of Load	Number	Rating (W)	Total (W)
METAL HALIDE LAMP	104	1500	156000
Total			156000

DEPARTMENT OF MASS COMMUNICATION AND JOURNALISM

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	354	40	14160
CFL	27	11	297
CEILING FAN	88	60	5280
EXHAUST FAN	20	60	1200
6A SOCKET	1012	100	101200
16A SOCKET	400	1000	400000
AC (1.5Tr)	15	2250	33750
150W MH	2	150	300
TOTAL			556187

ACADEMIC BUILDING No.5

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	291	40	11640
CFL	30	11	330
CEILING FAN	200	60	12000
EXHAUST FAN	27	60	1620
6A SOCKET	861	100	86100
16A SOCKET	396	1000	396000
AC (1.5Tr)	10	2250	22500
250W MH	2	250	500
INCANDESCENT LAMP	33	60	1980
Total			532670

ACADEMIC BUILDING No. 6

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	292	40	11680
CFL	30	11	330
CEILING FAN	199	60	11940
EXHAUST FAN	27	60	1620
6A SOCKET	862	100	86200
16A SOCKET	396	1000	396000
AC (1.5tr)	34	2250	76500
250W MH	2	250	500
INCANDESCENT LAMP	34	60	2040
Total			586810

ACADEMIC BUILDING FOR SCHOOL OF MANAGEMENT SCIENCE

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	240	40	9600
CFL	104	11	1144
CEILING FAN	82	60	4920
EXHAUST FAN	5	60	300
6A SOCKET	104	100	10400
16A SOCKET	109	1000	109000
AC (1.5Tr)	31	2250	697500
250W MH	2	250	500
Total			205614

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING WITH DEAN BUILDING

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	1494	40	59760
CFL	850	18	15300
CEILING FAN	618	60	37080
EXHAUST FAN	34	60	2040
6A SOCKET	899	100	89900
16A SOCKET	500	1000	500000
AC (1.5Tr)	21	2250	47250
250W MH	2	250	500
INCANDESCENT LAMP	34	60	2040
Total			753870

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	507	40	20280
CFL	214	36	7704
CEILING FAN	361	60	21660
EXHAUST FAN	12	60	720
6A SOCKET	1431	100	143100
16A SOCKET	870	1000	870000
AC (1.5Tr)	11	2250	24750
1500W MH	2	1500	3000
Total			1091214

DEPARTMENT OF MECHANICAL ENGINEERING

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	842	40	33680
CFL	224	36	8064
CEILING FAN	398	60	23880
EXHAUST FAN	31	60	1860
6A SOCKET	632	100	63200
16A SOCKET	193	1000	193000
AC (1.5Tr)	2	2250	4500
Total			328184

DEPARTMENT OF FOOD ENGINEERING AND TECHNOLOGY

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	682	40	27280
CFL	403	36	14508
CEILING FAN	347	60	20820
EXHAUST FAN	59	60	35340
6A SOCKET	542	100	54200
16A SOCKET	470	1000	470000
AC (1.5Tr)	14	2250	31500
Total			621848

CENTRAL LIBRARY

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	10	18	1800
CFL (18/20W)	336	72	24192
CFL (2x36W)	99	70	6930
CEILING FAN	6	50	300
EXHAUST FAN	79	100	7900
6A SOCKET	70	500	35000
16A SOCKET			66000
AC (1.5Tr)			48000
Total			190122

WOMEN FACILITY CENTRE

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	78	40	3120
CFL	85	36	3060
CEILING FAN	20	60	1200
EXHAUST FAN	10	60	600
6A SOCKET	30	100	3000
AC (1.5Tr)	37	1000	37000
Total			47980

SOPHISTICATED AND ANALYTICAL INSTRUMENTS LABORATORY (SAIC)

Type of Load	Number	Rating (W)	Total (W)
TUBE LIGHT	902	40	36080
CFL	128	11	1408
CEILING FAN	216	60	12960
EXHAUST FAN	8	60	480
6A SOCKET	245	100	24500
16A SOCKET	123	1000	123000
AC (1.5Tr)	36	2250	81000
Total			279428

Summary of connected Loads in Academic Departments

Buildings	Connected Load (kW)
Chem Sc	422
Energy	228
Civil	279
High Mast	156
MCJ	556
AB 5	533
AB 6	587
BA	206
CSE	754
ECE	1091
Mech	328
FET	622
Library	190
WFC	48
SAIC	279

2.3 Illumination level of some of the areas

DEPARTMENTS	LUXMETER READINGS (in Lux)
DEPARTMENT OF ENERGY	67
DEPARTMENT OF CHEMISTRY	123
STUDENTS ACTIVITY CENTRE	196
LIBRARY	118
EVS	114
DEPARTMENT OF PHYSICS	104
CIVIL	126
CSE	132
ECE	118

2.4 Equipment Load

The Departments uses various kinds of lab equipment which consumes different loads (in Watts). Some of the lab equipment are:

LAB EQUIPMENTS	LOAD
Compression Testing Machine	750W/3500W
Incubator	1400W
CBR Test Machine	370W
Flexural Testing Device	150 W
Compression Testing Machine	30W
Direct Shear Apparatus	50W
Frequency Modulation Kit	5W

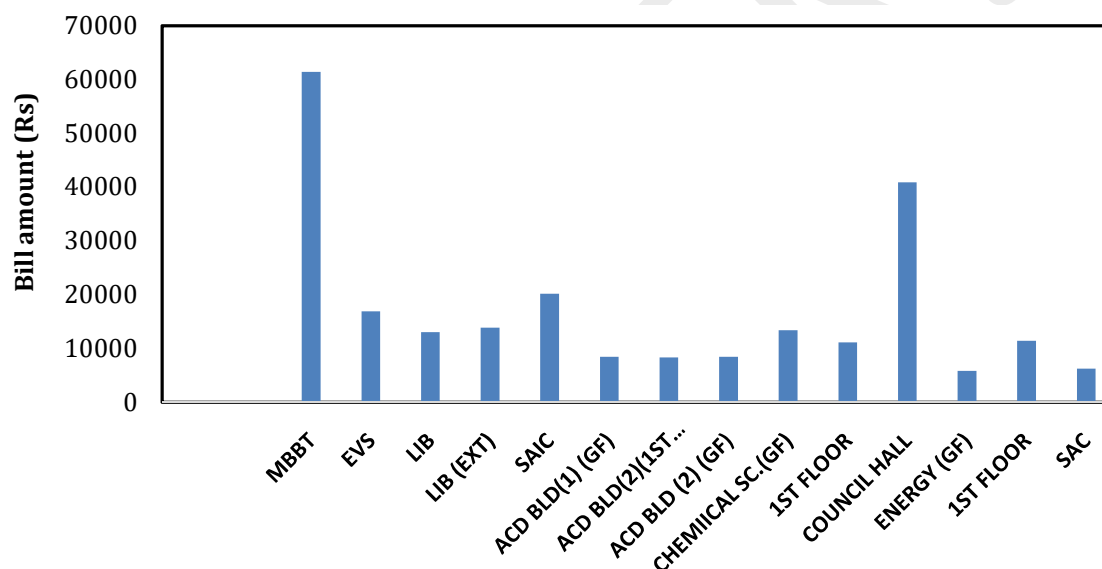
2.5 Energy Consumption

Meters have been installed in the Department from the year 2019. The calculations are being done by firstly taking the values from the Present Meter Reading and then subtracting it from the Previous Meter Reading. The CT Ratio has been considered to 100/5 i.e. 20. The Rate and the Meter Rent is considered to be Rs 6.8 and Rs 20 respectively. Meter Count and the Fixed Charge has been being provided from the powerhouse. The Energy Charge (in Rs) has been calculated by multiplying the Rate, Meter Count and the CT Ratio. The Electricity Duty Charge is the 5% of the total of the Fixed Charge and the Energy Charge. Other Charge is the 15% of the Energy Charge. Calculations have been done for the month of January 2019 till May 2019 and the readings have been compared for each month. The following data has been useful for the calculation purpose.

- (a) Previous Meter Reading: The meter reading from the previous month has been taken from the departments.
- (b) Present Meter Reading: The month whose calculation has to be done, that month's reading has been taken from the meters installed in the departments.
- (c) CT Ratio: It is the ratio of the primary current input to the secondary current output at full load.
- (d) Meter Count: It is obtained by subtracting the Present Meter Reading from the Previous Meter Reading.
- (e) Rate: It is taken as Rs 6.8/kWh.
- (f) Energy Charge: It is used to measure the energy status.
- (g) Meter Rent: It is defined as the price per meter i.e., Rs 20
- (h) Fixed Charge: It is the load of the building in kw and then multiplied by Rs 30.
- (i) Electricity Duty Charge: It is charged on consumption and is applicable per unit of electricity consumed.
- (j) Other Charge: It is calculated as the 15% of Energy Charge.

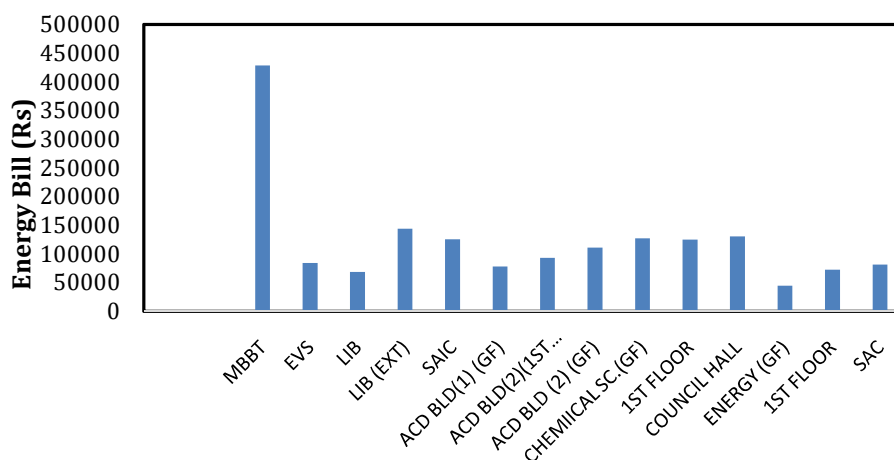
January 2019

BUILDINGS	ENERGY CHARGE (in Rs.)	METER RENT (in Rs.)	FIXED CHARGE (in Rs.)	E.D CHARGE (in Rs.)	OTHER CHARGE (in Rs.)	TOTAL (Rs)
MBBT	50741.6	20	253.8	2790.88	7611.24	61424.32
EVS	10621.6	20	2074.8	2605.88	1593.24	16922.32
LIB	9669.6	20	709.8	1193.28	1450.44	13049.92
LIB (EXT)	10363.2	20	709.8	1227.96	1554.48	13882.24
SAIC	14973.6	20	1088.1	1836.78	2246.04	20171.32
ACD BLD(1) (GF)	3141.6	20	1376.25	1533.33	2356.2	8434.18
ACD BLD (2) (FF)	3236.8	20	1003.68	1165.52	2913.12	8345.92
ACD BLD (2) (GF)	3236.8	20	1310.01	1471.85	2427.6	8473.06
CHEM SC.(GF)	8404.8	20	1645.8	2066.04	1260.72	13404.16
Chem Sc., 1ST FLOOR	6500.8	20	1645.8	1970.84	975.12	11119.36
COUNCIL HALL	1196.8	20	19724.46	19784.3	179.52	40911.88
ENERGY (GF)	3372.8	20	889.2	1057.84	505.92	5852.56
1ST FLOOR	7996.8	20	889.2	1289.04	1199.52	11401.36
SAC	3386.4	20	1084.02	1253.34	507.96	6258.52



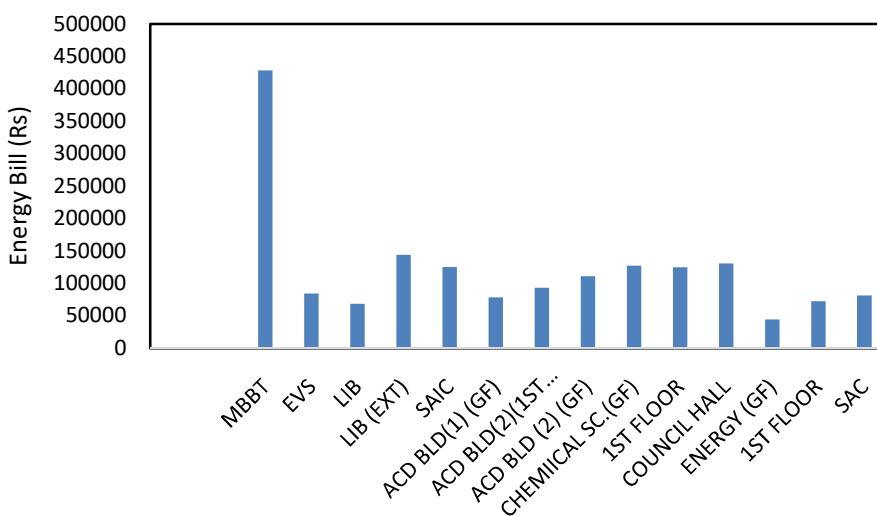
FEBRUARY 2019

BUILDINGS	ENERGY CHARGE (in Rs.)	METER RENT (in Rs.)	FIXED CHARGE (in Rs.)	E.D CHARGE (in Rs.)	OTHER CHARGE (in Rs.)	TOTAL (Rs)
MBBT	354552	20	253.8	17981.4	53182.8	428603.8
EVS	66368	20	2074.8	5393.2	9955.2	84306
LIB	55624	20	709.8	3491	8343.6	68604.2
LIB (EXT)	118184	20	709.8	6619	17727.6	144136.2
SAIC	102000	20	1088.1	6188.1	15300	125353
ACD BLD(1) (GF)	62560	20	1376.25	4504.25	9384	78311.3
ACD BLD (2) (FF)	75616	20	1003.68	4784.48	11342.4	93329.36
ACD BLD (2) (GF)	89624	20	1310.01	5791.21	13443.6	110854.62
CHEMSC.(GF)	102544	20	1645.8	6773	15381.6	127125.2
1ST FLOOR	100640	20	1645.8	6677.8	15096	124826.4
COUNCIL HALL	75616	20	19724.46	23505.26	11342.4	130770.92
ENERGY (GF)	35360	20	889.2	2657.2	5304	44497.2
1ST FLOOR	58616	20	889.2	3820	8792.4	72575.4
SAC	65688	20	1084.02	4368.42	9853.2	81503.44



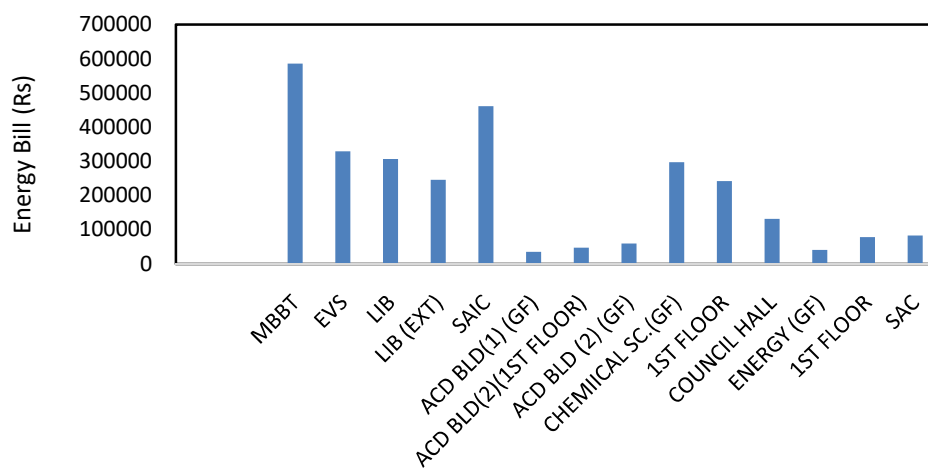
MARCH 2019

BUILDINGS	ENERGY CHARGE	METER RENT	FIXED CHARGE	ED CHARGE	OTHER CHARGE	TOTAL (Rs)
	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)	
MBBT	354552	20	253.8	17981.4	53182.8	428603.8
EVS	66368	20	2074.8	5393.2	9955.2	84306
LIB	55624	20	709.8	3491	8343.6	68604.2
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ACD BLD(2)(FF)	75616	20	1003.68	4784.48	11342.4	93329.36
ACD BLD (2) (GF)	89624	20	1310.01	5791.21	13443.6	110854.62
CHEM SC.(GF)	102544	20	1645.8	6773	15381.6	127125.2
1ST FLOOR	100640	20	1645.8	6677.8	15096	124826.4
COUNCIL HALL	75616	20	19724.46	23505.26	11342.4	130770.92
ENERGY (GF)	35360	20	889.2	2657.2	5304	44497.2
1ST FLOOR	58616	20	889.2	3820	8792.4	72575.4
SAC	65688	20	1084.02	4368.42	9853.2	81503.44



APRIL 2019

BUILDINGS	ENERGY CHARGE	METER RENT	FIXED CHARGE	ED CHARGE	OTHER CHARGE	TOTAL (Rs)
	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)	
MBBT	484432	20	253.8	24475.4	72664.8	585414.8
EVS	269552	20	2074.8	15552.4	40432.8	329620.8
LIB	252688	20	709.8	13344.2	37903.2	306530
LIB (EXT)	202368	20	709.8	10828.2	30355.2	245776
SAIC	380528	20	1088.1	20114.5	57079.2	461634.6
ACD BLD(1) (GF)	26928	20	1376.25	2722.65	4039.2	35290.9
ACD BLD(2)(FF)	38216	20	1003.68	2914.48	5732.4	48174.36
ACD BLD (2) (GF)	47328	20	1310.01	3676.41	7099.2	59788.42
CHEM SC.(GF)	243440	20	1645.8	13817.8	36516	297236.4
1ST FLOOR	198152	20	1645.8	11553.4	29722.8	242557.8
COUNCIL HALL	76568	20	19724.46	23552.86	11485.2	131920.32
ENERGY (GF)	32504	20	889.2	2514.4	4875.6	41049
1ST FLOOR	63240	20	889.2	4051.2	9486	78158.2
SAC	67184	20	1084.02	4443.22	10077.6	83309.64



MAY 2019

BUILDINGS	ENERGY CHARGE	METER RENT	FIXED CHARGE	ED CHARGE	OTHER CHARGE	TOTAL (Rs)
	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)	
MBBT	483072	20	253.8	24407.4	72460.8	583772.8
EVS	134776	20	2074.8	8813.6	20216.4	166898.6
LIB	92208	20	709.8	5320.2	13831.2	112774
LIB (EXT)	245344	20	709.8	12977	36801.6	297663.2
SAIC	261936	20	1088.1	14184.9	39290.4	318452.2
ACD BLD(1) (GF)	69088	20	1376.25	4830.65	10363.2	86192.9
ACD BLD(2)(FF)	56712	20	1003.68	3839.28	8506.8	70505.56
ACD BLD (2) (GF)	86496	20	1310.01	5634.81	12974.4	107078.02
CHEM SC.(GF)	91936	20	1645.8	6242.6	13790.4	114317.6
1ST FLOOR	232696	20	1645.8	13280.6	34904.4	284264.6
COUNCIL HALL	3672	20	19724.46	19908.06	550.8	43909.12
ENERGY (GF)	30328	20	889.2	2405.6	4549.2	38421.8
1ST FLOOR	47600	20	889.2	3269.2	7140	59275.2
SAC	117504	20	1084.02	6959.22	17625.6	144063.64

It can be inferred that the Department of Molecular Biology and Biotechnology consumes the highest amount the energy from the month January to February and the Department of Energy consumes the least. It is concluded that the consumption of MBBT remains the highest whereas the Library has seemed to increase as compared the beginning and the Council Hall's consumption as decreased as compared to the month of January and the same goes for the Department of Energy. The consumption of the Student's Activity Centre has also decreased.

2.6 Recommendation for Energy Conservation

- a) Increase the spacing between the lights and fans.
- b) Reduce the number of appliances that are not necessary.
- c) Use of increased number of LEDs and CFLs.
- d) Use of Power Strips for the purpose of energy saving.
- e) Recommend the use of alternative like that of Renewable Energy.
- f) Closing of unused Rooms or Laboratories.
- g) The refrigerators/ freezers which are used for experiment purposes should be kept clean by cleaning the coils and keeping the door properly closed for its better efficiency. If possible the freezers/refrigerators should be shared
- h) Usage of recyclable batteries or electronic items should be used as it will be helpful and much of waste would not be produced.
- i) The use of natural light should be encouraged.

CHAPTER 3

ENERGY CONSUMPTION IN THE HOSTELS OF UNIVERSITY

3.1 Introduction

Tezpur University was established by an act of parliament in 1994. It is situated in Napaam about 15km east of Tezpur, the headquarters of Sonitpur district of Assam. TU has an approximate area of 262 acres with a student community strength of around 3800 and about 300 faculties. The university enjoys 24-hour electricity supply and has a connected load of 1.5 MW. There are 15 student's hostels inside the university premises.

- Kanchenjunga Men's Hostel (KMH)
- Nilachal Men's Hostel (NMH)
- Charaideo Men's Hostel (CMH)
- Patkai Men's Hostel
- Saraighat CV Raman Men's Hostel (SCVRMH)
- Dhansiri Women's Hostel (DWH)
- Pragiyotika Women's Hostel (PWH)
- Bordoisila Women's Hostel (BWH)
- Subansiri Women's Hostel (SWH)
- Kapili Women's Hostel (KWH)
- Pobitora Madam Curie Women's Hostel (PMCWH)
- New Women's Hostel (NWH)
- Scholars Hostels
- Transit Men's Hostel
- Transit Women's Hostels

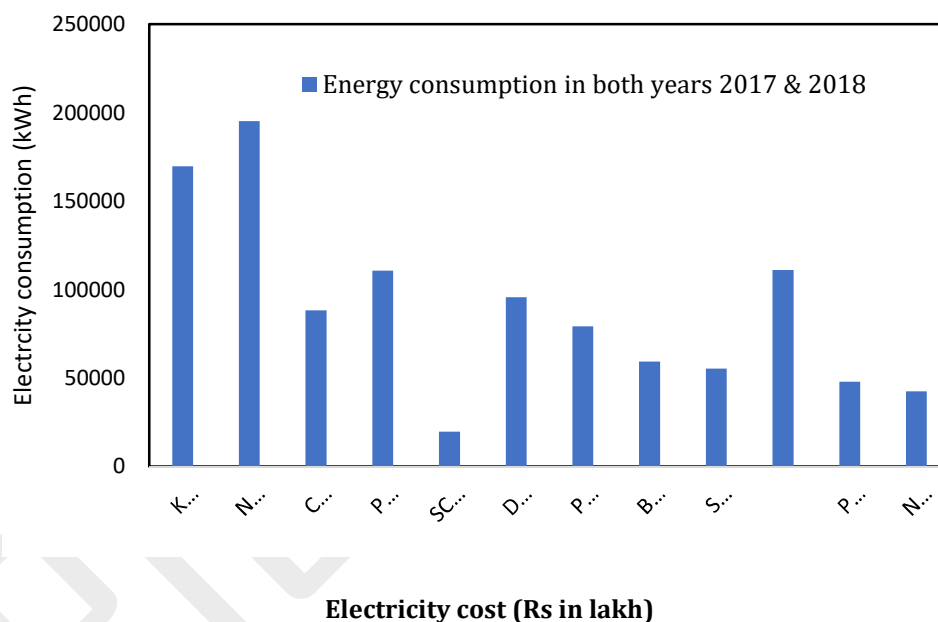
This energy audit is made to know the huge consumption and usage of energy in the hostels of TU campus, to know the significant cost of the energy used for the last two years. The report is also aimed to focus to give a detailed idea about energy consumption activities & hence, providing necessary energy conservation opportunities. Some important features of auditing energy are given below:

- To study the hostel energy consumption of Tezpur University
- To measure the energy uses in the hostels with a focus on electricity usage.
- To find out the major energy consumption areas of the hostels.
- To implement all possible aspects of energy conservation possibilities.

3.2 Energy scenario in hostels

The energy consumption in the hostel is mainly in the form of electricity and cooking fuel i.e. LPG. The annual energy consumption for hostels over last two years (2017-18) (in KWh) is presented in the following Table (The values for the year 2018 are up to the month of May due to unavailability of Data).

Year	KMH	NMH	CMH	PMH	SCVRMH	DWH
2017	106151	120276	54504	68265	12149	59363
2018	63496	74949	33751	42433	7527	36271
Year	PWH	BWH	KWH	SWH	PMCWH	NWH
2017	48826	36628	69357	34276	29770	26228
2018	30333	22705	41717	21156	18095	16329



Years	KMH	NMH	PMH	SCVRMH	PWH	KWH	SWH	PMCWH
2017	11.5	15.4	14.5	15.5	5.72	8.32	8.26	17.9
2018	5.68	6.83	6.40	6.48	2.46	2.89	3.1	6
Total	17.1	22.2	20.9	21.9	8.1	11.2	11.3	23.9

3.3 Methodology

To know the energy consumption for the university hostels we have carried out a survey around the hostels. The required data from the sub-station of the university. The steps and procedures used in obtaining and analysing the data include:

- Physical inspection: Visit to all the hostels of the university and an audit of the facilities and energy consumed by the students are made.

- Data collection: The data is collected by physically counting the lights, fans, sockets and other electrical appliances of all the hostels. The meter readings for each month during the two years is also collected.
- Identification/verification of energy consumption and other parameters by measurements.

The following information are collected in each hostel:

- No of hostel boarders.
- Number / types of lighting equipment, operation hours.
- Number/ types of space cooling devices and the operating hours.
- Number / types of electrical devices and appliances used in the hostels.
- Power rating of all the electrical devices.
- Lux meter readings of different corners of hostel. (eg. Rooms, bathrooms, corridors, mess)

To calculate the approximate energy consumption, the following formulae is used

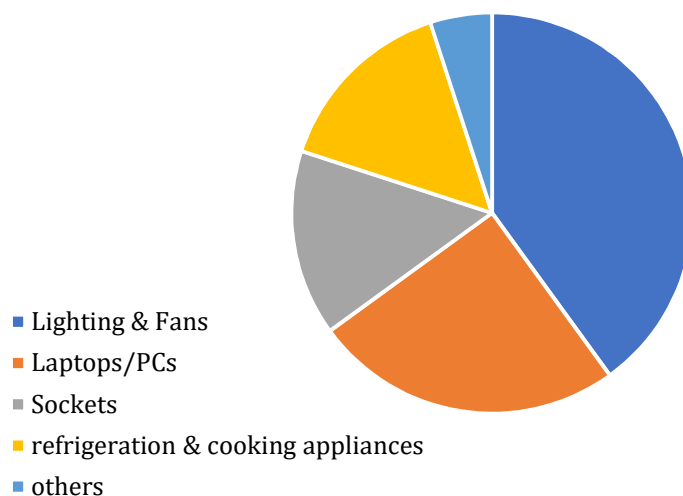
Electric usage is measured in Kilowatt-hours (KWh) = $P \text{ (KW)} \times t \text{ (hr.)}$ Multiplying this by the number of days you use the appliance during the year for annual consumption. To calculate the approximate cost for the energy usage for a month the formulae are:

- Present meter reading subtract previous meter reading
- Multiply the difference with the CT ratio.
- Then by multiplying the rate per unit we get the energy charge for the specific month (the rate per unit is Rs6.8/kWh in our university)
- Meter rent Rs 20 is added.
- Electricity duty charge= fixed charge+ energy charge x 5%
- Fixed charge = 30x load connected
- Other charges= 15% of the generated charge
- Total cost in rupees = energy charge + meter rent + ED Charge + fixed charge + other charges.

3.4 Classification and segregation of loads

Based on end-use, the connected loads in the hostel were grouped into five classes namely-

- Lighting (CFL, tube lights) & fans
- Computer/laptops
- Sockets
- Refrigeration and other cooking appliances
- Others



3.5 Hostel Rooms

The hostels of the Tezpur University are having a total of 4000 fans (approx.) in different Hostels. The total lighting load from the above is 350 kW and the connected fan load is 200 kW.

Table1: Description of students' hostel

NAME	DESCRIPTION	TYPE	NO.OF ROOM & TYPE	NO. OF STUDENTS
KMH	3 Storey building	Male	220	440
NMH	3 Storey building	Male	216 (1/2 seater)	400
CMH	2 Storey building	Male	114 (1/2/3seater)	190
PMH	3 Storey building	Male	282 (1/2 seater)	448
SCVRMH	3 Storey building	Male	365 (1 seater)	365
DWH	2 Storey building	Female	74 (1/2/3)	180
BWH	3 Storey building	Female	72(2 seater)	152
PWH	3 Storey building	Female	65 (1/2 seater)	150
KWH	3 Storey building	Female	110(2 seater)	210
SWH	3 Storey building	Female	110	205
PMCWH	3 Storey building	Female	280(1 seater)	280
NWH	3 Storey building	Female	115	200

Table 2: Lighting and fan load in hostels

Hostels	No. of CFL	No. of tube light	No. of Ceiling Fans	Exhaust fan	6A socket	16A socket
KMH	249	552	376	12	488	29
NMH	256	560	376	12	475	27
CMH	-	-	-	-	-	-
PMH	256	560	376	12	475	27
SCVRMH	1575	758	510	43	981	176
DWH	55	217	155	-	-	-
PWH	74	319	134	17	179	36
BWH	-	-	-	-	-	-
NWH	-	-	-	-	-	-
SWH	78	311	166	24	318	27
KWH	99	325	189	26	326	38
PMCWH	1656	525	384	23	685	127

The laptops/ computers, mobile phones and the personal electrical appliances used by the boarders account about 30-40% of energy. Although the power saving monitors consume lesser energy, the laptops with less power management consume more energy. According to the survey, it is seen that almost every student in the hostel have their own laptops. There are approximately 3500 laptops in approx. in the hostels of Tezpur University.

Table 3 Energy usage in hostel kitchens

Hostels	Connected Load (kW)	LPG usage per day(kg)	Estimated food wastage per day(kg)
KMH	132	45	120
NMH	129	45	120
CMH	<i>Data not available</i>	35	100
SCVRMH	394	30	80
PMH	129	45	150
DWH	<i>Data not available</i>	30	80
BWH	<i>Data not available</i>	35	80
SWH	85.6	35	100
KWH	100	40	120
NWH	<i>Data not available</i>	35	100
PWH	79.8	30	90
PMCWH	300	30	80
Total		435	1220

3.6 Benchmarking

Energy benchmarking involves the development of quantitative and qualitative indicators through the collection and analysis of energy-related data and energy management practices. Benchmarking in simplistic terms is the process of comparing the performance of a given process with that of the best possible process and to try to improve the standard of the process to improve quality of the system, product, services etc. It allows organizations to develop plans on how to adopt such best practices, usually with the aim of increasing some Aspect of performance. Benchmarking may be a one-off event, but is often treated as a continuous process in which organizations continually seek to challenge their practices. Benchmarking is a method which should be used on a continual basis as best practices are always evolving. Benchmarking of energy consumption is a powerful tool for performance assessment and logical evolution of avenues for improvement. Historical data, well documented, helps to bring out energy consumption and cost trends month-wise / daily. Trend analysis of energy consumption, cost, relevant production features, specific energy consumption, help to understand effects of capacity utilization on energy use efficiency and costs on a broader scale. The basis for benchmarking the energy consumption at TU Hostels is energy consumed per student. The benchmarking parameters are as following:

- Hostel energy performance.

- kWh consumed per sq.m of area.
- kWh consumed per capita.
- Hostels monthly energy bill.

3.7 Electricity energy consumption for different hostels

Electricity consumption in the Men's hostels

There are a total of 6 men's hostel (since, transit men's metering is done in the academic building 1 itself). Therefore, the audit is done for the rest five hostels. viz. KMH (Kanchenjunga Men's Hostel), NMH (Nilachal Men's Hostel), CMH (Charaideo Men's Hostel), PMH (Patkai Men's Hostel), SCVRMH (Saraighat CV Raman Men's Hostel). For the year 2017, the Nilachal men's hostel is having the highest energy consumption among the men's hostels having the usage of 120276 kWh whereas The Saraighat CV Raman Men's Hostel have the lowest with 12149 kWh. The NMH have the maximum usage of 74949 kWh up to the month of May and the SCVRMH have the minimum with the usage of 7527 kWh in the year 2018.

Table 4 Connected load in each hostel

Hostel name	Connected Load (kW)
Kanchenjunga men's hostel	132
Nilachal Men's Hostel	129
Charaideo Men's Hostel	<i>Data not available</i>
Patkai Men's Hostel	129
Saraighat CV Raman Men's Hostel	394

**Table 5 Monthly energy consumption units in the Men's hostel
Year -2017 (kWh)**

Hostel	Jan	Feb	March	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
KMH	333	306	398	592	653	413	113	905	787	491	505	32
NMH	386	410	382	792	794	238	268	1305	977	577	517	226
CMH	106	136	214	327	373	114	94	706	446	262	220	171
PMH	154	180	207	460	410	247	101	786	521	316	316	108
SCVRMH	62	50	45	50	54	83	60	68	79	55	55	40

Year 2018 (kWh)

Hostel	Jan	Feb	March	Apr	May
KMH	387	405	408	523	658
NMH	399	662	533	690	827
CMH	238	118	236	304	263
PMH	250	338	303	371	430
SCVRMH	55	74	46	52	64

Electricity consumption in Women's Hostels

There are 7 women's hostels in the campus, leaving aside the transit hostels. viz. DWH (Dhansiri women's Hostel), PWH (Pragiyotika women's Hostel), SWH (Subansiri Women's Hostel), KWH (Kapili Women's Hostel), BWH (Bordoisila Women's Hostel), NWH (New women's Hostel),

PMCWH (Pobitora madam curie women's Hostel). These are one storey and two storey buildings. Among all the women's hostels, it is found out that the *Kapili Women's Hostel* consumed the maximum amount of electricity of 69357 kWh and the lowest measured units was 26228 kWh which was consumed by *New Women's hostel* in the year 2017. The *KWH* have the highest usage of 41717 kWh and the *NWH* have the lowest of 16329 kWh units till the month of May in the year 2018.

Table 6 Connected load in each hostel

HOSTEL	CONNECTED LOAD (kW)
Pragjyotika women's Hostel	79.8
Dhansiri women's Hostel	<i>Data not available</i>
Bordoisila women's Hostel	<i>Data not available</i>
Kapili women's hostel	100
Subansiri Women's Hostel	85.6
Pobitora Madam Curie Women's Hostel	300
New Women's Hostel	<i>Data not available</i>

Table 7 Monthly energy consumption units in the Women's hostel

Year 2017 (in kWh)

Hostels	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
DWH	250	169	265	301	395	111	50	634	428	287	247	163
PWH	301	197	225	240	324	66	98	563	378	236	218	148
BWH	268	110	91	274	235	32	58	456	279	170	160	110
SWH	312	111	122	198	207	65	50	366	214	183	147	149
KWH	338	258	292	363	390	300	96	416	435	318	272	318
PMCWH	502	87	46	195	136	236	107	175	237	105	110	138
NWH	368	123	115	157	187	96	51	253	205	129	114	90

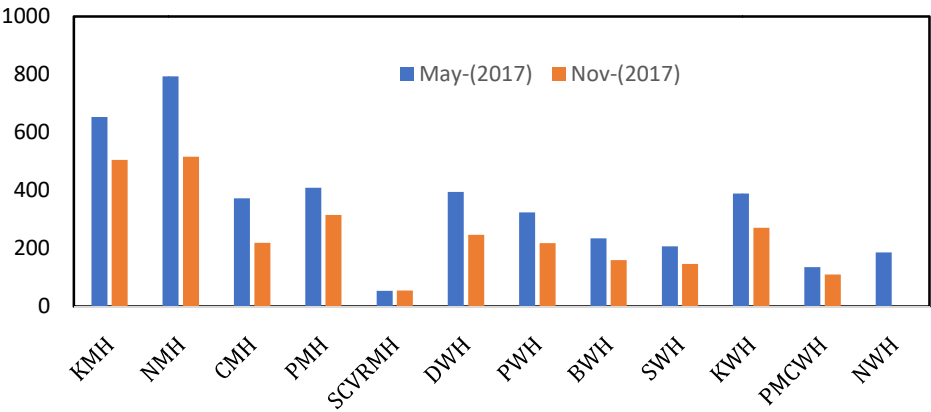
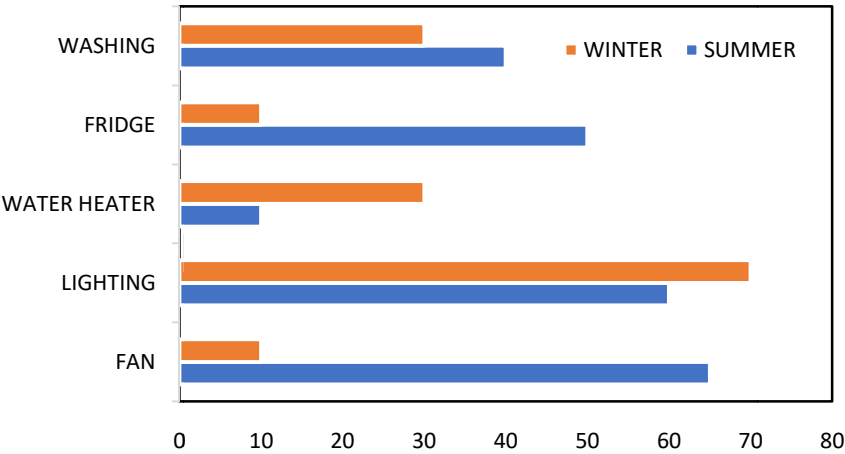
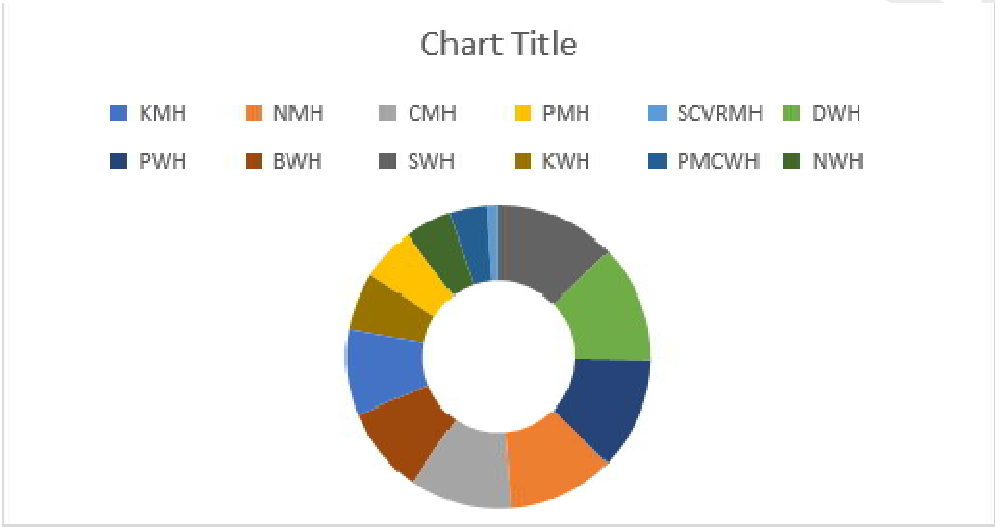
Year 2018 (in kWh)

Hostels	Jan	Feb	Mar	Apr	May
DWH	241	177	257	316	410
PWH	178	180	218	261	337
BWH	125	145	162	195	244
SWH	98	179	137	157	205
KWH	72	311	271	310	390
PMCWH	99	168	105	107	139
NWH	51	156	117	140	195

3.8 Specific Energy Consumption (SEC)

The specific energy consumption (SEC) is defined as the energy consumption per unit of product output. The specific energy consumption is considering the specific energy consumption in kWh/m³/annum and kWh/person/annum of all the hostels in the campus. The average energy consumption per person is approximately 250 kWh/person/annum. Monthly energy consumption of the hostels differs from time to time and also from its other. The monthly usage is mainly in the lightings and fans. After that we have the cooking, refrigeration, water pumping in the hostels, electrical appliances used by the boarders personally like the

boilers, electric rods to heat up the water, laptops, mobile phones, others etc. The consumption value is different in different hostels because of the number of boarders and the hostel size. The personal usage and number of appliances also mean the most. There is also change as of different seasons i.e. Winter and summer. In the winter seasons, there is no use of fans that is why the consumption units are little lower than of summer. The use of coolers, fans, refrigerators etc. plays a dominant role in the electricity consumption during summers. The electrical energy consumption patterns differ drastically between the two seasons.



The Nilachal Men's Hostel is having the highest number of usage i.e. 794 kWh in the summer of 2017. This hostel has the maximum in two years and SCVRMH have the lowest. The electricity is less consumed in smaller hostels, and it also differs during the holidays and the exam days. Typically, the demand is high in summer than in winter. The demand for electricity tends also to fluctuate over the course of the day, determined by human activities. The additional heating or cooling load causes an increase in electric use. In summers, if the usage of fans, coolers, fridge consumes energy then in the winters it is the heating appliances that consumes the electricity. In the hostels, the exam times or vacations are also a factor of increase or decrease of energy. The energy consumption in the last months of 2018 are little saved because of the installation of solar PV in the hostels. A 1000kWp grid connected rooftop PV Power plant was installed. The electricity cost has also been lowered as the rate per energy units from solar energy is much less than the electricity supply board i.e. Rs2.42/kWh.

Table 8 Electricity generation of Solar PV

MONTHS	SWH+PWH	KMH+NMH	PMH
August	1804.2	3794.4	0
September	7033	10099.8	1531.9
October	10049.6	12461.6	16423.5
November	9980.1	11232.8	15737.3
December	10398.1	10835.3	14418
January	12265.9	12050.78	15630.4
February	7891.5	7612.6	13331.8
March	11365.2	11024	11618
April	10051.7	10093.6	9692
TOTAL	80839.3	89204.88	98382.9

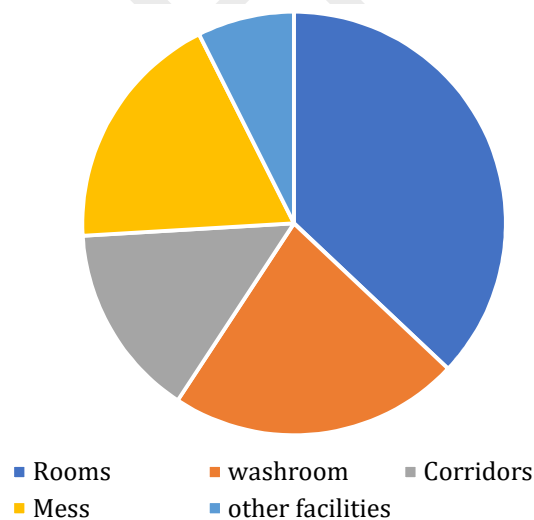
3.9 FACTORS LEADING TO THE ELECTRICITY CONSUMPTION

- **WEATHER-** The weather plays an important role in the fluctuation of energy used. In cold weather there is less use of Fans than the hot weather. A rainy weather is also a factor which compels the students to stay inside the room thereby using the electrical assets. The iron rods, geyser, boilers add up during winters.
- **VACATIONS/HOLIDAYS-** The electricity consumption also changes during holidays as almost all the students go to their homes during the long break. The month of June/July and December/half of January are summer recess and winter recess respectively for the university which results in a low electricity consumption.
- **PERSONAL NEGLIGENCE-** There are many times the students leave the rooms with the fans/lights on which can also be the energy wastage factor and also The bathroom's lights are mostly kept on during the daytime.

- ELECTRICAL APPLIANCES- Use of extra electrical appliances like iron or inductions with high wattage in the hostel rooms is also not acceptable.
- FUNCTIONS/CELEBRATIONS- There is also heavy consumption of current during the decorations in the hostel parties like Mess ending, Grand feast, Farewell or fresher's parties. Even after Diwali's the decoration lights are kept on use for a long period time.
- DAMAGED BOARDS/SOCKETS/WIRING- These also leads to the loss of electricity.
- CONNECTED LOADS- The connected loads also matter the most during electricity consumption.
- RATES- The energy rates /tariffs change from time to time which affects the electricity Cost.
- DURING EXAMS- During exams the lights and fans are used for the longer time than usual and also the use of laptops and PCs become high.
- ACCOMODATION- During accommodation of students in a single hostel during the vacations. The other hostels consume less energy than the one in which all are admitted.

3.10 LOCATION WISE ANALYSIS OF HOSTELS

The location wise analysis of all hostels done together suggests that maximum power



consumption after rooms is in toilets. The reason is mostly poor practices. It is a general complaint of all supervisors that students do not switch off the geyser after use. High consumption of mess is not a surprise as they use a number of other appliances in addition to general appliances in their kitchen.

The rooms, consuming 50% of total consumption, have major role in reducing total energy consumption, just by using better practices. There are Some students who don't switch off the

lights and/or fans even when they are not in room. Most of the students keep their computer/laptop in standby mode all the time. Lots of power is wasted due to these poor practices. Toilets are also a major area to focus upon, from energy conservation point of view. Power consumption here can largely be reduced by simply using the facilities a little more wisely. In lighting of toilets also, there is large potential of saving by using automation so that the light is not switched on all the time. Corridors, though having smaller share in power consumption than above two, have large potential for saving electric energy. Messes are more or less using electricity wisely and have very low potential for reducing energy consumption (except in the case, LPG replaces electricity completely for cooking purpose.) Central facilities (TV room, canteen, Indoor games room etc.) have minor share in power consumption and very small potential for saving energy.

3.11 Application wise analysis of hostels

It is seen that among all the applications used in the hostels, the lighting and fans holds a major part in energy consumption. The CFL's, tube lights, sockets can be used efficiently for the better use. The cooking is the second most application in terms of usage. Cooking is a significant part of about 25% share in total power consumption in the hostels. Washing/Bathing/Cleaning is also consuming application and comprises of unnecessary wastage of water, washing machines etc. Here energy efficiency mostly requires good practices. Others (offices, comforts etc.) are having insignificant consumption share and offer very small space for reducing consumption. Tube lights are maximum power consuming appliances accounting for 30% each. Fans account for 20% of total consumption. Consumption in water coolers is 10% of the total power consumption. All other devices have not that much significant consumption.

3.12 Annual electricity energy consumption bill

The annual electricity energy consumption bill over the last two years (2017 & 2018) in different hostels are calculated. The energy bill varies from one hostel to another. The Amount paid by the different type of hostels are stated below. It was observed that the monthly bill for energy in every hostel increased in each year.

Year- 2017

Hostels	Jan	Feb	Mar	April	May	June
KMH	90421	86015	101029	132690	14265	103477
NMH	98252	102169	97599	164511	164837	74098
PMH	67894	76380	85193	167772	151452	98249
SCVRMH	134748	119081	112553	119081	124303	162165
PWH	60035	43063	47362	50080	63787	21683
SWH	113541	47394	51525	76331	72969	32920
KWH	68831	55755	61324	72911	77318	111590
PMCWH	368675	97763	70998	168266	129750	195030

Hostels	July	Aug	Sept	Oct	Nov	Dec
KMH	54517	183772	164514	116207	118492	41298
NMH	78994	248233	194703	129423	119631	72140
PMH	50594	274178	187682	121423	120770	52879
SCVRMH	132137	142581	156943	116469	125609	106025
PWH	26906	102794	72602.3	49427	46490	35056
SWH	28024	131166	81554	71435	59685	60338
KWH	29337	81561	84662	65567	58060	65567
PMCWH	110819	155210	149987	109514	112778	131056

Year 2018

Hostels	Jan	Feb	Mar	Apr	May
KMH	99234	102172	102661	121429	143135
NMH	100373	143295	122242	147865	170223
PMH	99228	127951	116527	138722	157980
SCVRMH	125609	150415	113858	121692	137359
PWH	39962	40288	46490	53507	65911
SWH	42059	70130	56421	62949	78616
KWH	25420	64425	57897	64262	77318
PMCWH	105597	150640	109514	110819	131709

The Pobitara Madam curie Women's Hostel has the highest energy bill for the year 2017 of Rs 17.9 lakhs, whereas Pragjyotika Women's Hostel has the lowest of about Rs. 5.72 lakhs. In the year 2018, Nilachal Men's Hostel have the maximum while Kapili Women's Hostel have the minimum i.e. Rs 6.83 lakhs & Rs 2.46 lakhs respectively. The difference can be seen due to

consumption, connected loads, electrical devices and ratings, and along with the rate that is implemented.

3.13 ECBC Standards and comparison

As per the Energy Conservation Building Code (ECBC) 2006, published by the Bureau of Energy Efficiency (BEE), Govt. of India, the recommended Illuminance are as given below.

Type of Interior	Minimum Illuminance required(In Lux)
General	200
Reading room	200
Bathrooms	50
Computer workspace	300
Interior parking area	20
Music rooms	200
Corridors, stairs	50
Sport halls	200
Canteens ,and mess rooms or dining halls	150
Food preparation and cooking	300

Though the lux meter readings keep on changing, this is the average lux values that are being collected for the different locations of a hostel. A software for lux meter is used for this purpose. It can also be clearly seen that the lighting intensities are also very high than the standard illuminance levels.

Table 9 Lux meter readings at the hostels (Readings are in lux)

Hostel	Canteen	Bathroom	Corridors
KMH	200	150	25
NMH	220	150	35
CMH	180	70	20
PMH	200	100	15
SCVRMH	250	120	35
DWH	-	80	15
BWH	-	80	20
PWH	180	90	25
KWH	230	100	30
SWH	-	100	20
PMCWH	250	130	35
NWH	200	110	20

3.14 Energy Conservation in The Hostels

Energy conservation is an effective step to use the energy efficiently and to reduce the usage of consumption. As we can see there is a huge and a growing demand of Energy in the hostels of Tezpur University. A growing population, greater demand of cooling and other facilities, use of

high watt appliances increase the demand for energy and it is required to improve the energy efficiency in the hostels. The energy we use for electricity is coming from burning fossil fuels, be it in the lighting or be it in cooking. It is our duty to conserve and use energy efficiently. For that we must be concerned first. The electricity bill and the consumptions should be studied and accordingly we must plan the strategies to reduce it. We used also be concerned about the ratings of the devices as well as the maintenance/replacement whenever it is required. More efficient and modern techniques must be implemented for this purpose. Here it is listed about some of the recommendations that the university body can act upon.

3.15 Recommendations for Energy Saving

Based on the Energy consumption data and energy consumption cost of the hostels of Tezpur University, there are some of the suggestions regarding improvement of energy efficiency. Further, some cost analysis recommendations are also added. Some of the basic measures to reduce electricity bill are:

- Switching off the lights, fans or other electrical appliances when not in use.
- Appliances with low efficiency must be replaced with higher efficiency devices.
- Using of renewable energy to maximum extent for eg. Solar PV and solar water heater.
- Awareness among the students for energy wastage
- Replacement of old lighting devices with new ones.
- FTLs must be removed by replacing with CFL /LED bulbs.
- Regular maintenance must be done.
- Strictness in the hostels specially boy's hostels regarding the use of high rated devices/appliances.
- The old wirings must be changed to newer ones.
- Improved power factor
- Use of slimmer tube lights, which gives better light and consume less electricity.
- Lights must be off during daylight and more sunlight should be allowed to penetrate in the room during the daytime. Lighter color decorations or light colored curtains reflect light.
- The hostel rooms must be painted with light colors and other colors must not be used as darker colors absorb the light and doesn't reflect
- Also if the bulb or tube turns grey on top of the choke and also makes a humming noise when you switch it, it is time to replace it with a new one.
- More star rating refrigerators must be used
- The doors should be tightly locked and the temperature must be kept minimized between 3degree celsius-4degree Celsius.
- The old wirings of the hostels must be changed. These are consuming most of the electrical energy

Energy savings in lighting

The dominant source in lightings are mostly the tube lights, be it in the hostel rooms, mess, corridors, stairs, common rooms etc. Though the CFLs are connected, the number of tube lights are more than the CFLs. The rated power for the FTLs are 40W and usually they consume 15W more in addition. The hostels mostly have T12 FTLs. So, if we replace it by the more energy efficient T5 FTLs which have a lower wattage rating will lead to energy saving.

- For e.g. 1) Expected life hours of a 40W FTL – 5000hrs
 whereas expected life of a T5 FTL – 20000hrs
 2) Energy input per hour is 45W & 28W respectively.
 3) Consumption in 19hrs per day (approx.) are 0.882kWh and 0.532kWh respectively
 4) Considering annual consumption for at least 250 working days:
 $0.882\text{kWh} \times 250 = 220.5\text{kWh}$
 $0.532\text{kWh} \times 250 = 133\text{kWh}$
 5) Annual consumption cost at Rs. 7.5
 $220.5\text{kWh} \times 7.5 = \text{Rs}1653.75$
 $133\text{kWh} \times 7.5 = \text{Rs. } 997.5$
 Therefore, total savings = Rs. (1653.75-997.5) = Rs 656.25
 So if we replace at least 5000 FTLs with T5 FTLs we can save around Rs. 32,81,250 approx./yr.
 6) Total investment = $800 \times 5000 = \text{Rs. } 4000000$
 7) Simple payback period is thus calculated to be 1.21 years.

Or We can also replace the FTLs with the electronic ballast which are also much efficient than the conventional tube lights. The savings will also be very high as they can give at least 15W lesser consumption than those. Moreover, the replacement cost is about Rs150 per ballast which will be easily recovered within a simple period of less than 5 years.

Energy saving in Fan

There are approximately 4000 fans in total in the hostels of Tezpur university. Most of them are very old and have problems. Almost all of the fans have resistance regulator. So replacing the regulators with an electronic one will be much efficient in this regard. A saving of at least 10W per fan can be obtained by using this type of regulators.

For eg: Total No. of fans in the hostels = 4000 (approx.)

Average Power saved per fan = 8W

Total Power saving = $4000 \times 8\text{W} = 32000\text{W} = 32\text{kW}$

Average Use of fans per year = $200 \times 12\text{h} = 2400$ (considering 200 days)

Total Energy saved per year = $2400 \times 32\text{ kWh} = 76800\text{ kWh}$

Saving in Rs. Per year = $\text{Rs. } 76800 \times 7.5 = \text{Rs. } 576000$

Average Cost of Replacing per fan = Rs. 200

Total Cost of Replacing all resistance regulated fans = $4000 \times 200 = \text{Rs. } 800000$

Capital Cost Recovery time = $(800000) / (576000) = 1.38\text{ years.}$

Therefore, the capital cost recovery time for replacing all the fans of the hostels is around 1.38 years.

Installation of Biogas plant in hostels

Typical Waste Food Density is 890 Kg/M^3

Therefore, Total Volume of Waste Food Per Day is About 890 L.

Taking in Lieu of a Biogas Plant of About 1000m^3

Installation Cost = 5 Lakhs and O&M Cost Is Rs 8000

For E.g. Calorific Value of Biogas- 21mj^3

Calorific Value of LPG – 46.1mj/Kg

Methane Generation per Cubic Meter – 100-200

Energy output of biogas plant per day = 3500 MJ

This implies that LPG saved = $(3500/46.1) \text{ kg} = 75.9 \text{Kg} = (75.9/14) = 5.34 \text{ LPG cylinders per day.}$

Total working days = 250 days approximately

Total annual savings = $250 \times 5.34 \times 350 = \text{INR } 3,73,800$

Payback period = 26 months approx.

Installation of solar water heaters

Installation of solar water heaters will also lower energy consumption up to a great extent.

During winter energy consumed by iron rods, boilers, etc. are very high which can be efficiently minimized with the installation of SWH.

Use of Motion Sensors in Corridors and Washrooms

Corridors and washrooms have a large potential of saving energy by the use of some automation tools. Motion sensors can be used there to automatically switch on the light when there is any movement and switch off the light when there is no movement. This can greatly reduce the total load in corridors and washrooms.

Average number of tube lights in a corridor = 5

Average power of tube light = 50W

Average no. of motion sensors can be installed = 3

Average reduction in usage per day by motion sensor = 4h

Total energy saved in corridor per year = $(5 \times 50 \times 4 \times 365) / 1000 = 365 \text{kWh}$

Saving in Rs. Per year = $365 \times 7.5 = \text{Rs.} 2737.5$

Cost of installation per motion sensor = Rs. 250

Total cost of installing motion sensors in a corridor = $3 \times 250 = \text{Rs. } 750$

Capital Cost Recovery Time = 0.27 years.

Hence, we can clearly see that use of motion sensors are really beneficial and can be installed in the hostels for energy efficiency.

3.18 DISCUSSIONS

A Large amount of energy is consumed in the hostels for cooking, lighting and fans. The male hostels consume more than the female hostels because of bigger capacity, high load connected, more number of electrical appliances, cooking of food is more in men's hostel than women's, and this also adds as a factor to it.

Lighting and fans

It can be seen that the hostels have more number of tube lights which can be replaced by other low watt FTLs. The presence of CFL are also a good point in energy savings. When we conducted the survey it was found that most of the students leave their rooms with the lights/fans on. Even during the day hours, the lights are kept on in the rooms as well as the washrooms. Almost all the students agree to this. So therefore, if we are self-aware and always turn off the lights and fans when not in use, we can save almost 30% of electrical energy.

Water heating

Water heating is not much issue as the hostels are not provided with geysers. But it will be economically beneficial as well as useful. The students during winters use immersion rods to heat up water, and also use the kettles for warming. the installation of SWH will reduce the consumption by the heavy appliances. Sometimes due to high wattage the sockets also get damaged or fused, this will also help to reduce it.

Cooking

After conducting the survey, it was also found out that the cooking is also an integral part of energy consumption. There are different types of electrical appliances which are used in hostel kitchens. For e.g. Freezers, inductions, mixer grinder, microwave, ovens, etc. These are the electrical appliances with high ratings. The men's hostel in the campus uses more energy than the women's hostels as there is more population in them and food is cooked and stored in larger amount. There is also heavy usage of hot plates in the pantries by the students.

Refrigeration

It accounts a small amount in the energy consumption. This mainly depends upon the user habits i.e. Ensuring either the door is tightly shut or not and also putting off when not in use will conserve energy. Refrigerators and water coolers are mostly used in summers.

Others

There are many appliances which are used personally by the students. The mobile phones, laptops, dslr cameras, immersion rods, boilers, iron, other electronic gadgets etc. Here, energy can be saved if people change their habits. It is highly recommended that the students should switch off the electrical appliances (anything) when not in use.

CHAPTER 4

Energy conservation in the Commercial Areas of University

4.1 Introduction

Tezpur University was established in 1994. This university is at Napaam about 15km East of Tezpur. It is located in the district of Sonitpur. The university is stretched across a plot of area 242 acres of land. In this energy audit the commercial areas of Tezpur university like the shops, food stalls, laundry house, ATMs etc. are considered. There are 26 commercial areas where I have conducted my survey for the preparation of the energy audit. I witnessed a variety in the sources of energy consumption in different areas. But in this audit only thermal energy is considered.

4.2 Commercial areas

There are 26 different commercial sites currently occupied. These can be divided into grocery shops, fast food corners, restaurants, ATMs, Banks etc. The list of areas considered while performing the energy audit are:

- State Bank of India
- SBI ATM (near the campus gate)
- Punjab National Bank
- Punjab National Bank ATM
- Post office
- Axis Bank ATM
- Diksha fast food
- Kamdhenu
- Momo stall
- Juice centre 1
- Chaat house and vegetable stall
- Neeraj computers
- Juice centre 2
- Amenities
- Cafeteria
- Essentials
- KF
- Kalita food corner
- KF SBI ATM
- Biddya mandir
- Gopi provisional store
- Haridas biswas store
- Asha beauty parlour
- Saloon
- Brahmaputra multi utility service
- Safayat dry cleaner

4.3 Objectives of the study

The significance of energy audit comes to the light due to the fact that electricity bill of Tezpur university commercial areas had crossed Rs 1449737.00 in January, 2017 and that has increased over the year. The main objective is to obtain a clear and detailed idea of the various end use of energy consumption activities involved. Another target is to save electrical energy consumption to some extent. It also helped the students get a clear picture practical situations and problems faced during energy survey and audit. So, to sum it all up we can say that the 3 main objectives were:

- To survey the electrical consumption in different utilities inside Tezpur university campus.
- To calculate the energy consumption pattern in different utilities.
- To find out the major energy consuming areas of the commercial areas
- To find out some energy saving possibilities in these utilities.

4.4 Energy scenario

The types of energy consumed in this area of the university campus are electrical energy and LPG. In this audit we will take into account only the electrical energy. The campus had a connected load of 2.0 MW. The Tezpur university bill for the commercial areas recorded a total of Rs. 1449737.00 in 2017. The electricity bill consists of the energy consumed (per kWh or per energy consumed) and the other part is the summation of different charges which include energy charge, fixed charge, E.D charge etc. The pattern of energy consumption in the commercial areas of the university is very different than that of the household consumption pattern. For example, in a fast-food stall there is continuous use of induction plates, burners, mixer grinders and other electrical appliances but at a household system there is intermittent use of almost every appliance and so the pattern of energy consumption is quite different in these two areas. The different appliances that are being used in the commercial areas of the university campus along with their prescribed ratings are given below.

Table 4.1 Appliances used and their rating (watt)

Device	Rating (in watt)
5 Ampere sockets	100
15 Ampere sockets	1000
Incandescent light	60/40/100
Florescent light	16/34
CFLs	8/11/15/18/36
LED light	3/6/8/10/11/18/36
Fan	70
Exhaust fan	35/46
Air conditioner (1.5 ton)	2000
Air conditioner (2 ton)	2500
Oven	2400
Refrigerator	200
Induction plate	1200-1800
Mixer grinder	550-750
ATM machine	700
Laptop	60
Table fan	55-100
Sugarcane juicer	400
Fly trap	30

ELECTRICAL APPLIANCE	TOTAL NUMBER OF APPLIANCE
Lights (all types)	139
Fans	71
Mixer grinder	9
Sugarcane juicer	1
Induction plate	4
Oven	9
Refrigerator	15
Fly trap	4
Laptop	2
Desktop	7
ATM machine	6
Air conditioner	8

4.5 Methodology

Here we shall discuss the methods and procedures involved while doing this audit. In order to complete the energy audit, various steps were taken one by one which we shall discuss now point wise. In this step, a survey through the area was carried out to get the idea of the pattern, appliances etc. of electricity consumption. In the walk-through survey we have to take down every bit of information related to energy consumption. Before starting a walk through, we have to keep a copy and pen ready as we might miss out many important information. During this step we have to take into account the amount of operation hour of each area precisely and which areas or equipment consumes the maximum energy. While visiting the areas, we have to meet the owner or manager of that area to gather more information about the energy usage,

appliances, operation hours etc. This step is included under preliminary audit. After completion of the previous step i.e. the walk-through survey, the next step is the measurement of energy consumption in different areas. In this step required data was collected from the powerhouse of Tezpur university and manually by taking readings from meter box. We were taught how to calculate the total bill of the electricity consumed step by step. There are many charges included along with the unit of electricity consumed. The calculation will be explained later after the completion of all the required steps. In this step we go through the conditions of all the major equipment, switch boards their functioning quality, efficiency etc. This is a very important step as we will be able to give some remedial measures based on those observations. This can be very beneficial in saving electricity too. The calculated electricity cost for the year 2017 for all the commercial areas are collected and January 2017 data is listed below.

JANUARY 2017 (in Rs)

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	5032	20	8.56	256.8	508.4	754.8	6589
SBI ATM	37400	20	2.06	61.8	1931.8	5610	45278.6
PNB	55624	20	8.324	249.72	3030.92	8343.6	67657.24
PNB ATM	51544	20	10.502	315.06	2892.26	7731.6	62861.92
POST OFFICE	8024	20	2	60	461.2	1203.6	9807.8
AXIS BANK ATM	13736	20	2.08	62.4	749.2	2060.4	16709
DIKSHA FAST FOOD	56848	20	2.94	88.2	2930.6	8527.2	68812
KAMDHENU	56576	20	1.775	53.25	2882.05	8486.4	68413.7
MOMO STALL	8024	20	0.1	3	404.2	1203.6	9693.8
JUICE CENTRE 1	17816	20	0.29	8.7	899.5	2672.4	21527.6
CHAAT HOUSE & VEG	1224	20	0.12	3.6	64.8	183.6	1485
NEERAJ COMUTER	11424	20	0.7	21	592.2	1713.6	13834.8
JUICE CENTRE2	15640	20	0.4	12	794	2346	18907
AMENITIES	94520	20	2.16	64.8	4790.8	14178	114248.6
CAFETARIA	84320	20	4.2	126	4342	12648	102056
ESSENTIAL	82824	20	2.065	61.95	4203.15	12423.6	100121.7
KF	184008	20	3.96	118.8	9319.2	27601.2	222400.2
KALITA FOOD CORNER	48552	20	0.4	12	2439.6	7282.8	58643.4
KF SBI ATM	41616	20	2.09	62.7	2143.5	6242.4	50370.6
BIDDYA MANDIR	5712	20	0.265	7.95	293.55	856.8	6912.3
GOPI PROV. STORE	15232	20	0.56	16.8	778.4	2284.8	18424
HARIDAS BISWAS	5576	20	1.89	56.7	335.5	836.4	6845.6
ASHA BEAUTY PARLOUR	2720	20	0.273	8.19	144.19	408	3300.38
SALOON	3808	20	0.57	17.1	207.5	571.2	4631.8
BRAHMAPUTRA SERVICE	9248	20	0.47	14.1	476.5	1387.2	11193.8
SAFAYAT DRY CLEANER	1632	20	0.33	9.9	91.5	244.8	1990.2

4.6 Detailed explanation of the methodology

The electricity bill has been calculated by us step wise. There are many types of charges involved. Various steps were involved in calculating the total consumption bill which are explained in detail below:

- **Meter count:** The meter count is the difference between the present meter reading and the previous meter reading. To make this clear, we will try explaining this with the help of an example.
Example: If we want to calculate the meter count for the month of February 2017 for SBI, we will have to consider the January reading as 'previous meter reading' and the February meter reading as the 'present meter reading'.
- **CT Ratio:** Current transformers, or CTs, are transformers used to step down the current level of high-power transmission systems to measure or monitor the current levels. CTs are required because standard current measuring devices are not configured to measure high-current levels. Therefore, engineers use CTs to step down the current levels to measure it. The CT ratio is the ratio of primary current input to secondary current output at full load.
For example, a CT with a ratio of 100:5 is rated for 100 primary amps at full load and will produce 5 amps of secondary current when 100 A flow through the primary.
For the commercial areas of Tezpur university campus, the CT Ratio is 100:5 which gives us a calculated CT Ratio of 20A.
- **Rate:** It is the money that is charged for the consumption of 1 unit of electricity. The rate for 1 unit of electricity in Tezpur university is Rs. 6.8.
- **Energy charge:** Another charge that is included in the calculation is the energy charge. This is the per unit electricity charge that you pay on your bill. It is mostly defined slab wise and the cost increases as units on electricity bill increases. It can also be defined as the product of the meter count, the calculated CT Ratio and the rate.
- **Meter rent:** Rent that you pay for having meter at your home. Rates are different for single phase and three phase connections.
For our calculations the meter rent considered is Rs. 20.
- **Fixed charge:** Fixed charge, a part of the bill, is the cost a consumer must pay even if the person does not use any unit of power. This is mostly dependent on the connected load that the utility provides you. Connected load is typically calculated as sum of wattage of all the appliances that you have at your home. The utility allocates this much amount of electricity for your home and that is why the fixed charge is applicable.
- **Electricity Duty charge:** As a substitute to cross subsidy the Tariff Policy gives option to State Government to raise resources through mechanism of electricity duty and giving direct subsidy to only needy consumers. This is thought to be a better way of targeting subsidies effectively. Electricity duty is charged at different rates for different categories of consumers. Collection of electricity duty ensures that government can manage all finances related to the subsidies that are provided to needy customers for use of electricity. This is the government tax for using electricity. Duty is applicable per unit of electricity consumption and tax is applied on the whole bill amount.
- **Other charges:** It can be defined as the charge that is 15% of the energy charge.
- **Total charge:** It is the summation of all the charges to give us the total electricity consumption bill.

Annual consumption of electricity in the commercial areas (in the year 2017)

BUILDINGS	CONSUMPTION (kWh)
SBI	40498
SBI ATM	368599
PNB	876127
PNB ATM	774741
POST OFFICE	168059
AXIS BANK ATM	64240
DIKSHA FAST FOOD	500945
KAMDHENU	365560
MOMO STALL	16833
JUICE CENTRE 1	18568
CHAAT HOUSE & VEG	90500
NEERAJ COMUTER	56002
JUICE CENTRE2	133911
AMENITIES	116957
CAFETARIA	661614
ESSENTIAL	729734
KF	569497
KALITA FOOD CORNER	41607
KF SBI ATM	52469
BIDDYA MANDIR	131012
GOPI PROVISIONAL STORE	264302
HARIDAS BISWAS	106304
ASHA BEAUTY PARLOUR	20648
SALOON	33036
BRAHMAPUTRA SERVICE	72895
SAFAYAT DRY CLEANER	6008

Therefore, it is seen from above table that Punjab National Bank consumes the maximum amount of electricity and Safayat Dry cleaner consumes the least amount of electricity. The Luxmeter reading was highest in SBI ATM and the reading was lowest in Safayat Dry cleaner.

SBI ATM	198 LUX
Safayat Dry cleaner	29 LUX

4.8 Comparison of summer and winter electricity consumption

The consumption pattern of electricity is quite different in the summer season and in the winter season in household sector. India being a tropical country experiences hot summers and moderate winters. People of India couldn't help but use fans, ac, coolers etc. on long hourly usage on a daily basis. But in the winter too the energy demand rises high due the various reasons. The commercial areas energy consumption pattern is a bit different than that of the household area. This will be explained with the help of an example: Consider a house irrespective of its size or the number of family members in it. During the summer season they will use more hours of refrigerators, ACs, fans, coolers etc. along with their daily energy

consumption, while in winters this extra usage of energy is cut off. The winters of India is moderate excluding a few hilly areas and high-altitude areas of the country. So, majority of the population do not use electric heaters, geysers, electric blankets etc. But when we picture the same seasonal situation in a commercial area, it seems different. Irrespective of the season they will have to use the same amount of energy for running their shops, industries etc. excluding the off season. If we go to an AC restaurant, we will notice that the AC always on irrespective of the weather being cold or hot because that is included under their service tax and they will have to provide it no matter what. So, we have seen the difference between different sectors of electricity usage. But it is still not an accurate assumption and depends on various factors which are always variable.

4.9 Remedies for energy conservation in commercial areas

Running a business can be a difficult venture. It can become even more difficult when you consider the different types of costs you'll run into when you're starting up. Employee salaries, benefits, products, rental space and much more – all of these factors can impact your budget and will have to be taken into consideration when you're creating and running your business. However, something many people don't consider is the cost of energy and efficiency when you're operating. After the energy audit, now we can focus on the main purpose of why the energy audit was carried out. Following are few remedies that I could come up with in order to conserve energy.

- A. Energy Audit:** This is an obvious remedy because we need to understand the energy consumption pattern and all the details related to it. This can be considered as the first step of conserving energy. Nothing gets the heart racing like the word "audit." While this may not sound like a good thing at first, when it comes to your business energy costs and usage, it really is. Most utility companies offer free business energy audits to their commercial customers. They can help you figure out where your money is going every month, how to increase energy efficiency and where you can make adjustments to lower your electric bill.
- B. Turning off electronic appliances when not in use:** This one may seem pretty obvious, but you'd be surprised how much juice all those computers, monitors, printers and more consume sitting unused but left on. By making sure they're in "sleep mode" or turned off completely overnight, you won't be paying for electricity you're not even using. Make it someone's nightly routine to take a quick tour of the office and flip the OFF switch on idle equipment. That goes for breakroom devices like microwaves, coffeemakers, radios and TVs, too. Make sure these energy vampires are plugged into a single power strip, so they can be turned off all at once on the way out the door.

- C. Proper position of lights and fans:** This might seem like a unconventional step but it is a very useful one in saving those extra units of electricity. For example, in a small shop if the lights are positioned poorly and cramped close it would give the same amount of illuminance compared to when they are positioned in the centre of the area with ample open space. Thus, this simple step would reduce the electricity bill to and also add to the aesthetic appeal of the place instead of being a cramped hole.
- D. Using more efficient appliances:** When it comes time to buy new office equipment, be sure to look for the Energy Star logo. Energy Star-labelled computers, monitors, printers, fax machines, scanners and copiers can run much more efficiently and automatically power down during extended inactivity. That gives you the chance to save 50% or more in energy use on these power-hungry devices. And if your old heater or air conditioner is not working at maximum efficiency, it could draw unnecessary power, which also costs you money. Replace those old heaters and AC units with Energy Star models.
- E. Using CFLs and LEDs:** This is one place where saving a little bit in a lot of places can really add up. Replacing a single 60-watt bulb with an 18-watt energy-efficient bulb that's on for 10 hours a day can easily save a business \$1 or more each month. Multiply that out to an entire year—and by the hundreds (if not thousands) of bulbs in your business—and we're talking some serious savings. Energy-efficient bulbs aren't just a smart way to lower your electric bill in the short term. Their extended service life will help you save in the long-term, too. Energy Star LED light bulbs not only use at least 75% less energy, they can last 50 times longer than the average incandescent—up to 20 years.
- F. Opting for renewable sources of energy:** Using commercial renewable energy sources, such as solar and wind, to power some or all your business can help lower your business energy costs over time. It also generates power that's free of harmful CO₂ emissions and other greenhouse gases. Based on several factors, there may never be a better time to invest in solar (or other sources of clean energy) to get the energy your business needs and pay less over the long term.
- G. Opting for natural light:** We should make use of the sunlight during daytime as much as possible. Open the blinds around your workspaces to make the best use of daylight—and take advantage of skylights or other natural light sources to reduce your lighting needs during daytime hours. It's also worthwhile to see if there are areas of your office that are overly lit and remove lighting that may not be necessary.

CHAPTER 5

CONCLUSIONS

Energy resources are limited. India has approximately 1% of world's energy resources but it has 16% of world population. Most of the energy sources we use cannot be reused and renewed - Non renewable energy sources constitute 80% of the fuel use. It is said that our energy resources may last only for another 40 years or so. We save our money when we save energy when we save one unit of energy, it is equivalent to 2 units of energy produced. Save energy to reduce pollution - Energy production and use account to large proportion of air pollution and more than 83 percent of greenhouse gas emission.

The conclusion drawn from this energy audit studies are that the energy demand and usage varies in all the three areas significantly. The highest consumption at the Departments is found in MBBT and lowest in the Department of Energy. Nilachal Men's Hostel consumes the highest amount of electricity and lowest was in the CV Raman Hostel. Punjab National Bank consumes the highest amount of Electricity while Safayat Dry Cleaner consumes the lowest in case for the commercial establishment at the campus. It is observed by analysing the different utilities of the Tezpur University campus that there is a huge consumption of electricity as well as wastage. So, it will be beneficial if the necessary energy efficiency measures are implemented to reduce the energy consumption.

Annexure

Energy Bill Data for Commercial Establishments

JANUARY 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	5032	20	8.56	256.8	508.4	754.8	6589
SBI ATM	37400	20	2.06	61.8	1931.8	5610	45278.6
PNB	55624	20	8.324	249.72	3030.92	8343.6	67657.24
PNB ATM	51544	20	10.502	315.06	2892.26	7731.6	62861.92
POST OFFICE	8024	20	2	60	461.2	1203.6	9807.8
AXIS BANK ATM	13736	20	2.08	62.4	749.2	2060.4	16709
DIKSHA FAST FOOD	56848	20	2.94	88.2	2930.6	8527.2	68812
KAMDHENU	56576	20	1.775	53.25	2882.05	8486.4	68413.7
MOMO STALL	8024	20	0.1	3	404.2	1203.6	9693.8
JUICE CENTRE 1	17816	20	0.29	8.7	899.5	2672.4	21527.6
CHAAT HOUSE & VEG	1224	20	0.12	3.6	64.8	183.6	1485
NEERAJ COMUTER	11424	20	0.7	21	592.2	1713.6	13834.8
JUICE CENTRE2	15640	20	0.4	12	794	2346	18907
AMENITIES	94520	20	2.16	64.8	4790.8	14178	114248.6
CAFETARIA	84320	20	4.2	126	4342	12648	102056
ESSENTIAL	82824	20	2.065	61.95	4203.15	12423.6	100121.7
KF	184008	20	3.96	118.8	9319.2	27601.2	222400.2
KALITA CORNER	48552	20	0.4	12	2439.6	7282.8	58643.4
KF SBI ATM	41616	20	2.09	62.7	2143.5	6242.4	50370.6
BIDDYA MANDIR	5712	20	0.265	7.95	293.55	856.8	6912.3
GOPI PROV. STORE	15232	20	0.56	16.8	778.4	2284.8	18424
HARIDAS BISWAS	5576	20	1.89	56.7	335.5	836.4	6845.6
BEAUTY PARLOUR	2720	20	0.273	8.19	144.19	408	3300.38
SALOON	3808	20	0.57	17.1	207.5	571.2	4631.8
BRAH. SERVICE	9248	20	0.47	14.1	476.5	1387.2	11193.8
DRY CLEANER	1632	20	0.33	9.9	91.5	244.8	1990.2

FEBRUARY 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	5576	20	8.56	256.8	535.6	836.4	7245.8
SBI ATM	47600	20	2.06	61.8	2441.8	7140	57593.6
PNB	80240	20	8.324	249.72	4261.72	12036	97377.44
PNB ATM	46240	20	10.502	315.06	2627.06	6936	56458.12
POST OFFICE	14144	20	2	60	767.2	2121.6	17196.8
AXIS BANK ATM	37808	20	2.08	62.4	1952.8	5671.2	45772.4
DIKSHA FAST FOOD	56168	20	2.94	88.2	2896.6	8425.2	67991
KAMDHENU	56032	20	1.775	53.25	2854.85	8404.8	67756.9
MOMO STALL	7344	20	0.1	3	370.2	1101.6	8872.8
JUICE CENTRE 1	18632	20	0.29	8.7	940.3	2794.8	22512.8
CHAAT HOUSE & VEG	2040	20	0.12	3.6	105.6	306	2470.2
NEERAJ COMUTER	17544	20	0.7	21	898.2	2631.6	21223.8
JUICE CENTRE2	63376	20	0.4	12	3180.8	9506.4	76541.2
AMENITIES	59568	20	2.16	64.8	3043.2	8935.2	72049.2
CAFETARIA	87856	20	4.2	126	4518.8	13178.4	106325.2
ESSENTIAL	54400	20	2.065	61.95	2781.95	8160	65803.9
KF	145792	20	3.96	118.8	7408.4	21868.8	176260
KALITA CORNER	19720	20	0.4	12	998	2958	23833
KF SBI ATM	70176	20	2.09	62.7	3571.5	10526.4	84852.6
BIDDYA MANDIR	6256	20	0.265	7.95	320.75	938.4	7569.1
GOPI PROV STORE	17680	20	0.56	16.8	900.8	2652	21379.6
HARIDAS BISWAS	5576	20	1.89	56.7	335.5	836.4	6845.6
ASHA BEAUTY PARLOUR	2992	20	0.273	8.19	157.79	448.8	3628.78
SALOON	6256	20	0.57	17.1	329.9	938.4	7587.4
BRAHMAPUTRA SERVICE	24480	20	0.47	14.1	1238.1	3672	29584.2
SAFAYAT DRY CLEANER	1904	20	0.33	9.9	105.1	285.6	2318.6

March 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	5576	20	8.56	256.8	535.6	836.4	7245.8
SBI ATM	47600	20	2.06	61.8	2441.8	7140	57593.6
PNB	80240	20	8.324	249.72	4261.72	12036	97377.44
PNB ATM	46240	20	10.502	315.06	2627.06	6936	56458.12
POST OFFICE	14144	20	2	60	767.2	2121.6	17196.8
AXIS BANK ATM	37808	20	2.08	62.4	1952.8	5671.2	45772.4
DIKSHA FAST FOOD	56168	20	2.94	88.2	2896.6	8425.2	67991
KAMDHENU	56032	20	1.775	53.25	2854.85	8404.8	67756.9
MOMO STALL	7344	20	0.1	3	370.2	1101.6	8872.8
JUICE CENTRE 1	18632	20	0.29	8.7	940.3	2794.8	22512.8
CHAAT HOUSE & VEG	2040	20	0.12	3.6	105.6	306	2470.2
NEERAJ COMUTER	17544	20	0.7	21	898.2	2631.6	21223.8
JUICE CENTRE2	63376	20	0.4	12	3180.8	9506.4	76541.2
AMENETIES	59568	20	2.16	64.8	3043.2	8935.2	72049.2
CAFETARIA	87856	20	4.2	126	4518.8	13178.4	106325.2
ESSENTIAL	54400	20	2.065	61.95	2781.95	8160	65803.9
KF	145792	20	3.96	118.8	7408.4	21868.8	176260
KALITA CORNER	19720	20	0.4	12	998	2958	23833
KF SBI ATM	70176	20	2.09	62.7	3571.5	10526.4	84852.6
BIDDYA MANDIR	6256	20	0.265	7.95	320.75	938.4	7569.1
GOPI PROV STORE	17680	20	0.56	16.8	900.8	2652	21379.6
HARIDAS BISWAS	5576	20	1.89	56.7	335.5	836.4	6845.6
ASHA BEAUTY PARLOUR	2992	20	0.273	8.19	157.79	448.8	3628.78
SALOON	6256	20	0.57	17.1	329.9	938.4	7587.4
BRAHMAPUTRA SERVICE	24480	20	0.47	14.1	1238.1	3672	29584.2
SAFAYAT DRY CLEANER	1904	20	0.33	9.9	105.1	285.6	2318.6

April 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	11288	20	8.56	256.8	821.2	1693.2	14142.2
SBI ATM	125120	20	2.06	61.8	6317.8	18768	151187.6
PNB	80240	20	8.324	249.72	4261.72	12036	97377.44
PNB ATM	46240	20	10.502	315.06	2627.06	6936	56458.12
POST OFFICE	14144	20	2	60	767.2	2121.6	17196.8
AXIS BANK ATM	1881560	20	2.08	62.4	94015.6	282234	2271582.2
DIKSHA FAST FOOD	123080	20	2.94	88.2	6242.2	18462	148777.4
KAMDHENU	121856	20	1.775	53.25	6146.05	18278.4	147229.7
MOMO STALL	25432	20	0.1	3	1274.6	3814.8	30711.4
JUICE CENTRE 1	16320	20	0.29	8.7	824.7	2448	19721.4
CHAAT HOUSE & VEG	8976	20	0.12	3.6	452.4	1346.4	10844.4
NEERAJ COMUTER	27744	20	0.7	21	1408.2	4161.6	33538.8
JUICE CENTRE2	33456	20	0.4	12	1684.8	5018.4	40417.2
AMENETIES	32368	20	2.16	64.8	1683.2	4855.2	39209.2
CAFETARIA	182512	20	4.2	126	9251.6	27376.8	220608.4
ESSENTIAL	156536	20	2.065	61.95	7888.75	23480.4	189118.1
KF	529312	20	3.96	118.8	26584.4	79396.8	639304
KALITA CORNER	15504	20	0.4	12	787.2	2325.6	18742.8
KF SBI ATM	65552	20	2.09	62.7	3340.3	9832.8	79269.8
BIDDYA MANDIR	23664	20	0.265	7.95	1191.15	3549.6	28586.7
GOPI PROV STORE	38624	20	0.56	16.8	1948	5793.6	46666.4
HARIDAS BISWAS	13192	20	1.89	56.7	716.3	1978.8	16040.8
ASHA BEAUTY PARLOUR	4896	20	0.273	8.19	252.99	734.4	5927.58
SALOON	10472	20	0.57	17.1	540.7	1570.8	12677.6
BRAHMAPUTRA SERVICE	29240	20	0.47	14.1	1476.1	4386	35331.2
SAFAYAT DRY CLEANER	4624	20	0.33	9.9	241.1	693.6	5602.6

MAY 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	7480	20	8.56	256.8	630.8	1122	9544.6
SBI ATM	80648	20	2.06	61.8	4094.2	12097.2	97494.2
PNB	297704	20	8.324	249.72	15134.92	44655.6	359933.24
PNB ATM	88264	20	10.502	315.06	4728.26	13239.6	107195.92
POST OFFICE	25840	20	2	60	1352	3876	31318
AXIS BANK ATM	59976	20	2.08	62.4	3061.2	8996.4	72537
DIKSHA FAST FOOD	67864	20	2.94	88.2	3481.4	10179.6	82112.2
KAMDHENU	57528	20	1.775	53.25	2929.65	8629.2	69563.1
MOMO STALL	16864	20	0.1	3	846.2	2529.6	20366.8
JUICE CENTRE 1	16184	20	0.29	8.7	817.9	2427.6	19557.2
CHAAT HOUSE & VEG	5848	20	0.12	3.6	296	877.2	7067.8
NEERAJ COMUTER	21080	20	0.7	21	1075	3162	25493
JUICE CENTRE2	75072	20	0.4	12	3765.6	11260.8	90662.4
AMENETIES	11152	20	2.16	64.8	622.4	1672.8	13594
CAFETARIA	116824	20	4.2	126	5967.2	17523.6	141299.8
ESSENTIAL	43112	20	2.065	61.95	2217.55	6466.8	52175.3
KF	371416	20	3.96	118.8	18689.6	55712.4	448667.8
KALITA CORNER	9928	20	0.4	12	508.4	1489.2	12010.6
KF SBI ATM	31280	20	2.09	62.7	1626.7	4692	37891.4
BIDDYA MANDIR	11832	20	0.265	7.95	599.55	1774.8	14301.3
GOPI PROV STORE	33456	20	0.56	16.8	1689.6	5018.4	40426.8
HARIDAS BISWAS	7344	20	1.89	56.7	423.9	1101.6	8980.2
ASHA BEAUTY PARLOUR	3536	20	0.273	8.19	184.99	530.4	4285.58
SALOON	4488	20	0.57	17.1	241.5	673.2	5452.8
BRAHM SERVICE	1360	20	0.47	14.1	82.1	204	1670.2
SAFAYAT DRY CLEANER	2992	20	0.33	9.9	159.5	448.8	3632.2

June 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	6936	20	8.56	256.8	603.6	1040.4	8887.8
SBI ATM	50320	20	2.06	61.8	2577.8	7548	60877.6
PNB	148240	20	8.324	249.72	7661.72	22236	179477.44
PNB ATM	39440	20	10.502	315.06	2287.06	5916	48248.12
POST OFFICE	9792	20	2	60	549.6	1468.8	11942.4
AXIS BANK ATM	34000	20	2.08	62.4	1762.4	5100	41174.8
DIKSHA FAST FOOD	58208	20	2.94	88.2	2998.6	8731.2	70454
KAMDHENU	46648	20	1.775	53.25	2385.65	6997.2	56427.1
MOMO STALL	6800	20	0.1	3	343	1020	8216
JUICE CENTRE 1	5440	20	0.29	8.7	280.7	816	6585.4
CHAAT HOUSE & VEG	952	20	0.12	3.6	51.2	142.8	1156.6
NEERAJ COMUTER	16320	20	0.7	21	837	2448	19746
JUICE CENTRE2	12920	20	0.4	12	658	1938	15623
AMENETIES	33728	20	2.16	64.8	1751.2	5059.2	40851.2
CAFETARIA	64464	20	4.2	126	3349.2	9669.6	78082.8
ESSENTIAL	136952	20	2.065	61.95	6909.55	20542.8	165473.3
KF	61336	20	3.96	118.8	3185.6	9200.4	74291.8
KALITA CORNER	14688	20	0.4	12	746.4	2203.2	17757.6
KF SBI ATM	14008	20	2.09	62.7	763.1	2101.2	17038
BIDDYA MANDIR	6936	20	0.265	7.95	354.75	1040.4	8390.1
GOPI PROV STORE	27200	20	0.56	16.8	1376.8	4080	32873.6
HARIDAS BISWAS	6120	20	1.89	56.7	362.7	918	7502.4
ASHA BEAUTY PARLOUR	3264	20	0.273	8.19	171.39	489.6	3957.18
SALOON	5440	20	0.57	17.1	289.1	816	6602.2
BRAHM SERVICE	5576	20	0.47	14.1	292.9	836.4	6760.4
SAFAYAT DRY CLEANER	2720	20	0.33	9.9	145.9	408	3303.8

July 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	9248	20	8.56	256.8	719.2	1387.2	11679.2
SBI ATM	89488	20	2.06	61.8	4536.2	13423.2	108167.2
PNB	242760	20	8.324	249.72	12387.72	36414	293596.44
PNB ATM	55896	20	10.502	315.06	3109.86	8384.4	68116.32
POST OFFICE	27880	20	2	60	1454	4182	33781
AXIS BANK ATM	119816	20	2.08	62.4	6053.2	17972.4	144785
DIKSHA FAST FOOD	91120	20	2.94	88.2	4644.2	13668	110190.4
KAMDHENU	83232	20	1.775	53.25	4214.85	12484.8	100596.9
MOMO STALL	25704	20	0.1	3	1288.2	3855.6	31039.8
JUICE CENTRE 1	20672	20	0.29	8.7	1042.3	3100.8	24975.8
CHAAT HOUSE & VEG	13736	20	0.12	3.6	690.4	2060.4	16591.4
NEERAJ COMUTER	16320	20	0.7	21	837	2448	19746
JUICE CENTRE2	6664	20	0.4	12	345.2	999.6	8069.8
AMENETIES	26928	20	2.16	64.8	1411.2	4039.2	32641.2
CAFETARIA	183872	20	4.2	126	9319.6	27580.8	222250.4
ESSENTIAL	18224	20	2.065	61.95	973.15	2733.6	22126.7
KF	537064	20	3.96	118.8	26972	80559.6	648663.4
KALITA CORNER	42840	20	0.4	12	2154	6426	51747
KF SBI ATM	51408	20	2.09	62.7	2633.1	7711.2	62193
BIDDYA MANDIR	21216	20	0.265	7.95	1068.75	3182.4	25631.1
GOPI PROV STORE	17000	20	0.56	16.8	866.8	2550	20558.6
HARIDAS BISWAS	18224	20	1.89	56.7	967.9	2733.6	22116.2
ASHA BEAUTY PARLOUR	3264	20	0.273	8.19	171.39	489.6	3957.18
SALOON	6800	20	0.57	17.1	357.1	1020	8244.2
BRAHM SERVICE	13600	20	0.47	14.1	694.1	2040	16448.2
SAFAYAT DRY CLEANER	2584	20	0.33	9.9	139.1	387.6	3139.6

August 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	9656	20	8.56	256.8	739.6	1448.4	12171.8
SBI ATM	71944	20	2.06	61.8	3659	10791.6	86985.4
PNB	235688	20	8.324	249.72	12034.12	35353.2	285058.04
PNB ATM	65824	20	10.502	315.06	3606.26	9873.6	80102.92
POST OFFICE	27200	20	2	60	1420	4080	32960
AXIS BANK ATM	129880	20	2.08	62.4	6556.4	19482	156935.8
DIKSHA FAST FOOD	114648	20	2.94	88.2	5820.6	17197.2	138597
KAMDHENU	109752	20	1.775	53.25	5540.85	16462.8	132615.9
MOMO STALL	35088	20	0.1	3	1757.4	5263.2	42369.6
JUICE CENTRE 1	11832	20	0.29	8.7	600.3	1774.8	14302.8
CHAAT HOUSE & VEG	14144	20	0.12	3.6	710.8	2121.6	17084
NEERAJ COMUTER	8160	20	0.7	21	429	1224	9894
JUICE CENTRE2	15640	20	0.4	12	794	2346	18907
AMENETIES	53992	20	2.16	64.8	2764.4	8098.8	65317
CAFETARIA	-22304	20	4.2	126	-989.2	-3345.6	-26676.8
ESSENTIAL	153816	20	2.065	61.95	7752.75	23072.4	185834.1
KF	77248	20	3.96	118.8	3981.2	11587.2	93503.2
KALITA CORNER	27880	20	0.4	12	1406	4182	33685
KF SBI ATM	17408	20	2.09	62.7	933.1	2611.2	21143
BIDDYA MANDIR	40800	20	0.265	7.95	2047.95	6120	49275.9
GOPI PROV STORE	23392	20	0.56	16.8	1186.4	3508.8	28276
HARIDAS BISWAS	6936	20	1.89	56.7	403.5	1040.4	8487.6
ASHA BEAUTY PARLOUR	5984	20	0.273	8.19	307.39	897.6	7241.18
SALOON	8160	20	0.57	17.1	425.1	1224	9886.2
BRAHM SERVICE	11152	20	0.47	14.1	571.7	1672.8	13492.6
SAFAYAT DRY CLEANER	2584	20	0.33	9.9	139.1	387.6	3139.6

September 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	8160	20	8.56	256.8	664.8	1224	10365.6
SBI ATM	40800	20	2.06	61.8	2101.8	6120	49383.6
PNB	193120	20	8.324	249.72	9905.72	28968	233663.44
PNB ATM	43112	20	10.502	315.06	2470.66	6466.8	52681.52
POST OFFICE	17816	20	2	60	950.8	2672.4	21630.2
AXIS BANK ATM	88808	20	2.08	62.4	4502.8	13321.2	107347.4
DIKSHA FAST FOOD	79696	20	2.94	88.2	4073	11954.4	96397.6
KAMDHENU	80240	20	1.775	53.25	4065.25	12036	96984.5
MOMO STALL	19584	20	0.1	3	982.2	2937.6	23650.8
JUICE CENTRE 1	12376	20	0.29	8.7	627.5	1856.4	14959.6
CHAAT HOUSE & VEG	31008	20	0.12	3.6	1554	4651.2	37444.8
NEERAJ COMUTER	30056	20	0.7	21	1523.8	4508.4	36330.2
JUICE CENTRE2	28152	20	0.4	12	1419.6	4222.8	34013.4
AMENETIES	17272	20	2.16	64.8	928.4	2590.8	20983
CAFETARIA	81736	20	4.2	126	4212.8	12260.4	98936.2
ESSENTIAL	63512	20	2.065	61.95	3237.55	9526.8	76805.3
KF	231200	20	3.96	118.8	11678.8	34680	279377.6
KALITA CORNER	16456	20	0.4	12	834.8	2468.4	19892.2
KF SBI ATM	23528	20	2.09	62.7	1239.1	3529.2	28532
BIDDYA MANDIR	19992	20	0.265	7.95	1007.55	2998.8	24153.3
GOPI PROV STORE	20808	20	0.56	16.8	1057.2	3121.2	25156.2
HARIDAS BISWAS	20944	20	1.89	56.7	1103.9	3141.6	25400.2
ASHA BEAUTY PARLOUR	4488	20	0.273	8.19	232.59	673.2	5434.98
SALOON	8296	20	0.57	17.1	431.9	1244.4	10050.4
BRAHM SERVICE	9792	20	0.47	14.1	503.7	1468.8	11850.6
SAFAYAT DRY CLEANER	1904	20	0.33	9.9	105.1	285.6	2318.6

October 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	6528	20	8.56	256.8	583.2	979.2	8395.2
SBI ATM	46376	20	2.06	61.8	2380.6	6956.4	56115.8
PNB	111520	20	8.324	249.72	5825.72	16728	135143.44
PNB ATM	67592	20	10.502	315.06	3694.66	10138.8	82237.52
POST OFFICE	11696	20	2	60	644.8	1754.4	14241.2
AXIS BANK ATM	62560	20	2.08	62.4	3190.4	9384	75656.8
DIKSHA FAST FOOD	78472	20	2.94	88.2	4011.8	11770.8	94919.8
KAMDHENU	73848	20	1.775	53.25	3745.65	11077.2	89267.1
MOMO STALL	11696	20	0.1	3	587.8	1754.4	14127.2
JUICE CENTRE 1	16184	20	0.29	8.7	817.9	2427.6	19557.2
CHAAT HOUSE & VEG	10472	20	0.12	3.6	527.2	1570.8	12650.6
NEERAJ COMUTER	26656	20	0.7	21	1353.8	3998.4	32225.2
JUICE CENTRE2	18904	20	0.4	12	957.2	2835.6	22847.8
AMENETIES	17952	20	2.16	64.8	962.4	2692.8	21804
CAFETARIA	42432	20	4.2	126	2247.6	6364.8	51482.4
ESSENTIAL	15096	20	2.065	61.95	816.75	2264.4	18350.1
KF	277984	20	3.96	118.8	14018	41697.6	335862.4
KALITA CORNER	14688	20	0.4	12	746.4	2203.2	17757.6
KF SBI ATM	18360	20	2.09	62.7	980.7	2754	22292.4
BIDDYA MANDIR	10880	20	0.265	7.95	551.95	1632	13151.9
GOPI PROV STORE	22712	20	0.56	16.8	1152.4	3406.8	27455
HARIDAS BISWAS	9112	20	1.89	56.7	512.3	1366.8	11114.8
ASHA BEAUTY PARLOUR	2992	20	0.273	8.19	157.79	448.8	3628.78
SALOON	8024	20	0.57	17.1	418.3	1203.6	9722
BRAHM SERVICE	9384	20	0.47	14.1	483.3	1407.6	11358
SAFAYAT DRY CLEANER	4760	20	0.33	9.9	247.9	714	5766.8

November 2017

BUILDING	ENERGY CHARGE	METER RENT	LOAD	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	4624	20	8.56	256.8	488	693.6	6096.4
SBI ATM	36720	20	2.06	61.8	1897.8	5508	44457.6
PNB	80104	20	8.324	249.72	4254.92	12015.6	97213.24
PNB ATM	18496	20	10.502	315.06	1239.86	2774.4	22961.32
POST OFFICE	20400	20	2	60	1080	3060	24750
AXIS BANK ATM	33728	20	2.08	62.4	1748.8	5059.2	40846.4
DIKSHA FAST FOOD	47328	20	2.94	88.2	2454.6	7099.2	57318
KAMDHENU	45560	20	1.775	53.25	2331.25	6834	55113.5
MOMO STALL	15504	20	0.1	3	778.2	2325.6	18724.8
JUICE CENTRE 1	9384	20	0.29	8.7	477.9	1407.6	11347.2
CHAAT HOUSE & VEG	17000	20	0.12	3.6	853.6	2550	20532.2
NEERAJ COMUTER	19176	20	0.7	21	979.8	2876.4	23194.2
JUICE CENTRE2	40528	20	0.4	12	2038.4	6079.2	48955.6
AMENETIES	13736	20	2.16	64.8	751.6	2060.4	16713.8
CAFETARIA	9329600	20	4.2	126	466354	1399440	11263868
ESSENTIAL	21216	20	2.065	61.95	1122.75	3182.4	25739.1
KF	251600	20	3.96	118.8	12698.8	37740	304007.6
KALITA CORNER	11968	20	0.4	12	610.4	1795.2	14473.6
KF SBI ATM	30464	20	2.09	62.7	1585.9	4569.6	36906.2
BIDDYA MANDIR	5440	20	0.265	7.95	279.95	816	6583.9
GOPI PROV STORE	12648	20	0.56	16.8	649.2	1897.2	15304.2
HARIDAS BISWAS	24344	20	1.89	56.7	1273.9	3651.6	29505.2
ASHA BEAUTY PARLOUR	1360	20	0.273	8.19	76.19	204	1658.38
SALOON	8160	20	0.57	17.1	425.1	1224	9886.2
BRAHM SERVICE	7616	20	0.47	14.1	394.9	1142.4	9223.4
SAFAYAT DRY CLEANER	1768	20	0.33	9.9	98.3	265.2	2154.4

December 2017

BUILDING	ENERGY CHARGE	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL
SBI	4216	20	8460	8670.8	632.4	22010.2
SBI ATM	15504	20	2060	2835.2	2325.6	22838.8
PNB	87720	20	8324	12710	13158	122557
PNB ATM	49912	20	10502	12997.6	7486.8	81265.4
POST OFFICE	17136	20	2000	2856.8	2570.4	24689.2
AXIS BANK ATM	22984	20	2080	3229.2	3447.6	31909.8
DIKSHA FAST FOOD	52088	20	2940	5544.4	7813.2	68768.6
KAMDHENU	65824	20	1775	5066.2	9873.6	83022.8
MOMO STALL	18904	20	100	1045.2	2835.6	23023.8
JUICE CENTRE 1	16864	20	290	1133.2	2529.6	20940.8
CHAAT HOUSE & VEG	14688	20	50	784.4	2203.2	17833.6
NEERAJ COMUTER	15232	20	700	1461.6	2284.8	19790.4
JUICE CENTRE2	13736	20	400	1086.8	2060.4	17384.2
AMENETIES	56168	20	2160	4968.4	8425.2	72134.6
CAFETARIA	0	20	4200	4200	0	8400
ESSENTIAL	25704	20	2065	3350.2	3855.6	35163.8
KF	250104	20	3960	16465.2	37515.6	309883.8
KALITA CORNER	14824	20	400	1141.2	2223.6	18697.8
KF SBI ATM	47192	20	2090	4449.6	7078.8	61157.4
BIDDYA MANDIR	8840	20	60	502	1326	10793
GOPI PROV STORE	18360	20	560	1478	2754	23287
HARIDAS BISWAS	28560	20	1890	3318	4284	38262
ASHA BEAUTY PARLOUR	1088	20	273	327.4	163.2	1859.6
SALOON	21760	20	570	1658	3264	27412
BRAHM SERVICE	8024	20	470	871.2	1203.6	10627.8
SAFAYAT DRY CLEANER	1496	20	330	404.8	224.4	2466.2

Energy Bill Data for Hostels

January 2017

HOSTELS	PREV METER READ	PRESENT METER READ	DIFFERENCE	CT RATIO	RATE	ENERGY CHARGE	LOAD CONN	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL ELECTRICITY BILL	
					(rs/unit)	(in rs.)	(in KW)	(in rs)	(in rs)	(in rs)	(in rs.,)	(in rs)	
K.M.H (1)	2501	2309	192	20	6.8	26112	132	20	17160	2163.6	3916.8	49372.4	90421.6
K.M.H (2)	4040	3899	141	20	6.8	19176	132	20	17160	1816.8	2876.4	41049.2	
N.M.H (1)	3450	3105	345	20	6.8	46920	129	20	16770	3184.5	7038	73932.5	98252.2
N.M.H (2)	3750	3709	41	20	6.8	5576	129	20	16770	1117.3	836.4	24319.7	
C.M.H	3225	3119	106	20	6.8	14416		20					
P.M.H	4050	3896	154	40	6.8	41888	129	20	16770	2932.9	6283.2	67894.1	
C.V RAMA	760	698	62	160	6.8	67456	394	20	51220	5933.8	10118.4	134748.2	
D.W.H	3709	3459	250	20	6.8	34000		20					
P.W.H	3050	2749	301	20	6.8	40936	79.8	20	10374	2565.5	6140.4	60035.9	
B.W.H	2376	2108	268	20	6.8	36448		20					
S.W.H	2309	1997	312	40	6.8	84864	85.6	20	11128	4799.6	12729.6	113541.2	
K.W.H	4238	3900	338	20	6.8	45968	100	20	13000	2948.4	6895.2	68831.6	
P.M.C.W.H	2252	1750	502	80	6.8	273088	300	20	39000	15604.4	40963.2	368675.6	
N.W.H(1)	1190	1019	171	40	6.8	46512		20					
N.W.H(2)	600	403	197	40	6.8	53584		20					

February 2017

HOSTELS	PREV METER READ	PRESENT METER READ	DIFFERENCE	CT RATIO	RATE	ENERGY CHARGE	LOAD CONN	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGE	TOTAL ELECTRICITY BILL	
					(rs/unit)	(in rs.)	(in KW)	(in rs)	(in rs)	(in rs)	(in rs.,)	(in rs)	
K.M.H (1)	2309	2429	120	20	6.8	16320	132	20	17160	1674	2448	37622	86015.2
K.M.H (2)	3899	4085	186	20	6.8	25296	132	20	17160	2122.8	3794.4	48393.2	
N.M.H (1)	3105	3294	189	20	6.8	25704	129	20	16770	2123.7	3855.6	48473.3	102169
N.M.H (2)	3709	3930	221	20	6.8	30056	129	20	16770	2341.3	4508.4	53695.7	
C.M.H	3119	3255	136	20	6.8	18496							
P.M.H	3896	4076	180	40	6.8	48960	129	20	16770	3286.5	7344	76380.5	
C.V RAMAN	698	748	50	160	6.8	54400	394	20	51220	5281	8160	119081	
D.W.H	3459	3628	169	20	6.8	22984							
P.W.H	2749	2946	197	20	6.8	26792	79.8	20	10374	1858.3	4018.8	43063.1	
B.W.H	2108	2218	110	20	6.8	14960							
S.W.H	1997	2108	111	40	6.8	30192	85.6	20	11128	2066	4528.8	47934.8	
K.W.H	3900	4158	258	20	6.8	35088	100	20	13000	2404.4	5263.2	55775.6	
P.M.C.W.H	1750	1837	87	80	6.8	47328	300	20	39000	4316.4	7099.2	97763.6	
N.W.H(1)	1019	1094	75	40	6.8	20400							
N.W.H(2)	403	451	48	40	6.8	13056							

March 2017

HOSTELS	ENERGY CHARGE	LOAD CONNECTED	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGES	TOTAL ELECTRICITY BILL
	(in Rs.)	(in kW)	(in Rs)	(in Rs)	(in Rs)	(in Rs,,)	(in Rs)
K.M.H (1)	26928	132	20	17160	2204.4	4039.2	50351.6
K.M.H (2)	27200	132	20	17160	2218	4080	50678
N.M.H (1)	14824	129	20	16770	1579.7	2223.6	35417.3
N.M.H (2)	37128	129	20	16770	2694.9	5569.2	62182.1
C.M.H	29104		20				
P.M.H	56304	129	20	16770	3653.7	8445.6	85193.3
C.V RAMAN	48960	394	20	51220	5009	7344	112553
D.W.H	36040		20				
P.W.H	30600	79.8	20	10374	2048.7	4590	47632.7
B.W.H	12376		20				
S.W.H	33184	85.6	20	11128	2215.6	4977.6	51525.2
K.W.H	39712	100	20	13000	2635.6	5956.8	61324.4
P.M.C.W.H	25024	300	20	39000	3201.2	3753.6	70998.8
N.W.H(1)	17680		20				
N.W.H(2)	13600		20				

April 2017

HOSTELS	ENERGY CHARGE	LOAD CONNECTED	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGES	TOTAL ELECTRICITY BILL
	(in Rs.)	(in kW)	(in Rs)	(in Rs)	(in Rs)	(in Rs,,)	(in Rs)
K.M.H (1)	26248	132	20	17160	2170.4	3937.2	49535.6
K.M.H (2)	54264	132	20	17160	3571.2	8139.6	83154.8
N.M.H (1)	59840	129	20	16770	3830.5	8976	89436.5
N.M.H (2)	47872	129	20	16770	3232.1	7180.8	75074.9
C.M.H	44472						
P.M.H	125120	129	20	16770	7094.5	18768	167772.5
C.V RAMAN	54400	394	20	51220	5281	8160	119081
D.W.H	40936						
P.W.H	32640	79.8	20	10374	2150.7	4896	50080.7
B.W.H	37264						
S.W.H	53856	85.6	20	11128	3249.2	8078.4	76331.6
K.W.H	49368	100	20	13000	3118.4	7405.2	72911.6
P.M.C.W.H	106080	300	20	39000	7254	15912	168266
N.W.H(1)	24480						
N.W.H(2)	18224						

May 2017

HOSTELS	ENERGY CHARGE	LOAD CONNECTED	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGES	TOTAL ELECTRICITY BILL
	(in Rs.)	(in kW)	(in Rs)	(in Rs)	(in Rs)	(in Rs,,)	(in Rs)
K.M.H (1)	34272	132	20	17160	2571.6	5140.8	59164.4
K.M.H (2)	54536	132	20	17160	3584.8	8180.4	83481.2
N.M.H (1)	51408	129	20	16770	3408.9	7711.2	79318.1
N.M.H (2)	56576	129	20	16770	3667.3	8486.4	85519.7
C.M.H	50728		20				
P.M.H	111520	129	20	16770	6414.5	16728	151452.5
C.V RAMAN	58752	394	20	51220	5498.6	8812.8	124303.4
D.W.H	53720		20				
P.W.H	44064	79.8	20	10374	2721.9	6609.6	63789.5

B.W.H	31960		20				
S.W.H	56304	85.6	20	11128	3371.6	8445.6	79269.2
K.W.H	53040	100	20	13000	3302	7956	77318
P.M.C.W.H	73984	300	20	39000	5649.2	11097.6	129750.8
N.W.H(1)	26928		20				
N.W.H(2)	23392		20				

June 2017

HOSTELS	ENERGY CHARGE	LOAD CONNECTED	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGES	TOTAL ELECTRICITY BILL
	(in Rs.)	(in kW)	(in Rs)	(in Rs)	(in Rs)	(in Rs.,)	(in Rs)
K.M.H (1)	47328	132	20	17160	3224.4	7099.2	74831.6
K.M.H (2)	8840	132	20	17160	1300	1326	28646
N.M.H (1)	14824	129	20	16770	1579.7	2223.6	35417.3
N.M.H (2)	17544	129	20	16770	1715.7	2631.6	38681.3
C.M.H	15504		20				
P.M.H	67184	129	20	16770	4197.7	10077.6	98249.3
C.V RAMAN	90304	394	20	51220	7076.2	13545.6	162165.8
D.W.H	15096		20				
P.W.H	8976	79.8	20	10374	967.5	1346.4	21683.9
B.W.H	4352		20				
S.W.H	17680	85.6	20	11128	1440.4	2652	32920.4
K.W.H	81600	100	20	13000	4730	12240	111590
P.M.C.W.H	128384	300	20	39000	8369.2	19257.6	195030.8
N.W.H(1)	14416		20				
N.W.H(2)	11696		20				

July 2017

HOSTELS	ENERGY CHARGE	LOAD CONNECTED	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGES	TOTAL ELECTRICITY BILL
	(in Rs.)	(in kW)	(in Rs)	(in Rs)	(in Rs)	(in Rs.,)	(in Rs)
K.M.H (1)	8160	132	20	17160	1266	1224	27830
K.M.H (2)	7208	132	20	17160	1218.4	1081.2	26687.6
N.M.H (1)	23256	129	20	16770	2001.3	3488.4	45535.7
N.M.H (2)	13192	129	20	16770	1498.1	1978.8	33458.9
C.M.H	12784		20				
P.M.H	27472	129	20	16770	2212.1	4120.8	50594.9
C.V RAMAN	65280	394	20	51220	5825	9792	132137
D.W.H	6800		20				
P.W.H	13328	79.8	20	10374	1185.1	1999.2	26906.3
B.W.H	6936		20				
S.W.H	13600	85.6	20	11128	1236.4	2040	28024.4
K.W.H	13056	100	20	13000	1302.8	1958.4	29337.2
P.M.C.W.H	58208	300	20	39000	4860.4	8731.2	110819.6
N.W.H(1)	10608						
N.W.H(2)	3264						

August 2017

HOSTELS	ENERGY CHARGE	LOAD CONNECTED	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGES	TOTAL ELECTRICITY BILL
	(in Rs.)	(in kW)	(in Rs)	(in Rs)	(in Rs)	(in Rs.,)	(in Rs)
K.M.H (1)	16320	132	20	17160	1674	2448	37622
K.M.H (2)	106760	132	20	17160	6196	16014	146150
N.M.H (1)	76160	129	20	16770	4646.5	11424	109020.5

N.M.H (2)	101320	129	20	16770	5904.5	15198	139212.5
C.M.H	96016		20				
P.M.H	213792	129	20	16770	11528.1	32068.8	274178.9
C.V RAMAN	73984	394	20	51220	6260.2	11097.6	142581.8
D.W.H	86224		20				
P.W.H	76568	79.8	20	10374	4347.1	11485.2	102794.3
B.W.H	62016		20				
S.W.H	99552	85.6	20	11128	5534	14932.8	131166.8
K.W.H	56576	100	20	13000	3478.8	8486.4	81561.2
P.M.C.W.H	95200	300	20	39000	6710	14280	155210
N.W.H(1)	35088						
N.W.H(2)	33728						

September 2017

HOSTELS	ENERGY CHARGE	LOAD CONNECTED	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGES	TOTAL ELECTRICITY BILL
	(in Rs.)	(in kW)	(in Rs)	(in Rs)	(in Rs)	(in Rs,)	(in Rs)
K.M.H (1)	37536	132	20	17160	2734.8	5630.4	63081.2
K.M.H (2)	69496	132	20	17160	4332.8	10424.4	101433.2
N.M.H (1)	62696	129	20	16770	3973.3	9404.4	92863.7
N.M.H (2)	70176	129	20	16770	4347.3	10526.4	101839.7
C.M.H	60656		20				
P.M.H	141712	129	20	16770	7924.1	21256.8	187682.9
C.V RAMAN	85952	394	20	51220	6858.6	12892.8	156943.4
D.W.H	58208		20				
P.W.H	51408	79.8	20	10374	3089.1	7711.2	72602.3
B.W.H	37944		20				
S.W.H	58208	85.6	20	11128	3466.8	8731.2	81554
K.W.H	59160	100	20	13000	3608	8874	84662
P.M.C.W.H	90848	300	20	39000	6492.4	13627.2	149987.6
N.W.H(1)	30736						
N.W.H(2)	25024						

October 2017

HOSTELS	ENERGY CHARGE	LOAD CONNECTED	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGES	TOTAL ELECTRICITY BILL
	(in Rs.)	(in kW)	(in Rs)	(in Rs)	(in Rs)	(in Rs,)	(in Rs)
K.M.H (1)	23528	132	20	17160	2034.4	3529.2	46271.6
K.M.H (2)	43248	132	20	17160	3020.4	6487.2	69935.6
N.M.H (1)	37808	129	20	16770	2728.9	5671.2	62998.1
N.M.H (2)	40664	129	20	16770	2871.7	6099.6	66425.3
C.M.H	35632		20				
P.M.H	86496	129	20	16770	5163.3	12974.4	121423.7
C.V RAMAN	52224	394	20	51220	5172.2	7833.6	116469.8
D.W.H	39032		20				
P.W.H	32096	79.8	20	10374	2123.5	4814.4	49427.9
B.W.H	23120		20				
S.W.H	49776	85.6	20	11128	3045.2	7466.4	71435.6
K.W.H	43248	100	20	13000	2812.4	6487.2	65567.6
P.M.C.W.H	57120	300	20	39000	4806	8568	109514
N.W.H(1)	20128						
N.W.H(2)	14960						

November 2017

HOSTELS	ENERGY CHARGE	LOAD CONNECTED	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGES	TOTAL ELECTRICITY BILL
	(in Rs.)	(in kW)	(in Rs)	(in Rs)	(in Rs)	(in Rs,,)	(in Rs)
K.M.H (1)	31960	132	20	17160	2456	4794	56390
K.M.H (2)	36720	132	20	17160	2694	5508	62102
N.M.H (1)	35224	129	20	16770	2599.7	5283.6	59897.3
N.M.H (2)	35088	129	20	16770	2592.9	5263.2	59734.1
C.M.H	29920		20				
P.M.H	85952	129	20	16770	5136.1	12892.8	120770.9
C.V RAMAN	59840	394	20	51220	5553	8976	125609
D.W.H	33592		20				
P.W.H	29648	79.8	20	10374	2001.1	4447.2	46490.3
B.W.H	21760		20				
S.W.H	39984	85.6	20	11128	2555.6	5997.6	59685.2
K.W.H	36992	100	20	13000	2499.6	5548.8	58060.4
P.M.C.W.H	59840	300	20	39000	4942	8976	112778
N.W.H(1)	18496						
N.W.H(2)	12512						

December 2017

HOSTELS	ENERGY CHARGE	LOAD CONNECTED	METER RENT	FIXED CHARGE	E.D CHARGE	OTHER CHARGES	TOTAL ELECTRICITY BILL
	(in Rs.)	(in kW)	(in Rs)	(in Rs)	(in Rs)	(in Rs,,)	(in Rs)
K.M.H (1)	2312	132	20	17160	973.6	346.8	20812.4
K.M.H (2)	2040	132	20	17160	960	306	20486
N.M.H (1)	12376	129	20	16770	1457.3	1856.4	32479.7
N.M.H (2)	18360	129	20	16770	1756.5	2754	39660.5
C.M.H	23256						
P.M.H	29376	129	20	16770	2307.3	4406.4	52879.7
C.V RAMAN	43520	394	20	51220	4737	6528	106025
D.W.H	22168						
P.W.H	20128	79.8	20	10374	1525.1	3019.2	35066.3
B.W.H	14960						
S.W.H	40528	85.6	20	11128	2582.8	6079.2	60338
K.W.H	43248	100	20	13000	2812.4	6487.2	65567.6
P.M.C.W.H	75072	300	20	39000	5703.6	11260.8	131056.4
N.W.H(1)	17952						
N.W.H(2)	6528						

Energy Bill Data for Departments

JANUARY 2019

BUILDINGS	ENERGY CHARGE	METER RENT	FIXED CHARGE	ED CHARGE	OTHER CHARGE	TOTAL
	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)
MBBT	354552	20	253.8	17981.4	53182.8	428603.8
EVS	66368	20	2074.8	5393.2	9955.2	84306
LIB	55624	20	709.8	3491	8343.6	68604.2
LIB (EXT)	118184	20	709.8	6619	17727.6	144136.2
SAIC	102000	20	1088.1	6188.1	15300	125353
ACD BLD(1) (GF)	62560	20	1376.25	4504.25	9384	78311.3
ACD BLD(2)(FF)	75616	20	1003.68	4784.48	11342.4	93329.36
ACD BLD (2) (GF)	89624	20	1310.01	5791.21	13443.6	110854.62
CHEMICAL SC.(GF)	102544	20	1645.8	6773	15381.6	127125.2
1ST FLOOR	100640	20	1645.8	6677.8	15096	124826.4
COUNCIL HALL	75616	20	19724.46	23505.26	11342.4	130770.92
ENERGY (GF)	35360	20	889.2	2657.2	5304	44497.2
1ST FLOOR	58616	20	889.2	3820	8792.4	72575.4
SAC	65688	20	1084.02	4368.42	9853.2	81503.44

February 2019

BUILDINGS	ENERGY CHARGE	METER RENT	FIXED CHARGE	ED CHARGE	OTHER CHARGE	TOTAL
	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)
MBBT	354552	20	253.8	17981.4	53182.8	428603.8
EVS	66368	20	2074.8	5393.2	9955.2	84306
LIB	55624	20	709.8	3491	8343.6	68604.2
LIB (EXT)	118184	20	709.8	6619	17727.6	144136.2
SAIC	102000	20	1088.1	6188.1	15300	125353
ACD BLD(1) (GF)	62560	20	1376.25	4504.25	9384	78311.3
ACD BLD(2)(FF)	75616	20	1003.68	4784.48	11342.4	93329.36
ACD BLD (2) (GF)	89624	20	1310.01	5791.21	13443.6	110854.62
CHEMICAL SC.(GF)	102544	20	1645.8	6773	15381.6	127125.2
1ST FLOOR	100640	20	1645.8	6677.8	15096	124826.4
COUNCIL HALL	75616	20	19724.46	23505.26	11342.4	130770.92
ENERGY (GF)	35360	20	889.2	2657.2	5304	44497.2
1ST FLOOR	58616	20	889.2	3820	8792.4	72575.4
SAC	65688	20	1084.02	4368.42	9853.2	81503.44

MARCH 2019

BUILDINGS	ENERGY CHARGE	METER RENT	FIXED CHARGE	ED CHARGE	OTHER CHARGE	TOTAL
	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)
MBBT	430712	20	253.8	21789.4	64606.8	455949
EVS	60928	20	2074.8	5121.2	9139.2	68598.8
LIB	63104	20	709.8	3865	9465.6	68169.6
LIB (EXT)	128520	20	709.8	7135.8	19278	137337.4
SAIC	153408	20	1088.1	8758.5	23011.2	164409.4
ACD BLD(1) (GF)	51408	20	1376.25	3946.65	7711.2	57135.7
ACD BLD(2)(FF)	52360	20	1003.68	3621.68	7854	57397.16
ACD BLD (2) (GF)	42704	20	1310.01	3445.21	6405.6	47800.02
CHEMIICAL SC.(GF)	25704	20	1645.8	2931	3855.6	30496.6
1ST FLOOR	31144	20	1645.8	3203	4671.6	36248.6
COUNCIL HALL	45152	20	19724.46	21982.06	6772.8	87217.32
ENERGY (GF)	48688	20	889.2	3323.6	7303.2	53285.6
1ST FLOOR	51000	20	889.2	3439.2	7650	55730.2
SAC	55352	20	1084.02	3851.62	8302.8	60721.44

APRIL 2019

BUILDINGS	ENERGY CHARGE	METER RENT	FIXED CHARGE	ED CHARGE	OTHER CHARGE	TOTAL
	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)
MBBT	484432	20	253.8	24475.4	72664.8	585414.8
EVS	269552	20	2074.8	15552.4	40432.8	329620.8
LIB	252688	20	709.8	13344.2	37903.2	306530
LIB (EXT)	202368	20	709.8	10828.2	30355.2	245776
SAIC	380528	20	1088.1	20114.5	57079.2	461634.6
ACD BLD(1) (GF)	26928	20	1376.25	2722.65	4039.2	35290.9
ACD BLD(2)(FF)	38216	20	1003.68	2914.48	5732.4	48174.36
ACD BLD (2) (GF)	47328	20	1310.01	3676.41	7099.2	59788.42
CHEMIICAL SC.(GF)	243440	20	1645.8	13817.8	36516	297236.4
1ST FLOOR	198152	20	1645.8	11553.4	29722.8	242557.8
COUNCIL HALL	76568	20	19724.46	23552.86	11485.2	131920.32
ENERGY (GF)	32504	20	889.2	2514.4	4875.6	41049
1ST FLOOR	63240	20	889.2	4051.2	9486	78158.2
SAC	67184	20	1084.02	4443.22	10077.6	83309.64

MAY 2019

BUILDINGS	ENERGY CHARGE	METER RENT	FIXED CHARGE	ED CHARGE	OTHER CHARGE	TOTAL
	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)	(in RS)
MBBT	483072	20	253.8	24407.4	72460.8	583772.8
EVS	134776	20	2074.8	8813.6	20216.4	166898.6
LIB	92208	20	709.8	5320.2	13831.2	112774
LIB (EXT)	245344	20	709.8	12977	36801.6	297663.2
SAIC	261936	20	1088.1	14184.9	39290.4	318452.2
ACD BLD(1) (GF)	69088	20	1376.25	4830.65	10363.2	86192.9
ACD BLD(2)(FF)	56712	20	1003.68	3839.28	8506.8	70505.56
ACD BLD (2) (GF)	86496	20	1310.01	5634.81	12974.4	107078.02
CHEMIICAL SC.(GF)	91936	20	1645.8	6242.6	13790.4	114317.6
1ST FLOOR	232696	20	1645.8	13280.6	34904.4	284264.6
COUNCIL HALL	3672	20	19724.46	19908.06	550.8	43909.12
ENERGY (GF)	30328	20	889.2	2405.6	4549.2	38421.8
1ST FLOOR	47600	20	889.2	3269.2	7140	59275.2
SAC	117504	20	1084.02	6959.22	17625.6	144063.64