NALLAMUTHU GOUNDER MAHALINGAM COLLEGE

(Autonomous Institutions -Affiliated to Bharathiar University)

ISO 9001:2015 Certified and Re-Accredited with "B "Grade by NAAC

POLLACHI – 642 001

ENERGY AUDIT REPORT

AUDIT / REPORT BY

ALCHEME GREEN ENERGY COMPANY
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ACKNOWLEDGEMENT

We at ALCHEME GREEN ENERGY COMPANY, Madurai are thankful to the principal for giving us the opportunity to carry out Energy audit at Nallamuthu Gounder Mahalingam College, Pollachi -642 001. Alcheme Green Energy Company team is also thankful to all other supporting Officers / Staffs of the above institute for their wholehearted support, hospitality and the courtesy extended to the Audit team during the course of the visit.

The following officers from Alcheme Green Energy Company under the guidance of Mr. C. Jebaraj, B.Tech., have carried out the Energy Audit.

Name	Qualifications	Certification Number
Mr. C. Jebaraj	B.Tech., PDGEM., DIS., BEE Certificated Energy Auditor, IRCA Certified Lead Auditor - OHSMS Internal Auditor-QMS CII Certified Carbon footprint Professional	EA-9847
Mr. S. Lakhsmana Kumaran	B.Tech., MSc.,(Env. Science), MBA., IRCA Certified Lead Auditor ISO 14001 EMS	UID - 351851

The following staff from the Institution participated in the audit process

Name	Qualification	Designation
Dr. R. Muthukumaran	M.A., M.Phil., B.Ed., Ph.D.,	Principal
Dr. R. Manicka Chezhian	M.Sc., M.S., Ph.D.,	IQAC Co-Ordinator
Thiru. K. Srinivasan	M.C.A	Associate Professor Department of Computer Science ERP Co-Ordinator
Dr. A. Srividhya	M.A., M.Phil., Ph.D.,	Assistant Professor Department of English
Dr. P. Archanaa	M.Com., M.Phil., PGDCA., Ph.D., M.A[HINDI]	Assistant Professor PG Department of Commerce with Computer Applications
Dr. A. Kanakaraj	MCA., M.Sc., M.Phil., Ph.D., DIR	Assistant Professor PG Department of Computer Science

Summary of Audit

Energy audit of Nallamuthu Gounder Mahalingam College and Hostel was carried by Alcheme Green Energy Company. The Audit team has gone through the data related to TNEB GRID Electrical Energy, Renewable Energy, Diesel and LPG consumption. A study was also carried out on Renewable energy utilisation and Energy Conservation measures to reduce energy consumption.

During the visit it was observed that Nallamuthu Gounder Mahalingam College strictly follows reduce, reuse and recycle policy to limit energy usage. The concept of energy conservation is disseminated among the students and staffs through various seminars/workshops and training programs.

We hope that the results presented in the energy auditing report will serve as a guide for the institution on the existing energy related practices and resource usage.

Note Worthy

Installation of 90KW On Grid Roof Top Solar Power Plant to reduce conventional energy usage

The audit outputs and recommendations are summarised as follows

- Annual electricity consumption from TNEB GRID is around 2,93,479units during the year 2021-2022.
- Electrical Energy consumption from Diesel Generator – 7,596 units.
- Solar Power Electrical energy consumption- 8,021 units
- Total Electrical Energy consumption – 3,09,096 units.
- LPG consumption - 3838 Kgs
- Solar water heater installed capacity 4,100 LPD
- High Volume low speed fans are provided at auditorium to reduce energy consumption
- BEE Star rated appliances are being used.

ENERGY SAVING POTENTIALS

1.**Conventional tube lights shall be replaced with LED tube lights**

Replacement cost for 100 LED tube lights-Rs 180x100= RS 18,000
Cost savings for 100 LED tube lights-Rs 44,600 / year
Energy savings for 100 LED tube lights-5,000 units/ year
Payback period-5 months

2.**Conventional fans shall be replaced with energy efficient fans**

Replacement cost for 100 Nos. ENERGY EFFICIENT FAN-Rs 2,800x100= RS ,80,000
Cost savings for 100 Nos. ENERGY EFFICIENT FAN -Rs 1,36,100/ year
Energy savings for 100 Nos. ENERGY EFFICIENT FAN -15,300 units/ year
Payback period 25 months

- Remaining Conventional Tube lights shall be replaced with LED tube lights in a phased manner
- 5 Star rated Energy efficient electrical equipments shall be procured in future
- Automatic power switch off systems may be introduced in the required areas

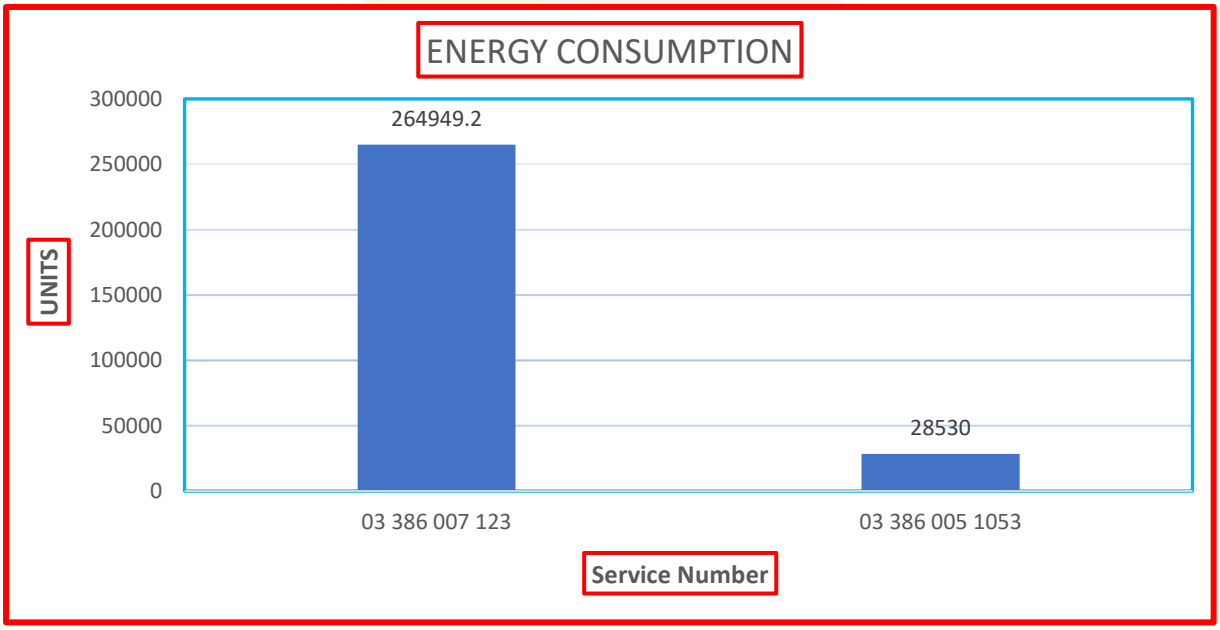
We are happy to submit this detailed energy audit report to the Nallamuthu Gounder Mahalingam College

Alcheme Green Energy Company
Madurai

1. Service connection, Tariff, Load and Energy consumption details

TNEB SERVICE CONNECTION DETAILS				
Sl. No	**Service Number**	**BLOCK/BUILDING NAME**	**Tariff**	**connected load in KW**
1	03 386 007 123	College	LM2B2	149.52
2	03 386 005 1053	Hostel	LM2B2	14.48
	Total			164

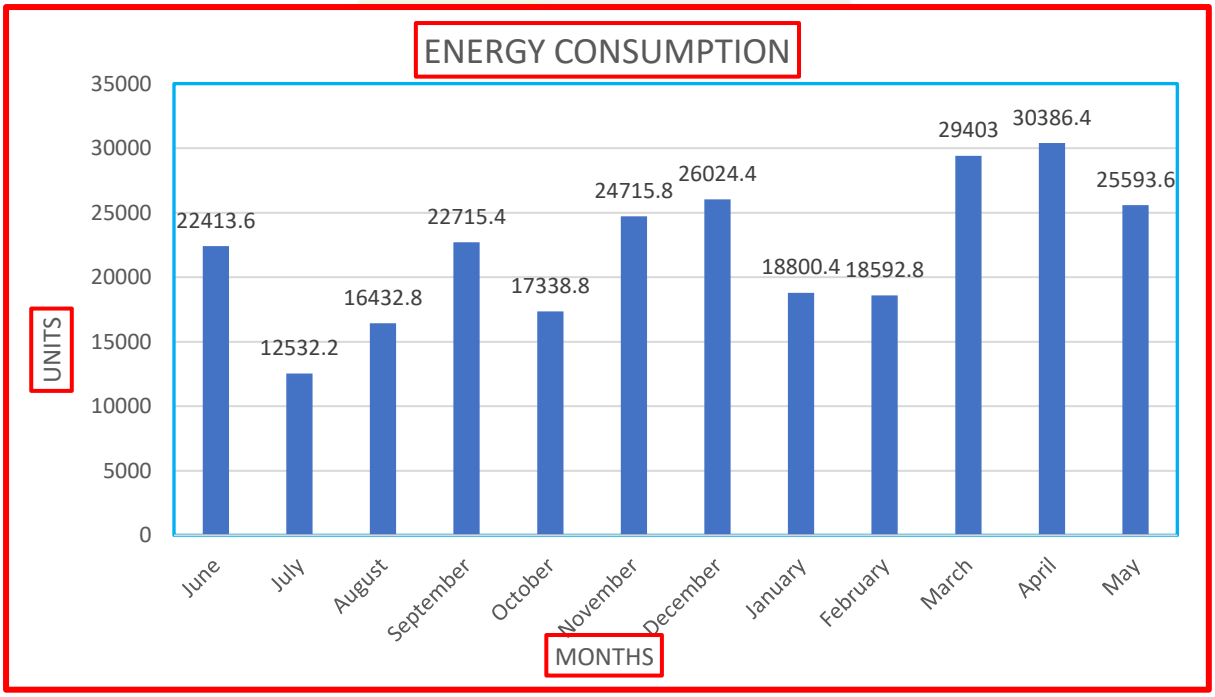
Sl. No	Service Number	Tariff	Units Consumed
1	03 386 007 123	LM 2B2	264949
2	03 386 005 1053	LM 2B2	28530
	Total		293479



College and Hostel Energy consumption during the year 2021-2022

2. Electrical Energy consumption in the college service number 03 386 007 123

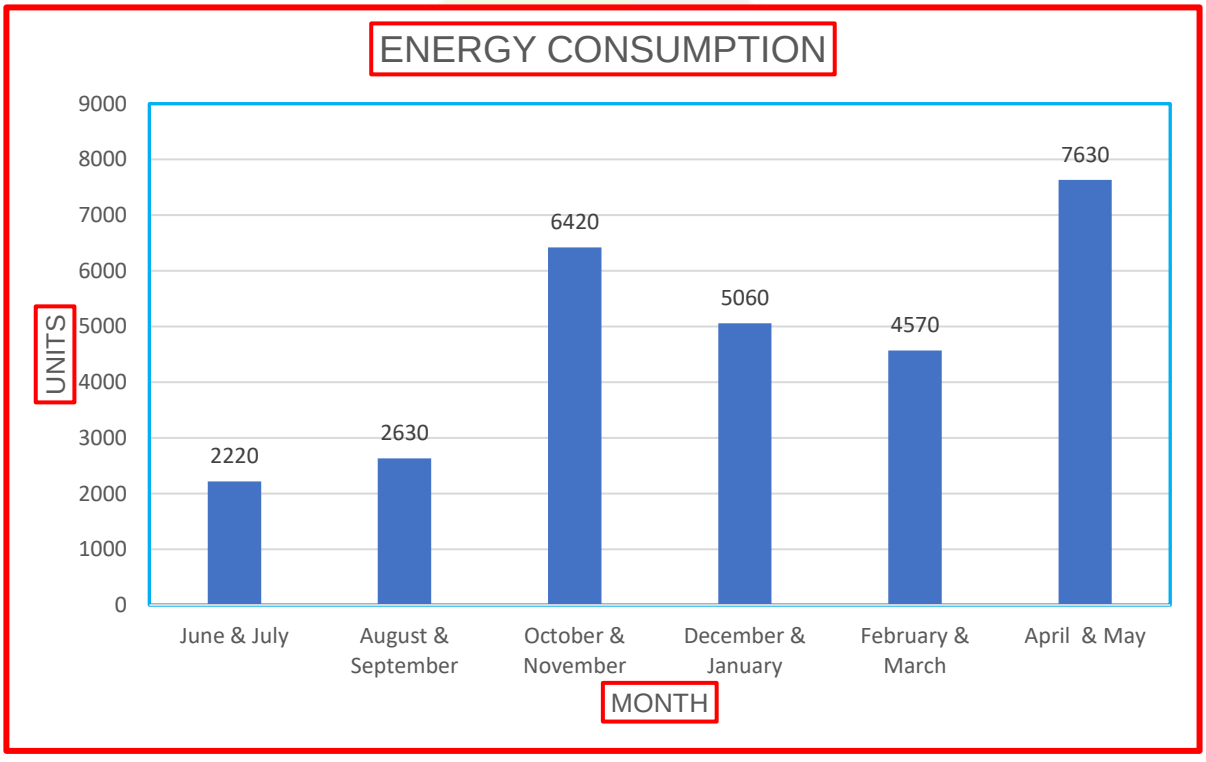
Sl. No.	Assessment Date	Months	Units Consumed
1	26.06.2021	June	22413.6
2	27.07.2021	July	12532.2
3	27.08.2021	August	16432.8
4	28.09.2021	September	22715.4
5	26.10.2021	October	17338.8
6	29.11.2021	November	24715.8
7	27.12.2021	December	26024.4
8	28.01.2022	January	18800.4
9	28.02.2022	February	18592.8
10	26.03.2022	March	29403
11	27.04.2022	April	30386.4
12	27.05.2022	May	25593.6
	Total		264949.2



Month wise Energy consumption in the college

3. Electrical Energy consumption in the hostel service number 03 386 005 1053

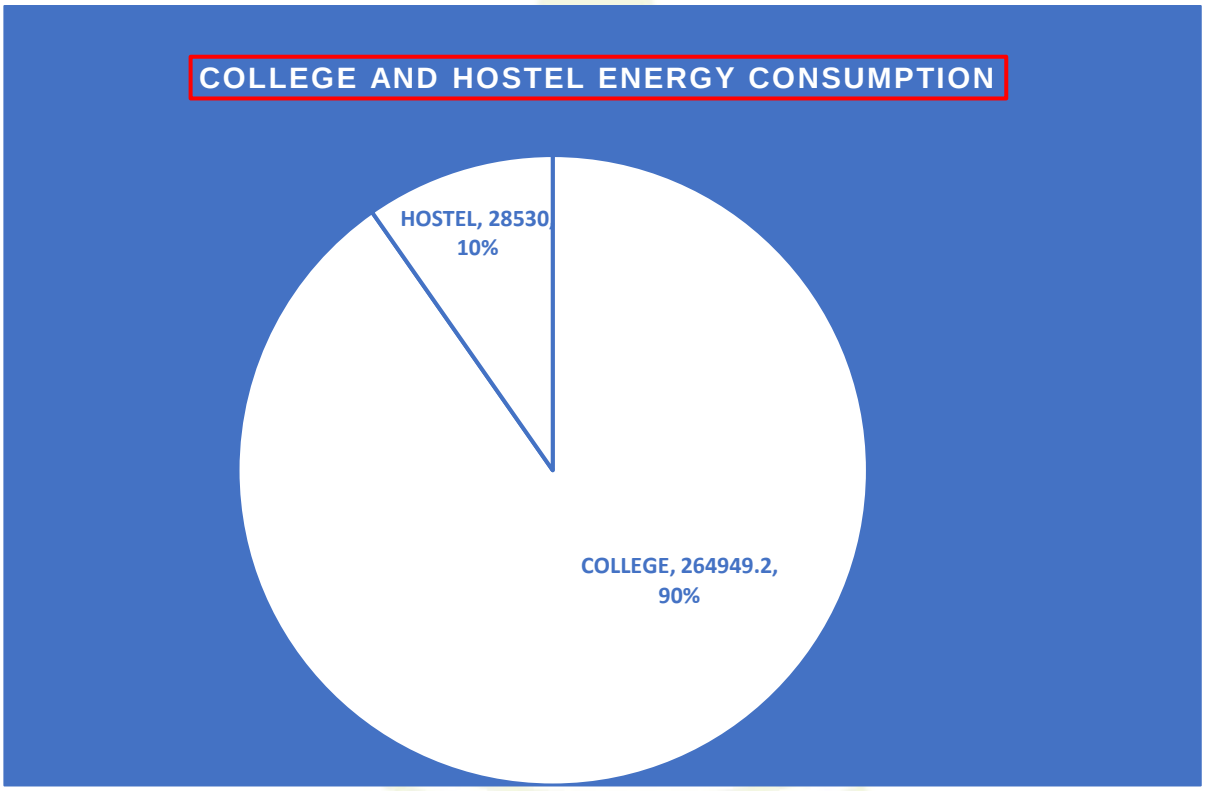
Service No 03 386 005 1053 14.48 KW 3 Phase Tariff LM2B2			
Sl. No.	**Assessment Date**	**Months**	**Units Consumed**
1	27.07.2021	June & July	2220
2	27.09.2021	August & September	2630
3	29.11.2021	October & November	6420
4	29.01.2022	December & January	5060
5	25.03.2022	February & March	4570
6	24.05.2022	April & May	7630
	Total		28530



Bi Monthly Energy consumption in the Hostel

4.TNEB Grid Energy consumption pattern in College and Hostel

Sl. No.	Place	Service Number	Units Consumed
1	COLLEGE	03 386 007 123	264949
2	HOSTEL	03 386 005 1053	28530
	TOTAL		293479



5.DG set Electrical Energy consumption

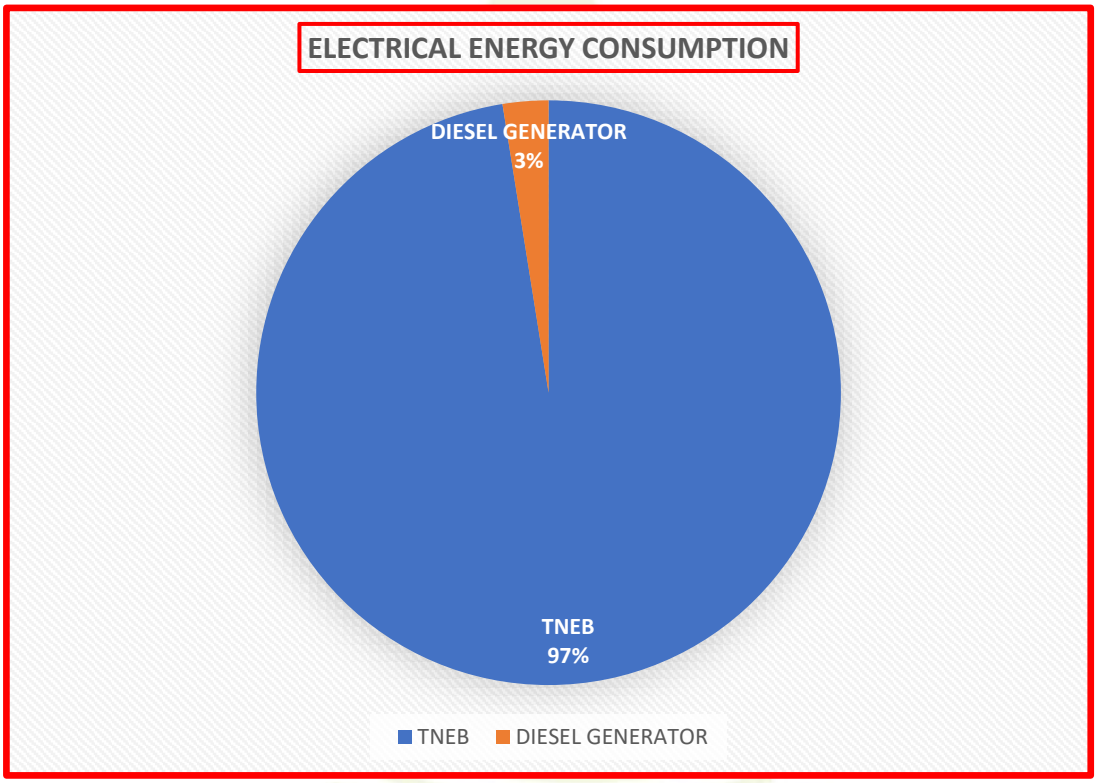
College Diesel Generator

Hostel Diesel Generator

- Total Diesel consumption-2532 litres
- Power generation -7596 units

6.Total Conventional Electrical Energy Consumption details

SL.NO	SOURCE	UNITS CONSUMED
1	TNEB	293479
2	DIESEL GENERATOR	7596
	Total	301075



7.Renewable Electrical Energy-Solar Electrical energy Consumption

ON GRID ROOF TOP SOLAR POWER PLANT

Capacity-90KW

Commissioned on 1St May 2022

Solar Energy generated up to 31.05.2022




Solar Street Lights

- Solar Street Lights -5 Nos
- Power of LED lamp-20watts
- Total power generation - 438 units

8.Conventional Thermal Energy consumption – LPG

LPG cylinders used- commercial cylinders of 19 kgs capacity

- LPG consumption in the hostel mess during the year 2021-2022- 200 cylinders
- LPG consumption in the college during the year 2021-2022- 2 cylinders
- **Total LPG consumption during the year 2021-2022- 3838 KGs (202 Cylinders)**

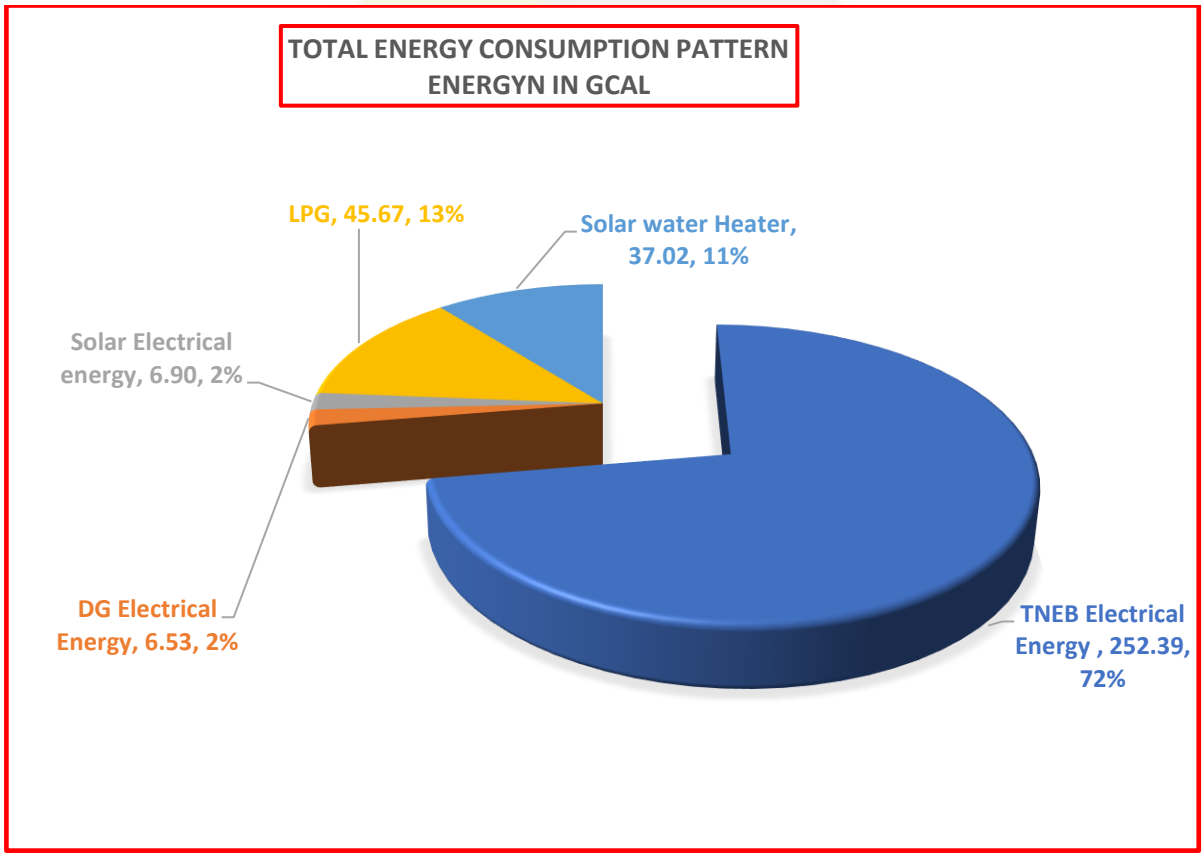
9. Renewable Thermal Energy

Total capacity of Solar Water Heaters-4100 Litters Per Day

	Boys Hostel 1000 LPD X 1
	Girls Hostel 1000 LPD X 1
	Girls Hostel 1000 LPD X 2 100 LPD X 1

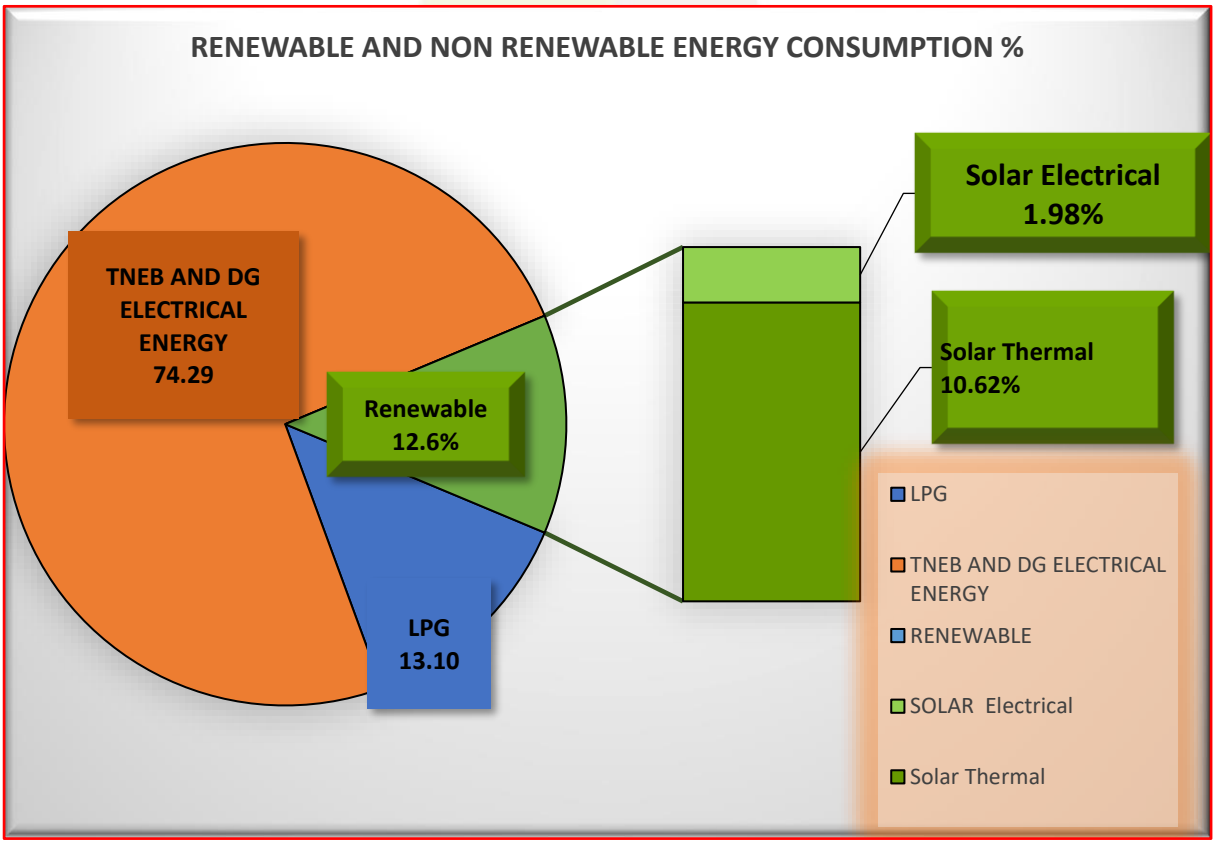
10.Total Energy consumption

SL.NO	TYPE OF ENERGY	ENERGY -GCAL
1	TNEB Electrical Energy	252.39
2	DG Electrical Energy	6.53
3	Solar Electrical energy	6.90
4	LPG	45.67
5	Solar water Heater	37.02
	Total	348.5



11.Renewable and Non-Renewable(conventional) energy distribution

ENERGY CONSUMPTION	PERCENTAGE
NON RENEWABLE	
LPG	13.10
TNEB AND DG ELECTRICAL ENERGY	74.29
RENEWABLE	
SOLAR Electrical	1.98
Solar Thermal	10.62



12.The energy conservation measures followed

- High volume Low Speed fans are provided in the auditorium
- Maximum utilisation of day lights at auditorium, hostel and colleges
- Staff and Students are made aware of using public transport system
- Individual vehicle usage is reduced to the minimum level
- Periodical maintenance and overhauling of generators is being carried out
- The fans, lights, air-conditioners and other electronic and electrical equipments are switched off when not in use.
- Lights and fans are switched off by the students whenever they are out of hostel rooms
- Replacing conventional electrical light fittings with energy efficient Light-Emitting Diode (LED) bulbs.
- Replacing old high energy consuming appliances with star rated energy efficient appliances.
- Computers are switched to sleep mode or hibernate mode automatically when not in use.
- At the end of every practical session, Computer monitors and UPS are switched off.
- Soft copies are maintained instead of hard copies, to reduce power consumption and paper.

13.Major Electrical load details

Sl. No	Equipment	Watts	Nos	Total watts	KW
1	Ceiling Fan	75	932	69900	69.9
2	Computer	180	560	100800	100.8
3	Printer	115	30	3450	3.45
4	LCD	240	30	7200	7.2
5	Light	36	99	3564	3.564
6	light	18	68	1224	1.224
7	Light	16	4	64	0.064
8	Light	11	131	1441	1.441
9	LED	32	88	2816	2.816
10	LED	18	193	3474	3.474
11	LED	20	335	6700	6.7
12	LED	9	236	2124	2.124
13	CFL	27	3	81	0.081
14	CFL	18	13	234	0.234
15	CFL	12	6	72	0.072
16	CFL	4	4	16	0.016
17	Sodium Light	250	27	6750	6.75
18	Pedestal Fan	60	12	720	0.72
19	Wall mounted fan	55	10	550	0.55
20	Xerox Printer	2100	5	10500	10.5
21	Water Doctor	750	12	9000	9
22	1 Ton AC	1000	9	9000	9
23	1.5 T AC	1500	20	30000	30
	HOSTEL				
	H	HP	Nos		KW
1	Ceiling Fan	3	2	6	4.5
2	Motor	3	1	3	0.003
3	Motor	7.5	3	22.5	0.0225
4	Motor	5	1	5	0.005
5	Motor	2	1	2	0.002
6	Motor	1	1	1	0.001
	Hostel				
	Equipment	Watts	Nos	Watts	KW
1	Wet Grinder	1300	1	1300	1.3
2	Wet Grinder	750	1	750	0.75
3	Mixie	1500	1	1500	1.5
4	Mixie	750	1	750	0.75
	UPS				
	30 KVA	1			
	20 KVA	6			
	10KVA	1			
	6 KVA	1			
	3KVA	10			

Lighting Load

Total Lighting load	28.56	KW	
Contribution on Total lighting Load			%
LED Load	15.11	KW	52.92
CFL load	0.40	KW	1.41
Conventional lights	13.04	KW	45.67

Diesel Generators

1. 200 KVA- 1- College

2.62.5 KVA- 2 - College

3. 25 KVA-1- Hostel

14.COMMON OBSERVATION AND FEEDBACK

1. Lightning arrestor system is provided in the campus
2. Metal Roof was provided for DG sets to avoid rain water entry and rust formation on silencer.
3. Unwanted materials to be removed from power room
4. Energy conservation program for all staffs shall be planned on regular basis
5. Additional Display of Emergency contact numbers to be posted on prominent places
6. History card to be maintained for all UPS and batteries.
7. Proper ventilation to be ensured in battery and UPS storage room
8. Solar Street light system battery conditions to be checked on periodical manner
9. Five star rated energy efficient appliances to be procured in the future

Lightning Arrestor

Shed for DG

15. AUDIT FINDINGS & ENERGY SAVING POTENIAL

Findings

- Annual electricity consumption from TNEB GRID is around 2,93,479units during the year 2021-2022.
- Electrical Energy consumption from Diesel Generator – 7,596 units.
- Solar Power Electrical energy consumption- 8,021 units
- Total Electrical Energy consumption – 3,09,096 units.
- LPG consumption - 3838 Kgs
- Solar water heater installed capacity 4,100 LPD
- High Volume low speed fans are provided at auditorium to reduce energy consumption
- 5 Star rated Energy efficient electrical equipments shall be procured in future
- In total Lighting loads, 52.92 % lighting loads are converted into LED lighting system. Remaining Conventional Tube lights shall be replaced with LED tube lights in a phased manner
- Lightning arrestor was provided inside the campus at higher elevation
- Students and staff may be encouraged to shift over to E- Vehicle
- Automatic power switch off systems may be introduced in the required areas

Renewable Energy

90KW On Grid Roof Top Solar Power Plant was installed and commissioned on 1st May 2022

Bi Directional meter to be fixed in the existing energy meter as soon as possible to harvest maximum Solar Energy

Energy saving potentials

1.Conventional tube lights shall be replaced with LED tube lights

Conventional tube light (with electronic choke) energy consumption-40 watts/hr

LED Tube lights energy consumption-20 watts/ hr

Savings per tube light -20 watts/hr

No of hours usage per day in the hostel– 10 hrs

No of days hostel occupied with students-252 days

Energy savings per tube light per year -252 x10x20= 50,400wh=50 units

Average energy cost- Rs 8.5/unit + 5% Tax = Rs 8.9/unit

Cost saving per year per tube light-50 x 8.925 = Rs 446

Cost savings per month-Rs 37

Approximate Cost of LED tube light -Rs 180

Payback period-5 months

Replacement cost for 100 LED tube lights-Rs 180x100= RS 18,000

Cost savings for 100 LED tube lights-Rs 44,600 / year

Energy savings for 100 LED tube lights-5,000 units/ year

Payback period-5 months

2. Conventional fans shall be replaced with energy efficient fans

Conventional FAN energy consumption-60 watts/hr

ENERGY efficient fan energy consumption-28 watts/ hr

Savings per fan -32 watts/hr

No of hours usage per day in the hostel– 16 hrs

No of days hostel occupied with students-252 days

Energy savings per fan per year -252x16x38= 153216wh=153 units

Average energy cost- Rs 8.9 /unit

Cost saving per year per FAN-153 units x 8.9 = Rs 1361

Cost saving per month-Rs 113

Cost of ENERGY EFFICIENT FAN -Rs 2800

Payback period 25 months

Replacement cost for 100 Nos. ENERGY EFFICIENT FAN-Rs 2,800x100= RS 2,80,000

Cost savings for 100 Nos. ENERGY EFFICIENT FAN -Rs 1,36,100/ year

Energy savings for 100 Nos. ENERGY EFFICIENT FAN -15,300 units/ year

Payback period 25 months