

# ANNUAL ENERGY AUDIT REPORT

March 2023 to February 2024



## ARYA VIDYAPEETH COLLEGE

Arya Vidyapeeth College (Autonomous)  
Gopinath Nagar, Guwahati, Assam Pin – 781127.

April -2024

Prepared by

**Thunderbolt Energy Consultancy, Pune**

In Association with

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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.



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## Acknowledgement

We express our sincere gratitude to the authorities of Arya Vidyapeeth College for entrusting and offering the opportunity of energy performance assessment assignment.

- Dr. Pradip Kumar Bhattacharyya- Principal
- Dr. Anurupa Devi - Co-Ordinator (IQAC)

We are thankful to Arya Vidyapeeth College 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.

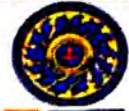


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## Why Energy Audit?

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.



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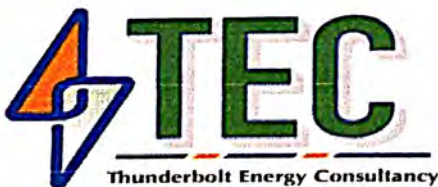
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## Energy Audit Team

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. Prashant Yadev	Data tabulation and analysis & report preparation	Graduate in Electrical & Electronics Engineering with experience in field data collection, Data analysis, Green building and Environment assessment.



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## Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the Energy Consumption & mitigate the CO<sub>2</sub> emissions.

Arya Vidyapeeth College, 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	19,225	159,457
2	Minimum	3,029	40,239
3	Average	9,077	88,933

### 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.



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### 3. Key Observations

1. College has 125 kVA Diesel Generator set for uninterrupted power supply in case of supply failure from APDCL.
2. Presently 63 kVA transformer is installed in college campus.
3. There are about 749 Nos old Tube light fittings which need to be replaced by 18 W LEDs.
4. There are about 18 Nos 18 W CFL light fittings which need to be replaced by 9 W LEDs.
5. There are 539 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. Regarding the use of renewable energy college has installed 120 number of solar panels with total capacity 40 KW and few solar street lights.
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 3 nos. of Pump set has capacity of 1 HP.

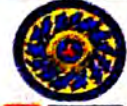


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4. Recommendations

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 749 Nos Tube Light fittings with 18W LED fittings	12,359	0.834	4.869	70
2	Replacement of 18 Nos CFL fittings with 9 W LED fittings	122	0.008	0.039	57
3	Replacement of 539 Nos Old Ceiling Fans with STAR rating fans	16,170	1.091	11.858	130
4	To reduce billed contract demand from 91.76 kVA to 50 kVA	NA	0.752	NA	NA
5	Replacement of 27 Nos Old 1.5 TR Acs with STAR rating Acs	17,213	1.162	12.150	125
6	Optimize the temperature setting to 23-25 degree Celsius	972	0.066	NA	NA
<b>Total</b>		<b>46,835</b>	<b>3.91</b>	<b>28.92</b>	<b>-</b>

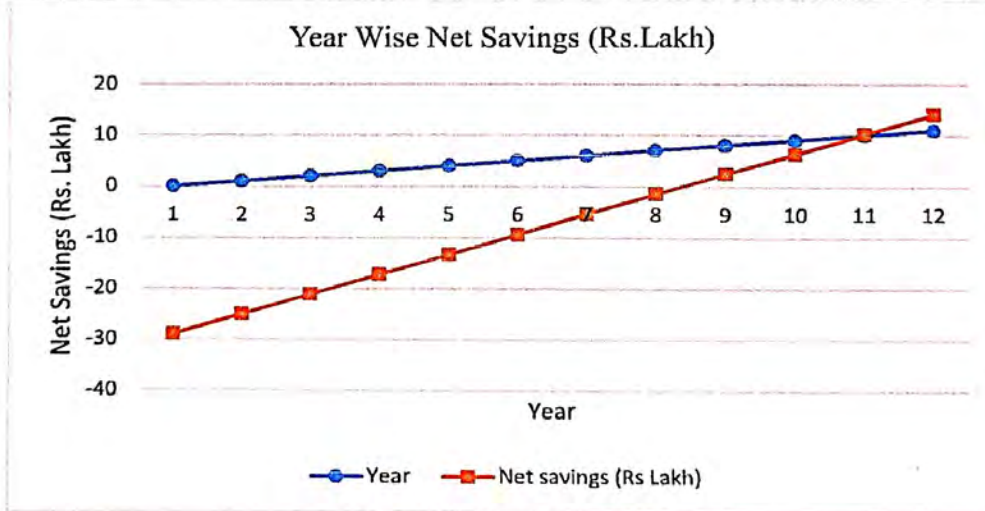


Figure 1 Year Wise Net Savings (Rs. Lakh)



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### 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



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## 1. Introduction

Established on 29th July 1958, Arya Vidyapeeth College, is one of the beacons in the field of education in Assam, catering to the requirements of higher education and tapping the intellectual potential of the youth of the entire North East India. Tomaso Ma Jyotirgamaya (Let the advent of light remove all darkness) are the opening words of the vision statement of the College. Arya Vidyapeeth College is the fruit of the missionary zeal and relentless efforts on the part of a team of exceptionally farsighted visionaries led by Late Giridhar Sarma, an exceptional personality, renowned academician and litterateur of repute. Luminaries like Mahendra Mohan Choudhury (former Chief Minister of Assam and Governor of Punjab), Prof. Radha Kanta Das, a prominent mathematician of the region, educationist Sarat Chandra Goswami and some other leading citizens were involved in this noble endeavour.

Since its inception, the College has consistently been able to meet the challenges and ever changing demands in the field of higher education. While keeping its roots deeply entrenched in human values, the College has carved a niche for itself as a melting pot of diverse cultures of the region which reflects the true spirit of India. The College is committed to empower the young generation through quality education and provides various opportunities to hone their extra-curricular skills and thereby developing their strong sense of social responsibility. Arya Vidyapeeth College has played a significant role in academic upliftment of the disadvantaged students of the region. The College has a consistent record of ensuring a better academic performance of students with a lower input at the entry level.

### 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.

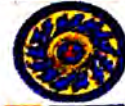


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### 1.2 Audit methodology

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.



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### 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 Accreditation 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

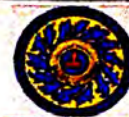


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## 2. Energy Details

The electricity supply for Arya Vidyapeeth College is provided by Assam Power Distribution Company Limited. The energy consumed by Arya Vidyapeeth College falls under LT Category. The facility also has 1 DG sets of 125 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.
Arya Vidyapeeth College	HT IV (BULK SUPPLY) (Govt. Education)	006000002970

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
- 5) Air Conditioner

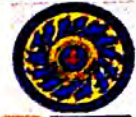


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### 3. Study of connected load

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	256	4.61
2	Non LED Lighting	No. of tubes Light	40	749	29.96
3	CFL	No. of CFL Light	18	18	0.32
4	Fan Load	No. of Fans (Celling+ Wall+ Exhaust)	70	600	42.00
5	Office Load	No. of Projectors	500	18	9.00
6	Office Load	No. of Computers	250	126	31.50
7	Office Load	No. of Printers	500	29	14.50
8	Office Load	No. of Xerox machine	1000	3	3.00
9	Other Load	No. of Refrigerator	500	10	5.00
10	Other Load	No. of Pumps	750	4	3.00
11	Air Conditioner	No. of AC	1000	27	27.00
<b>Total Load kW</b>					<b>169.89</b>



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**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	34.89	4.61	30.28
	Percentage %	100	13.21	86.79
(B)	Energy in kWh per year	26,169	3,456	22,713
	Percentage %	100	13.21	86.79

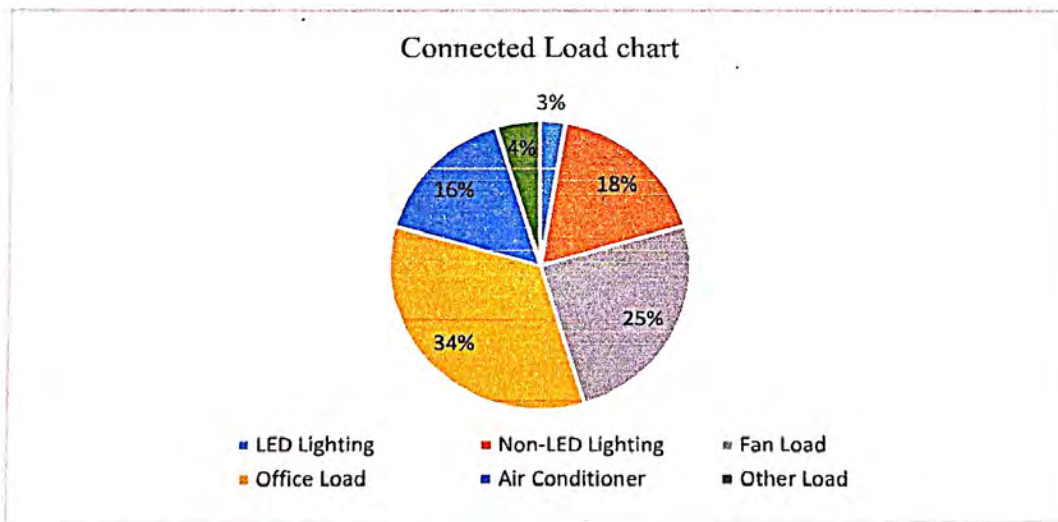
Note- Above calculation is based on 3 hours working and 250 days per annum.

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	256	4.61
2	Non-LED Lighting	767	30.28
3	Fan Load	600	42.00
4	Office Load	176	58.00
5	Air Conditioner	27	27
6	Other Load	14	8.00

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



**Figure 2 Distribution of connected load**



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## 4. Study of Electrical Energy Consumption

Consumer Name- Arya Vidyapeeth College

Consumer Number- 006000002970

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

Table 8 Electricity bills of consumer 006000002970

Sr. No.	Month	Energy (kWh)	Bill Amount (Rs)	Max. Demand (kVA)
1	Mar-23	7,353	69,313	38.00
2	Apr-23	7,997	74,146	58
3	May-23	11,058	105,526	60
4	Jun-23	12,280	115,081	76
5	Jul-23	8,350	83,206	42
6	Aug-23	19,225	159,457	106
7	Sep-23	13,949	139,417	96
8	Oct-23	9,079	93,734	86
9	Nov-23	7,391	78,773	52
10	Dec-23	4,900	57,240	22
11	Jan-24	3,029	40,239	16
12	Feb-24	4,307	51,069	24
	<b>Total</b>	<b>108,918</b>	<b>1,067,201</b>	<b>676</b>

Key observations of electricity bill are as follows,

Table 9 Key observations of consumer 006000002970







Sr no	Parameter	Energy consumed, (Units)	Bill Amount (Rs)	Max. Demand (kVA)
1	Maximum	19,225	159,457	106.00
2	Minimum	3,029	40,239	16.00
3	Average	9,077	88,933	56.33



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Variation in energy consumption is as follows,

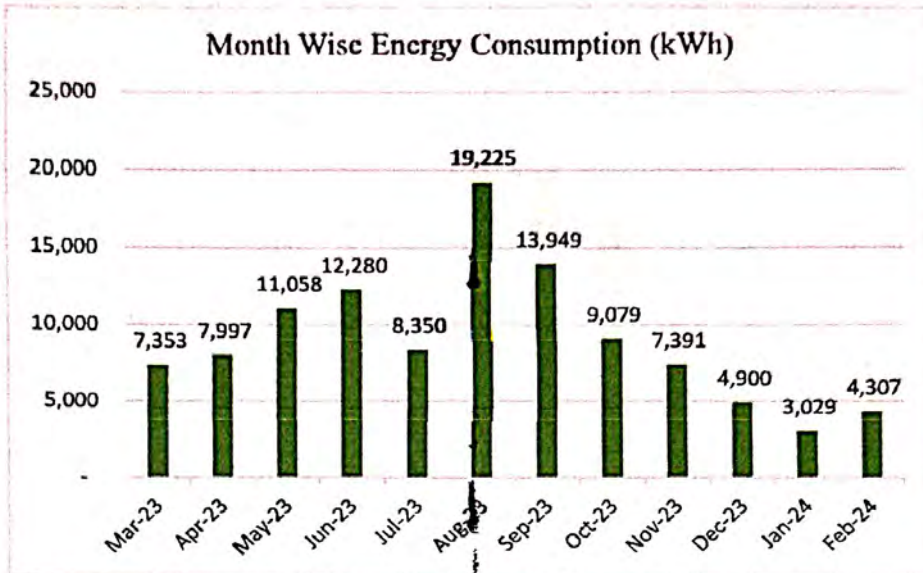


Figure 3 Month wise energy consumption of consumer 006000002970

Monthly variation in electricity bill is as follows,

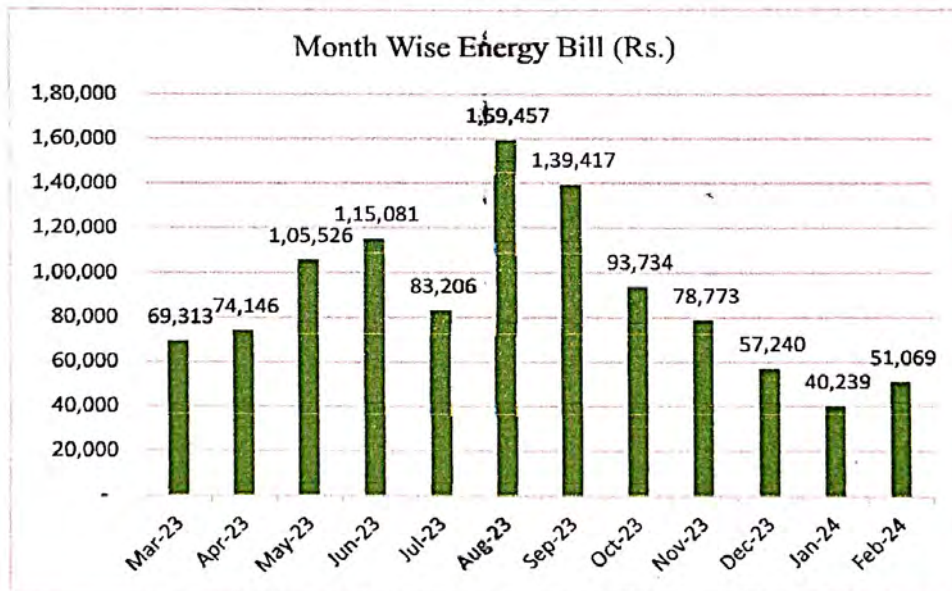
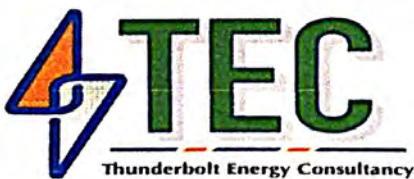


Figure 4 Month wise electricity bill of consumer 006000002970

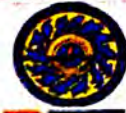


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Monthly variation in Maximum demand is as follows,

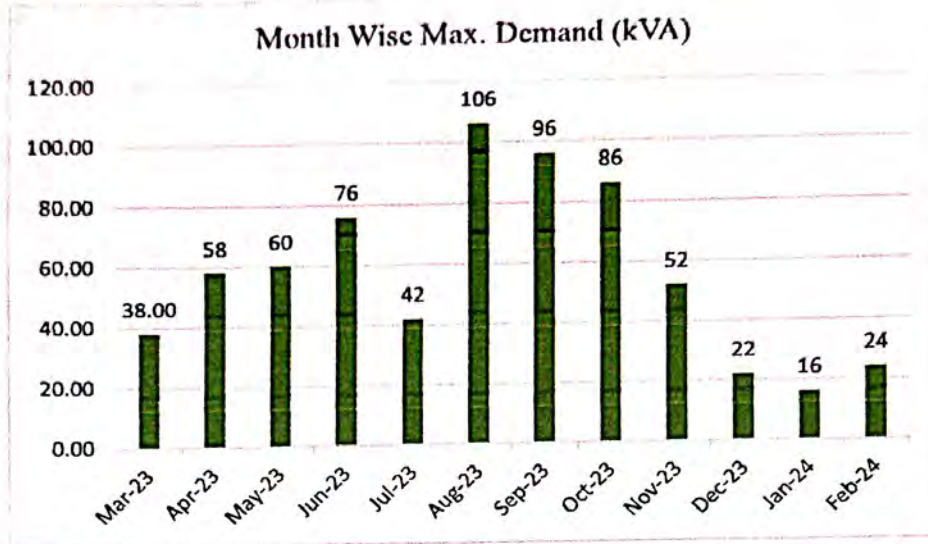


Figure 5 Month wise electricity bill of consumer 006000002970

## 5. Carbon Footprint

1. **A Carbon Foot print** is defined as the Total Greenhouse Gas emissions (CO<sub>2</sub> 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<sub>2</sub> Emissions:**

The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy is as under

1 Unit (kWh) of Electrical Energy releases **0.85 Kg of CO<sub>2</sub>** into atmosphere.

Based on the above Data we compute the CO<sub>2</sub> 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



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Consumer Name- Arya Vidyapeeth College

Consumer Number- 006000002970

Table 10 Month wise Consumption of Energy & CO2 Emissions of consumer 006000002970

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Mar-23	7,353	6.25
2	Apr-23	7,997	6.80
3	May-23	11,058	9.40
4	Jun-23	12,280	10.44
5	Jul-23	8,350	7.10
6	Aug-23	19,225	16.34
7	Sep-23	13,949	11.86
8	Oct-23	9,079	7.72
9	Nov-23	7,391	6.28
10	Dec-23	4,300	4.17
11	Jan-24	3,029	2.57
12	Feb-24	4,307	3.66
	<b>Total</b>	<b>108,918</b>	<b>87.13</b>

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

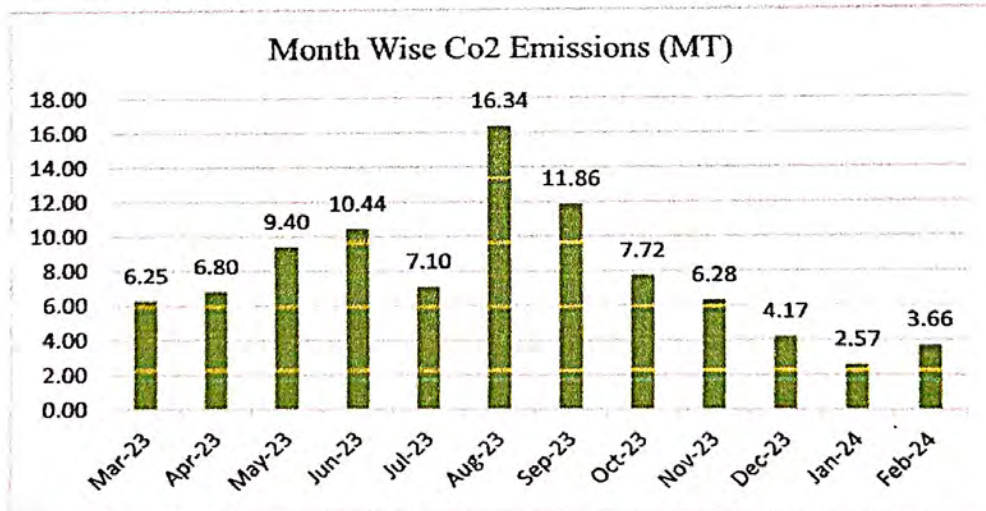


Figure 6 Month wise CO2 emissions of consumer 006000002970



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## 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 749 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 18 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 27 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 539 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. 51 Nos of wall fan and 10 Nos of table fan also available in the premises.

### 6.4 Office Load

In Office load facility have 126 nos of computer, 29 nos printers, 3 Photocopier machine/Xerox machine and Invertor system for office use.

### 6.5 Submersible Pump Load

Drinking water purpose premise having 3 nos of water bore well pump. Water is supplied from bore well to tank and Pump set has capacity of 1 HP.



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## 7. Energy conservation proposals

### 7.1 Replacement of 749 Nos Old, FTLs with 18 W LED fittings

In the facility, there are about 749 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	749	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	49	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	12,359	kWh/Annum
9	Rate of Electrical Energy	6.75	Rs/kWh
10	Annual Monetary saving	0.834	Rs. In Lakh/Annum
11	Cost of 18 W LED Tube	650	Rs/Unit
12	Investment required	4.869	Rs. In Lakh/Annum
13	Simple Payback period	70	Months

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



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## 7.2 Replacement of 18 Nos CFL fitting with 9 W LED fittings

In the facility, there are about 18 No fittings. It is recommended to 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	18	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	0.49	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	122	kWh/Annum
9	Rate of Electrical Energy	6.75	Rs/kWh
10	Annual Monetary saving	0.008	Rs. In Lakh/Annum
11	Cost of 18 W LED Tube	0.15	Rs/Unit
12	Investment required	0.039	Rs. In Lakh/Annum
13	Simple Payback period	57	Months

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



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### 7.3 Replacement of 539 Nos Old Fans with STAR Rated Ceiling Fans

During the Audit, it was observed that there are 539 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	539	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	5	hrs/Day
6	Daily saving in Energy	65	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving potential	16,170	kWh/Annum
9	Rate of Electrical Energy	6.75	Rs/kWh
10	Annual Monetary saving	1.091	Rs. In Lakh/Annum
11	Cost of STAR Rated Ceiling Fan	2,200	Rs/unit
12	Investment required	11.858	Rs. In Lakh/Annum
13	Simple Payback period	130	Months

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



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#### 7.4 Reduce Contract demand from 91.76 kVA to 20 kVA.

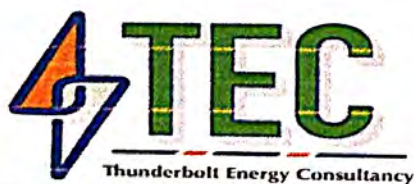
During the Bill Analysis, it was observed that average maximum demand in 2023-2024 is 56.33 kVA and Contracted Demand is 91.76 kVA.

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	91.76	kVA
2	Current highest maximum demand	106	kVA
3	Recommended contract billed demand	50	kVA
4	Reduction in billed demand	42	kVA
5	Per unit charges for billed demand	150	Rs/ kW/ month
6	Monthly Monetary savings	6,264	Rs/month
7	Annual monetary savings	0.752	Rs/year







It is suggested to reduce contract demand from 91.76 kVA to 50 kVA.



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### 7.5 Replacement of 27 Nos old ACs with STAR Rated ACs.

During the field visit it is observed that 27 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	27	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	69	kWh/Day
7	Annual Working Days	250	Nos
8	Annual Energy Saving possible	17,213	kWh/Annum
9	Rate of Electrical Energy	6.75	Rs/kWh
10	Annual Monetary saving	1.162	Rs. In Lakh/Annum
11	Cost of STAR Rated 1.5 TR AC	45,000	Rs/unit
12	Investment required	17,150	Rs In Lakh/Annum
13	Simple Payback period	125	Months


It is recommended to change ACs in a phase manner.



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### 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<sup>o</sup> C to 22<sup>o</sup> C.

It is known that a 1<sup>o</sup>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	27	Nos
2	Energy Demand of Old 1.5 TR AC	2.00	kW/Unit
3	Estimated consumption of Acs	162	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	972	kWh/Annum
8	Unit Rate	6.75	Rs/kWh
9	Annual Saving	0.066	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<sup>o</sup>C to 25<sup>o</sup> C and keeping inlet temperature unaltered.



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## 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 749 Nos Tube Light fittings with 18W LED fittings	12,359	0.834	4.869	70
2	Replacement of 18 Nos CFL fittings with 9 W LED fittings	122	0.008	0.039	57
3	Replacement of 559 Nos Old Ceiling Fans with STAR rating fans	16,170	1.091	11.858	130
4	To reduce billed contract demand from 91.76 kVA to 50 kVA	NA	0.752	NA	NA
5	Replacement of 27 Nos Old 1.5 TR Acs with STAR rating Acs	17,213	1.162	12.150	125
6	Optimize the temperature setting to 23-25 degree Celsius	972	0.066	NA	NA
<b>Total</b>		<b>46,835</b>	<b>3.91</b>	<b>28.92</b>	<b>-</b>



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Certificate



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This is to certify that

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has been independently assessed by QRO and is compliant with the requirement of:

ISO 50001:2018

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Date of Certification: 15th April 2023 2nd Surveillance Audit Due: 14th April 2025 1st Surveillance Audit Due: 14th April 2024 Certificate Expiry: 14th April 2026

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