ANNUAL ENERGY AUDIT REPORT

April 2022 to March 2023

BIMALA PRASAD CHALIHA COLLEGE

Bimala Prasad Chaliha College, Nagarbera
Kamrup, Assam Pin – 781127.

July -2023

Prepared by

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In Association with

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Disclaimer

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All the calculations for energy savings and recommendations to achieve these savings given in this report is fully based on the data shared by the college with Thunderbolt Energy Consultancy.

Acknowledgement

We express our sincere gratitude to the authorities of Bimala Prasad Chaliha College, Nagarbera for entrusting and offering the opportunity of energy performance assessment assignment.

- Dr. Kamala Chandra Pathak- Principal
- Dr. Arun Kumar Sarkar - Co-Ordinator (IQAC)

We are thankful to Bimala Prasad Chaliha College, Nagarbera for their positive support in undertaking the task of system mapping and energy efficiency assessment of all electrical system, air conditioners, utilities and other equipment. The field studies would not have been completed on time without their interaction and guidance. We are grateful to their cooperation during field studies and providing necessary data for the study.

We are also thankful to all field staff and agencies working with whom we interacted during the field studies for their wholehearted support in undertaking measurements and eagerness to assess the system / equipment performance and saving potential. Also thankful to all concerned staff interacted during the conduct of this exercise for completing official documentations.

Why Energy Audit?

An energy audit determines the amount of energy consumption affiliated with a building and the potential savings associated with that energy consumption. Additionally, an energy audit is designed to understand the specific conditions that are impacting the performance and comfort in your facility to maximize the overall impact of energy-focused building improvements.

An energy audit is a systematic review of the energy consuming installations in a building or premises to ensure that energy is being used sensibly and efficiently. An energy audit usually commences with the collection and analysis of all information that may affect the energy consumption of the building or premises, then follows with reviewing and analyzing the condition and performance of various building services installations and building management, with an aim at identifying areas of inefficiency and suggesting means for improvement.

Through implementation of the suggested improvement measures, building owners can get the immediate benefit for paying less for energy bills. On the other hand, lowering of energy consumption in buildings will lead to the chain effect that less fossil fuel will be burnt for electricity generation by the power supply companies and relatively less pollutants and greenhouse gases will be introduced into the atmosphere, thus contributing to conserve the environment and to enhance sustainable development.

Energy Audit Team

Table 1 The team members of Thunderbolt Energy Consultancy

Name	Role	Field of expertise
Mr. Mahesh Khode	Project coordinator, ECM verification, Report verification	Graduate Electrical engineer, BEE Certified Energy Manager, ADIS Safety, Certified First Aider with experience in Energy Efficiency Assessment, Energy Audit, Safety Audit, Firefighting system, Fire Extinguisher, Electrical Safety audit, Green Audit, Green building, ECBC, EHS, OHSA, Environment policy, Environmental Audit, Industrial Utility System, Project Management, Electrical Distribution System, Commercial Buildings and Industrial Maintenance Services.
Mr. Kaustubh Bhatwadekar	Energy Auditor and ECM verification	Graduate Mechanical engineer, M.Tech IIT Bombay, BEE Certified Energy Auditor, Experience In Industrial Energy, distribution system, Energy Efficiency Assessment, Green audit and Environment audit.
Mr. Shantanu Deshmukh	Data tabulation and analysis & report preparation	Graduate in Electrical & Electronics Engineering with experience in field data collection, Data analysis, Green building and Environment assessment.

Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the Energy Consumption & mitigate the CO_2 emissions.

Bimala Prasad Chaliha College, Nagarbera, consumes Energy in the form of Electrical Energy used for various gadgets, Office & other facilities.

1. Present Energy Consumption

In the following Table, we present the details of Energy Consumption.

Table 2 Details of energy consumption

Sr no	Parameter	College Building	
		Energy consumed, (Units)	Bill Amount (Rs)
1	Maximum	4,005	35,090
2	Minimum	1,058	13,496
3	Average	2,359	22,261

2. Energy Conservation Projects already installed

1. Usage of LED lights at some indoor locations.
2. Usage of LED Lights for outdoor lighting.
3. Solar lighting system Installed.
4. Solar Panel System Installed.
5. BEE Star rated LED Lights Installed.

3. Key Observations

1. College has 10 kVA Diesel Generator set for uninterrupted power supply in case of supply failure from APDCL.
2. Presently 25 kVA transformer is installed in college campus.
3. There are about 29 Nos old Tube light fittings which need to be replaced by 18 W LEDs.
4. There are about 8 Nos 18 W CFL light fittings which need to be replaced by 9 W LEDs.
5. There are 73 Nos of ceiling fans which need to be replaced with STAR rated fans.
6. Optimize the temperature setting to 23-25 degree Celsius.
7. There is minimum or practically negligible use of lights during day time as the building structure has possibility of daylight usage.
8. The lighting arrangements are well balanced with arrangements to switch ON and OFF.
9. The policy of college is switch off the lights and other electrical equipment when they are not in use.
10. Cleanliness is well maintained. In- house light fittings are cleaned time to time.
11. Lights are negligibly operated during day time. The lights are operated manually.
12. There is no any sensor-based lighting system.
13. The college is utilizing natural lighting as first preference.
14. Computers, printers and other equipment are switched off at the end of the day.
15. The all the electrical equipment is well operated.
16. The overall electrification system is regularly monitored by a duly qualified electrician.
17. 1 kWp solar panel Installed on building.
18. Fire extinguisher is present in campus area.
19. The campus area is well facilitated with CCTVs for security purpose.
20. Water is supplied from bore well to tank and 6 nos. of Pump set has capacity of 1 HP.

4. Recommendations

Table 3 Recommendations for energy savings

Sr. No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs Lakh/Annum	Investment Required, Rs/ Lakh/Annum	Payback period, Months
1	Replacement of 29 Nos Tube Light fittings with 18W LED fittings	479	0.032	0.189	70
2	Replacement of 8 Nos CFL fittings with 9 W LED fittings	54	0.004	0.017	57
3	Replacement of 73 Nos Old Ceiling Fans with STAR rating fans	2,190	0.148	1.606	130
4	To reduce billed contract demand from 35.29 kVA to 20 kVA	NA	0.257	NA	NA
5	Replacement of 8 Nos Old 1.5 TR Acs with STAR rating Acs	5,100	0.344	3.600	125
6	Optimize the temperature setting to 23-25 degree Celsius	288	0.019	NA	NA
Total		**8,111**	**0.80**	**5.41**	-

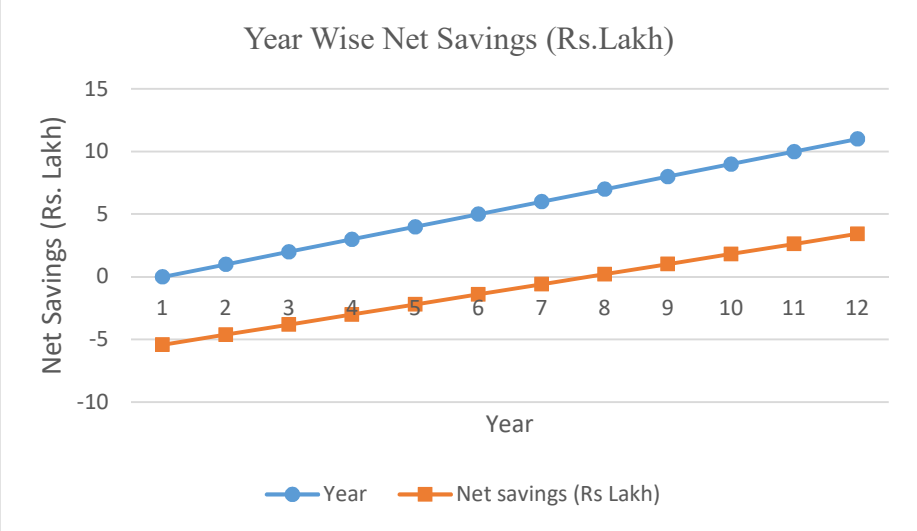

Figure 1 Year Wise Net Savings (Rs. Lakh)

5. Notes & Assumptions

1. Daily working hours-03
2. Annual working days- 250
3. Rate of Electrical Energy- Rs 6.75 /- per kWh.

Abbreviations

CFL	:	Compact Fluorescent Lamp
FTL	:	Fluorescent Tube Light
LED	:	Light Emitting Diode
V	:	Voltage
I	:	Current
kW	:	Kilo- Watt
kWh	:	kilo-Watt Hour
kVA	:	Active Power
PF	:	Power Factor

1. Introduction

B. P. Chaliha College, Nagarbera was born in an auspicious moment in the year 1972 in the sylvan setting of Nagarbera, embraced by the sweet flowing river Jaljali on the eastern side and a vast expanse of green field on the western side. The College was aptly named after the Ex-Chief Minister Late Bimala Prasad Chaliha, an iIlustrious son and an architect of modern Assam. The College is situated on the south west corner of Kamrup district, presently extending its grasp over two other neighboring districts - Barpeta and Goalpara. In addition to catering to the need of higher education in Kamrup district, it also promotes knowledge and skill among the vast mass of socio-economically disadvantaged people of greater Nagarbera area. The College strives to achieve excellence in every possible human endeavour. The College was brought under Grant-in-Aid system on 01-09-1979. Another feature was added to its glory when Science stream was introduced in 1985. At present the College is a full-fledged one with both Arts and Science stream of fering major courses in fourteen different subjects at graduate level. From this session a new department of Computer Science will start functioning offering B.Sc. with Computer Science. Apart from catering to the usual learning programmes of both H.S. and Three Years Degree courses under A.H.S.E.C. & G.U. the College has arranged to impart occasional Courses and Master Degree Programme in different subjects like English, Assamese, History, Political Science, Education under the Institute of Distance and Open Learning (IDOL) programme of G.U.

1.1 Objectives

1. To study present level of Energy Consumption.
2. To Study Electrical Consumption.
3. To assess the various equipment/facilities from Energy efficiency aspect.
4. To study various measures to reduce the Energy Consumption.

1.2 Audit methodology

The objective of Energy Audit is to balance the total energy inputs with its use and to identify the energy conservation opportunities in the stream. Energy Audit also gives focused attention to energy cost and cost involved in achieving higher performance with technical and financial analysis. The best alternative is selected on financial analysis basis.

1.3 Historical Data Analysis

The historical data analysis involves establishment of energy consumption pattern to establish base line data on energy consumption and its variation with change in production volumes.

1.4 Actual measurement and data analysis

This step involves actual site measurement and field trials using various portable measurement instruments. It also involves input to output analysis to establish actual operating equipment efficiency and finding out losses in the system.

1.5 Identification and evaluation of Energy Conservation Opportunities

This step involves evaluation of energy conservation opportunities identified during the energy audit. It gives potential of energy saving and investment required to implement the proposed modifications with payback period. All recommendations for reducing losses in the system are backed with its cost benefit analysis.

1.6 Monitoring and Control

Energy accounting followed by energy monitoring and controlling is the first step of an Energy Management Program. With increasing energy prices, many organizations have incorporated sub-metering system in their plants. Sub metering is essential for monitoring, establishing energy consumption pattern, detailed engineering and energy saving after implementation of energy conservation projects. It is required to identify and monitor parameters for energy consumption per unit of production or services i.e., Specific Energy Consumption (SEC). SEC monitoring is an important tool for monitoring and proving of energy conservation measures.

1.7 About Thunderbolt Energy Consultancy

We are pleased to introduce ourselves as **Thunderbolt Energy Consultancy**. We are a team of young Energy professionals, working to help Businesses and facilities become Energy efficient and promote green and clean Energy.

Our highly competent team of Certified Energy Managers, Energy Auditors, Safety Auditors, Analyst, Engineers and Experts having experience in variety of sectors and we are one of the leading engineering services and solutions providing company.

Our company was established in 2020 pioneering in quality and customer satisfaction. We have been a beacon of performance for the last 4 years and our vision is to deliver everlasting performance through our services.

Thunderbolt Energy Consultancy is extremely proud to announce that we have achieved ISO 9001:2015, ISO 14001:2015, ISO 50001:2018 and ISO/IEC 17020:2012 certification. Assessment for certification was done by QRO (Quality Research Organization) Certification LLP accredited by several bodies like, Egyptian Accreditation Council (EGAC) and UKAF (United Kingdom Akkreditation Forum). This certification not only anticipates the demands of our customers, but also reveals our commitment to providing quality services to all our existing and prospective customers.

We are providing services in various areas like

- Energy Audit, Electrical Audit, Electrical Survey
- Green Audit & Environmental Audit for all Entities
- Safety Audit, Electrical safety audit, Safety survey
- Industrial Maintenance Services
- Project Management Consultancy
- Third-Party Audit

2. Energy Details

The electricity supply for Bimala Prasad Chaliha College, Nagarbera is provided by Assam Power Distribution Company Limited. The energy consumed by Bimala Prasad Chaliha College, Nagarbera falls under LT Category. The facility also has 1 DG sets of 10 KVA. The DG set is mainly used for power failure from APDCL.

The energy efficiency assessment was conducted for the load connected to the mains supply of college building.

Consumer details:

Table 4 Details of energy consumption

Name of Consumer	Tariff Category	Consumer Account No.
Bimala Prasad Chaliha College, Nagarbera	LT V (B) (Govt. Education)	025000000946

Mainly energy is used on this facility for the following purposes:

1) Lighting's load
2) Fan load
3) Office equipment
4) Other Equipment's

3. Study of connected load

In this chapter, we present details of various connected electrical equipment and electrical load.

Table 5 Location wise study of Electrical fittings in various buildings

Sr. No	Type	Equipment	Wattage	Total number	Load, kW
1	LED Lighting	No. of LEDs	18	62	1.12
2	Non-LED Lighting	No. of tubes Light	40	29	1.16
3	CFL	No. of CFL Light	18	8	0.14
4	Fan Load	No. of Fans (Celling+ Wall+ Exhaust)	70	73	5.11
5	Office Load	No. of Projectors	500	7	3.50
6	Office Load	No. of Computers	250	40	10.00
7	Office Load	No. of Printers	500	5	2.50
8	Office Load	No. of Xerox machine	1000	8	8.00
9	Air Conditioner	No. of AC	1000	8	8.00
10	Submersible Pump	No. of Pumps	750	6	4.50
11	Other Load	No. of Common analytical instruments		32	0.00
Total Load kW					**44.03**

Table 6 Lighting load percentage in total consumption

Particulars		Total Lighting requirement	Lighting met Through LED Bulb	Lighting met through other type lamp
(A)	Load in kW	2.42	1.12	1.30
	Percentage %	100	46.12	53.88
(B)	Energy in kWh per year	1,815	837	978
	Percentage %	100	46.12	53.88

Note- Above calculation is based on 3 hours working and 250 days per annum.

Apart from above load, the college has Fan load, street lights. Individual fitting wise load is as under

Table 7 Equipment wise Connected Load

Sr. No.	Equipment	Qty	Load, kW
1	LED Lighting	62	1.12
2	Non-LED Lighting	37	1.30
3	Fan Load	73	5.11
4	Office Load	60	24
5	Air Conditioner	8	8
6	Other Load	6	4.50

Data can be represented in terms of PIE chart as under,

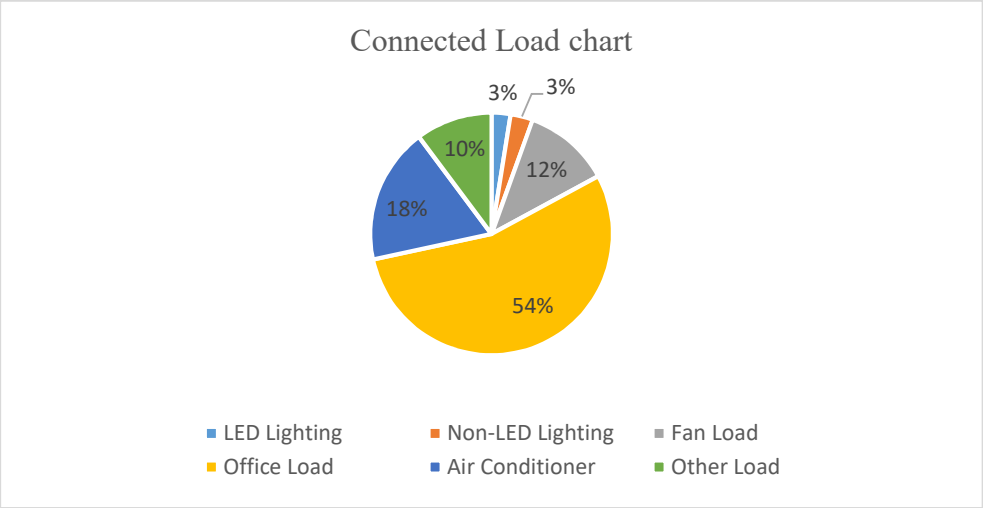

Figure 2 Distribution of connected load

4. Study of Electrical Energy Consumption

Consumer Name- Bimala Prasad Chaliha College, Nagarbera

Consumer Number- 025000000946

In this chapter, electricity bills are studied for the analysis of electrical energy consumption.

Table 8 Electricity bills of consumer 025000000946

Sr. No.	Month	Energy (kWh)	Bill Amount (Rs)	Max. Demand (kVA)
1	Apr-22	1,657	16,819	12.56
2	May-22	3,037	26,620	22.6
3	Jun-22	3,362	29,116	24.23
4	Jul-22	3,378	29,447	25.56
5	Aug-22	3,167	28,641	26
6	Sep-22	4,005	35,090	23.68
7	Oct-22	1,989	16,712	20.2
8	Nov-22	1,747	18,228	12.52
9	Dec-22	1,312	15,206	6.12
10	Jan-23	1,058	13,496	7.88
11	Feb-23	1,797	18,573	16.4
12	Mar-23	1,802	19,189	11.68
	Total	**28,312**	**2,67,136**	**209**

Key observations of electricity bill are as follows,

Table 9 Key observations of consumer 025000000946

Sr no	Parameter	Energy consumed, (Units)	Bill Amount (Rs)	Max. Demand (kVA)
1	Maximum	4,005	35,090	26.00
2	Minimum	1,058	13,496	6.12
3	Average	2,359	22,261	17.45

Variation in energy consumption is as follows,

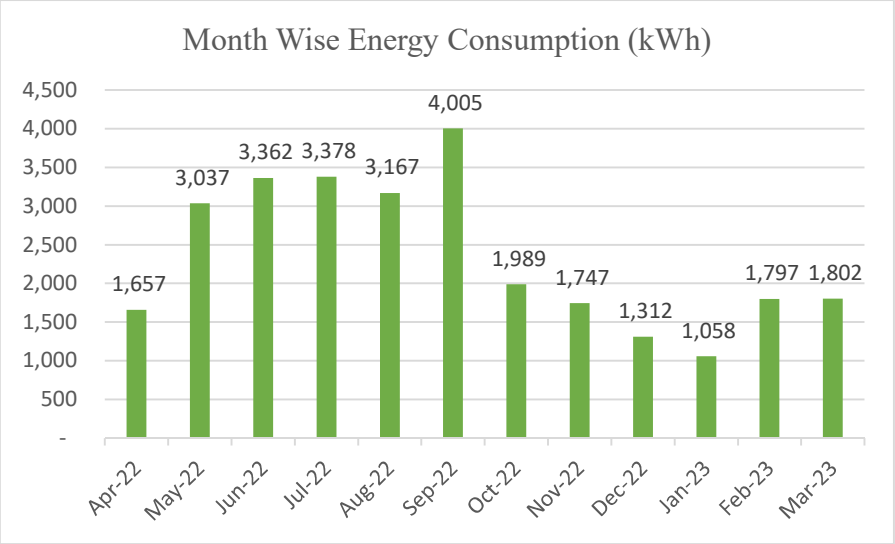

Figure 3 Month wise energy consumption of consumer 025000000946

Monthly variation in electricity bill is as follows,

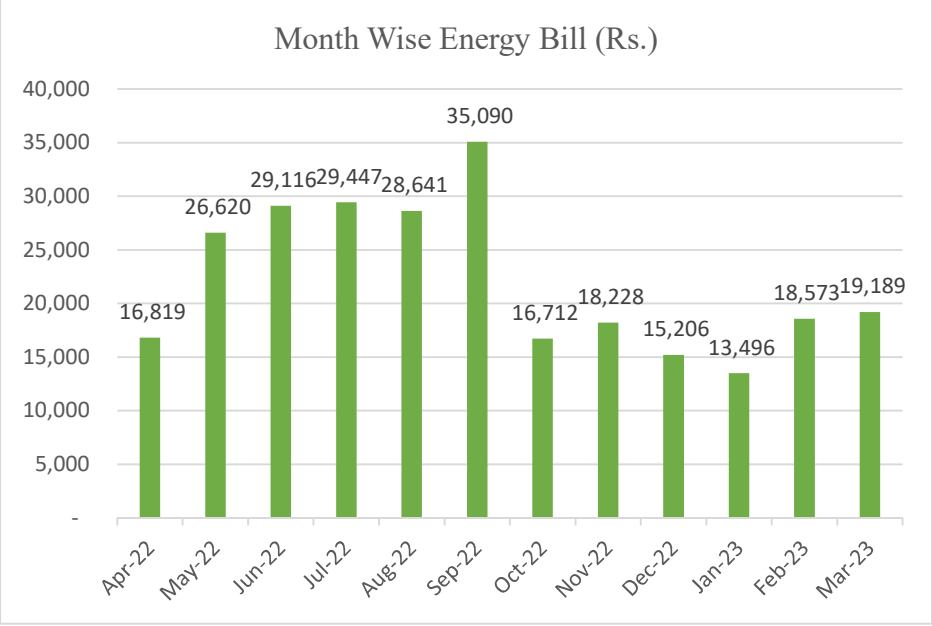

Figure 4 Month wise electricity bill of consumer 025000000946

Monthly variation in Maximum demand is as follows,

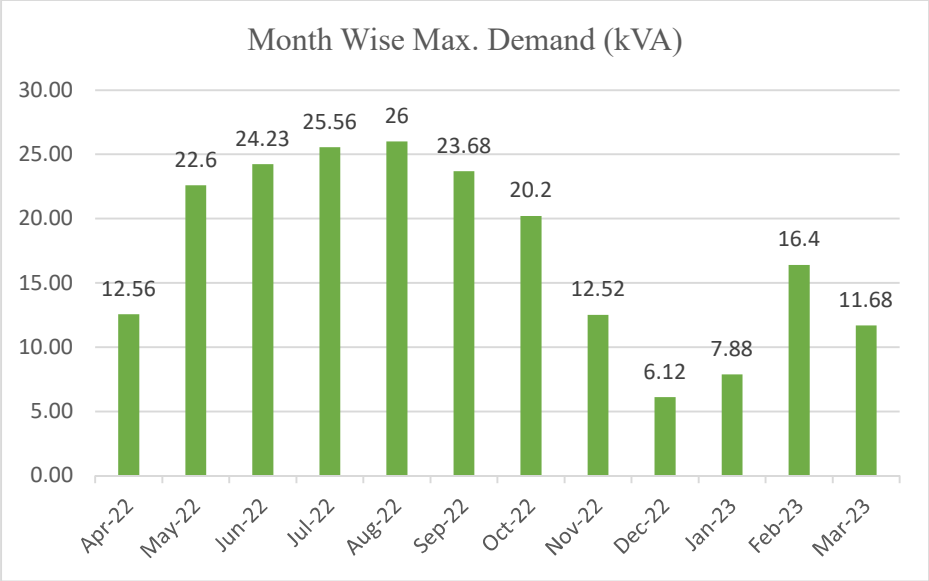

Figure 5 Month wise electricity bill of consumer 025000000946

5. Carbon Footprint

1. **A Carbon Foot print** is defined as the Total Greenhouse Gas emissions (CO_2 emissions), emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various form of Electrical Energy used by the College for performing its day-to-day activities
2. **Basis for computation of CO_2 Emissions:**

   The basis of Calculation for CO_2 emissions due to Electrical Energy is as under

1 Unit (kWh) of Electrical Energy releases **0.85 Kg of CO_2** into atmosphere.

Based on the above Data we compute the CO_2 emissions which are being released in to the atmosphere by the College due to its Day-to-Day operations.

We herewith furnish the details of various forms of Energy consumption as under

Consumer Name- Bimala Prasad Chaliha College, Nagarbera

Consumer Number- 025000000946

Table 10 Month wise Consumption of Energy & CO2 Emissions of consumer 025000000946

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Apr-22	1,657	1.41
2	May-22	3,037	2.58
3	Jun-22	3,362	2.86
4	Jul-22	3,378	2.87
5	Aug-22	3,167	2.69
6	Sep-22	4,005	3.40
7	Oct-22	1,989	1.69
8	Nov-22	1,747	1.48
9	Dec-22	1,312	1.12
10	Jan-23	1,058	0.90
11	Feb-23	1,797	1.53
12	Mar-23	1,802	1.53
	Total	**28,312**	**22.65**

In the following Chart we present the CO2 emissions due to usage of Electrical Energy.

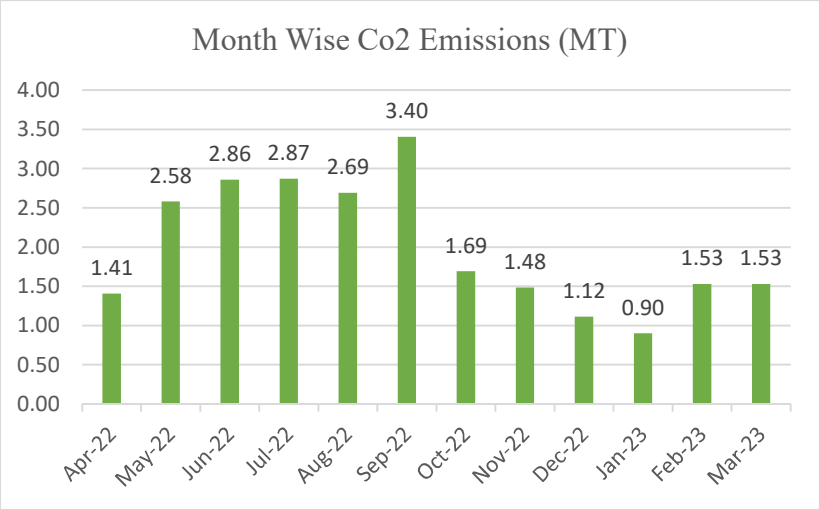

Figure 6 Month wise CO2 emissions of consumer 025000000946

6. Study of utilities

6.1 Study of Lighting

In the facility, the lighting system can be divided mainly in two parts, indoor lighting and outdoor lighting. There are 29 FTL fittings with electronic/ magnetic chokes and It is recommended to install the 18 W LED Tube light fittings in place of these old Tube light fittings. There are 8 CFL fittings are observed and It is recommended to install the 9 W LED fittings in place of these CFL fittings.

6.2 Air-conditioners

In the facility, there are about 8 Nos. of 1.5 Tr Air-conditioners. It is found that all ACs with BEE STAR Rated ACs.

6.3 Ceiling Fans

At building facility, there are about 73 Nos Old Ceiling Fans, which consumed about 70 W of Electrical Energy. It is recommended to replace these old Fans with BEE STAR Rated Ceiling Fans.

6.4 Office Load

In Office load facility have 40 nos of computer, Photocopier machine and Invertor system for office use.

6.5 Submersible Pump Load

Drinking water purpose premise having 6 nos of water bore well pump. Water is supplied from bore well to tank and Pump set has capacity of 1 HP.

7. Energy conservation proposals

7.1 Replacement of 29 Nos Old, FTLs with 18 W LED fittings

In the facility, there are about 29 Nos, FTL fittings with electronic/magnetic chokes. It is recommended to the install 18 W LED Tube light fittings in place of these old fittings. In the following Table, we present the savings, investment required & payback analysis.

Table 11 Tube light calculation

Sr. No	Particulars	Value	Unit
1	Present Qty of Tube light fittings	29	Nos
2	Energy Demand of Tube light fitting	40	W/Unit
3	Energy Demand of 18 W LED fitting	18	W/Unit
4	Reduction in demand	22	W/Unit
5	Average Daily Usage period	3	Hrs/Day
6	Daily saving in Energy	2	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	479	kWh/Annum
9	Rate of Electrical Energy	6.75	Rs/kWh
10	Annual Monetary saving	0.032	Rs. In Lakh/Annum
11	Cost of 18 W LED Tube	650	Rs/Unit
12	Investment required	0.189	Rs. In Lakh/Annum
13	Simple Payback period	70	Months

It is recommended to change lighting system in a phase manner.

7.2 Replacement of 8 Nos CFL fitting with 9 W LED fittings

In the facility, there are about 8 No fittings. It is recommended to the install 9 W LED light fittings in place of these old fittings. In the following Table, we present the savings, investment required & payback analysis.

Table 12 CFL light calculation

Sr. No	Particulars	Value	Unit
1	Present Qty of CFL light fittings	8	Nos
2	Energy Demand of CFL light fitting	18	W/Unit
3	Energy Demand of 9 W LED fitting	9	W/Unit
4	Reduction in demand	9	W/Unit
5	Average Daily Usage period	3	Hrs/Day
6	Daily saving in Energy	0.22	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	54	kWh/Annum
9	Rate of Electrical Energy	6.75	Rs/kWh
10	Annual Monetary saving	0.004	Rs. In Lakh/Annum
11	Cost of 18 W LED Tube	215	Rs/Unit
12	Investment required	0.017	Rs. In Lakh/Annum
13	Simple Payback period	57	Months

It is recommended to change lighting system in a phase manner.

7.3 Replacement of 73 Nos Old Fans with STAR Rated Ceiling Fans

During the Audit, it was observed that there are 73 Nos, old fans. It is recommended to replace these old fans with 5 STAR Rated Fans.

In the following Table, we present the savings, investment required & payback analysis.

Table 13 Fan calculation

Sr. No	Particulars	Value	Unit
1	Present Qty of Old Fan fittings	73	Nos
2	Energy Demand of Old Ceiling Fan fitting	70	W/Unit
3	Energy Demand of STAR Rated Fan	30	W/Unit
4	Reduction in demand	40	W/Unit
5	Average Daily Usage period	3	Hrs/Day
6	Daily saving in Energy	9	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving potential	2,190	kWh/Annum
9	Rate of Electrical Energy	6.75	Rs/kWh
10	Annual Monetary saving	0.148	Rs. In Lakh/Annum
11	Cost of STAR Rated Ceiling Fan	2,200	Rs/unit
12	Investment required	1.606	Rs. In Lakh/Annum
13	Simple Payback period	130	Months

It is recommended to replace fan with energy efficient fan accordingly.

7.4 Reduce Contract demand from 35.29 kVA to 20 kVA.

During the Bill Analysis, it was observed that average maximum demand in 2022-2023 is 26 kVA and Contracted Demand is 35.29 kVA.

In the following Table, we present the savings, investment required & payback analysis.

Table 14 Contract demand calculation

No	Particulars	Value	Unit
1	Current contract billed demand	35.29	kVA
2	Current highest maximum demand	26	kVA
3	Recommended contract billed demand	20	kVA
4	Reduction in billed demand	15	kVA
5	Per unit charges for billed demand	140	Rs/ kW/ month
6	Monthly Monetary savings	2,141	Rs/month
7	Annual monetary savings	0.257	Rs/year

It is suggested to reduce contract demand from 35.29 kVA to 20 kVA.

7.5 Replacement of 8 Nos old ACs with STAR Rated ACs.

During the field visit it is observed that 8 nos of 2 and 3 star ACs found. It is recommended to replace these old ACs with 5 STAR Rated ACs.

In the following Table, we present the savings, investment required & payback analysis.

Table 15 Air Conditioner calculation

No	Particulars	Value	Unit
1	Present Qty of 1.5 TR Old ACs	8	Nos
2	Energy Demand of Old 1.5 TR AC	2.00	kW/Unit
3	Energy Demand of New AC	1.15	kW/Unit
4	Reduction in demand	0.85	kW/Unit
5	Average Daily Usage period	3	Hrs/Day
6	Daily saving in Energy	20	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	5,100	kWh/Annum
9	Rate of Electrical Energy	6.75	Rs/kWh
10	Annual Monetary saving	0.344	Rs. In Lakh/Annum
11	Cost of STAR Rated 1.5 TR AC	45,000	Rs/unit
12	Investment required	3.600	Rs. In Lakh/Annum
13	Simple Payback period	125	Months

It is recommended to change ACs in a phase manner.

7.6 Optimize the Temperature Setting of ACs.

During the field visit it is observed that Temperature settings are very low**.**

During EEA study at facility it was observed that temperature settings of AC in office & meeting rooms were in the range of 17^0 C to 22^0 C.

It is known that a 1°C raise in AC temperature can help to save almost 6 % on power consumption (this can also be verified in BEE guideline).

Table 16 Temperature Setting of ACs calculation

No	Particulars	Value	Unit
1	Present Qty of 1.5 TR ACs	8	Nos
2	Energy Demand of Old 1.5 TR AC	2.00	kW/Unit
3	Estimated consumption of Acs	48	kWh/hr
4	Estimated Saving	6	%
5	Operating Hrs per day	3	hrs/day
6	Operating days per year	250	Days/Annum
7	Annual Estimated Saving	288	kWh/Annum
8	Unit Rate	6.75	Rs/kWh
9	Annual Saving	0.019	Rs. In Lakh/Annum
10	Investment required	-	Rs. In Lakh/Annum
11	Simple Payback period	-	Months

Hence it was recommended that temperature setting of outlets will be changed from present 23 ^{0}C to 25 ^{0} C and keeping inlet temperature unaltered.

8. Summary of Savings

Table 17 Summary of savings

Sr. No	Recommendation	Annual Saving potential, kWh/Annum	Annual Monetary Gain, Rs. Lakh/Annum	Investment Required, Rs. Lakh/Annum	Payback period, Months
1	Replacement of 29 Nos Tube Light fittings with 18W LED fittings	479	0.032	0.189	70
2	Replacement of 8 Nos CFL fittings with 9 W LED fittings	54	0.004	0.017	57
3	Replacement of 73 Nos Old Ceiling Fans with STAR rating fans	2,190	0.148	1.606	130
4	To reduce billed contract demand from 35.29 kVA to 20 kVA	NA	0.257	NA	NA
5	Replacement of 8 Nos Old 1.5 TR Acs with STAR rating Acs	5,100	0.344	3.600	125
6	Optimize the temperature setting to 23-25 degree Celsius	288	0.019	NA	NA
Total		**8,111**	**0.80**	**5.41**	-