



Estd. 1919

# National College (Autonomous)

Tiruchirappalli - 620001, Tamil Nadu, INDIA

Nationally Re-accredited with 'A+' Grade by NAAC with CGPA of 3.61 on 4.00 scale

College with Potential for Excellence

## ENERGY AUDIT REPORT 2022-2023



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 National College, Trichy -620 001. 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.

<b>Name</b>	<b>Qualifications</b>	<b>Certification Number</b>
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. Lakshmana 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

<b>Name</b>	<b>Designation</b>
Dr. KUMAR.K	Principal & Chairperson
Dr. D.E. Benet	Coordinator
Mr. Thangaraj	Estate Manager

## Energy Audit - Methodology

Energy audit consists of survey, analysis and inspection of the energy flow in the system. Its aim is to find the scope of energy conservation by implementing energy saving procedures without affecting the outputs of the system. Energy audit plays a significant role in finding opportunities to save energy and reduce electricity bills / carbon emissions. Energy audit recommends ways to implement renewable energy systems & energy efficiency enhancement technologies thereby reducing the overall carbon footprint and to achieve carbon “net zero” emissions.

### **Step 1: Pre-audit data collection**

The main purpose of this step is to evaluate the characteristics of the energy systems and the energy use. Some of the tasks that can be performed in this step are presented below, with the key goals expected from each task:

- Identify the energy consumption
- Determine the consumption patterns of energy
- Understand utility rate structure (energy and demand)

### **Step 2: Walk-Through Survey**

In this step we should identify potential for energy savings measures. The results of this step are important since they determine if it requires any further energy auditing work. Some of the tasks involved in this step are

- Identify the customer’s concerns and needs
- Check the current operating and maintenance procedures
- Determine the existing operating conditions of major energy use equipment
- Estimate the occupancy, equipment, and lighting (energy use density and hours of operation)

### **Step 3: Baseline for Building Energy Use**

The main purpose of this step is to develop a base model that represents the existing energy use and operating conditions. This will be used as a reference to estimate the energy savings due to appropriately selected energy conservation measures. The major tasks to be performed during this step are

- Inspect, test, and evaluate equipment for efficiency, performance, and reliability
- Obtain all energy consuming equipment (including lighting, fans, HVAC systems, motors, pumps etc.,)

## Step 4: Evaluation of Energy-Saving Measures

In this step, a list of cost-effective energy conservation measures is determined using both energy savings and economic analysis. To achieve this goal, the following tasks are recommended:

Prepare a comprehensive list of energy conservation measures (using the information collected in the walk-through survey)

Evaluate the cost-effectiveness of each energy conservation measure using an economic analysis method (simple payback or life-cycle cost analysis) The outcome of this audit can recommend for a detail audit with clear evidence and easily implementable suggestions/solutions can be given to reduce energy consumption.

Energy audit consists of:

- Scout energy consumption in the organization
- Find the scope for saving
- Identify the most likely areas for attention
- Identify areas of improvements/ savings
- Set a 'reference point



## Summary of Audit

Energy audit of National 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 National 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.

### The audit outputs and recommendations are summarised as follows

- Electrical Energy consumption from TNEB during the year 2022-2023 –6,57,880 units.
- Electrical Energy consumption from Diesel Generator –10,800 units.
- Total Electrical Energy consumption from TNEB and DG –6,68,680 units.
- LPG consumption -58,216 Kgs
- Diesel consumption -3,600 litres
- Lot of Energy conservation initiatives are taken. Energy efficient appliances are installed
- Renewable energy utilisation shall be planned in the coming years

### 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 47,500 / year**

**Energy savings for 100 LED tube lights-4,800 units/ year**

**Payback period-4.5 months**

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

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

**Cost savings for 100 Nos. ENERGY EFFICIENT FAN -Rs 1,52,400 / year**

**Energy savings for 100 Nos. ENERGY EFFICIENT FAN -15,400 units/ year**

**Payback period 22 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

We are happy to submit this detailed energy audit report to the National College



**Alchemer Green Energy Company  
Madurai**



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**1. TNEB HT Service connection number and energy consumption**

TNEB HT SERVICE CONNECTION DETAILS	
Service Number	06 909 442 0343
Tariff	HT II B
Maximum Demand Permitted	350 KVA
Demand Charges	Rs 562/KVA
Consumption tariff	Rs 7.65 per unit
Peak hour consumption (25% extra)	Rs 1.91 per unit
Night hour consumption (5% rebate)	Rs 0.3825

**From April 2023 onwards all LT services inside the college campus were merged and only one HT service is existing as per TNEB requirements**

**LT service for Boys Hostel is existing as such (located outside the college campus)**

HT Service Energy Consumption details for the year 2022-2023

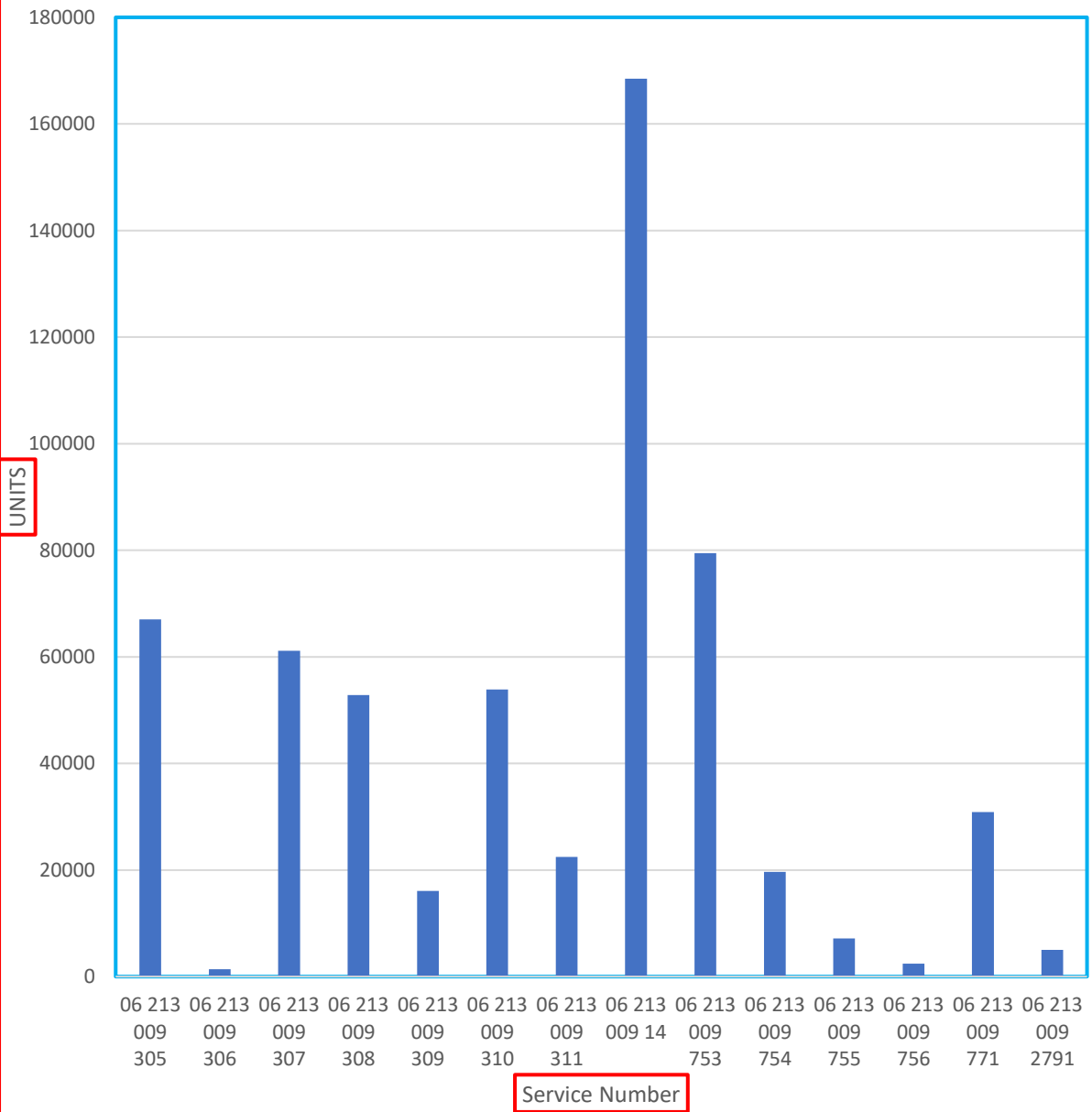
Billing Month	Energy consumption in units	Total Bill amount-Rs
April - 2023	28,752	5,25,589
May - 2023	41,308	5,24,782
Total	70,060	



2. **TNEB LT Service** connection numbers and energy consumption

<b>TNEB LT Service Energy consumption in the year 2022-2023</b>				
<b>Sl. No</b>	<b>SERVICE NO</b>	<b>Units Consumed</b>	<b>Bill Amount -Rs</b>	<b>Average Unit cost-Rs</b>
1	06 213 009 305	67010	532491	7.95
2	06 213 009 306	1380	12978	0.00
3	06 213 009 307	61115	490096	8.02
4	06 213 009 308	52820	417799	7.91
5	06 213 009 309	16070	129588	8.06
6	06 213 009 310	53880	427754	7.94
7	06 213 009 311	22470	180611	8.04
8	06 213 009 14	168495	1341497	7.96
9	06 213 009 753	79460	608542	7.66
10	06 213 009 754	19670	163386	8.31
11	06 213 009 755	7160	58325	8.15
12	06 213 009 756	2430	21762	8.96
13	06 213 009 771	30860	271784	8.81
14	06 213 009 2791	5000	59893	11.98
	<b>Total</b>	<b>587820</b>	<b>4716506</b>	

TNEB LT SERVICE ENERGY CONSUMPTION



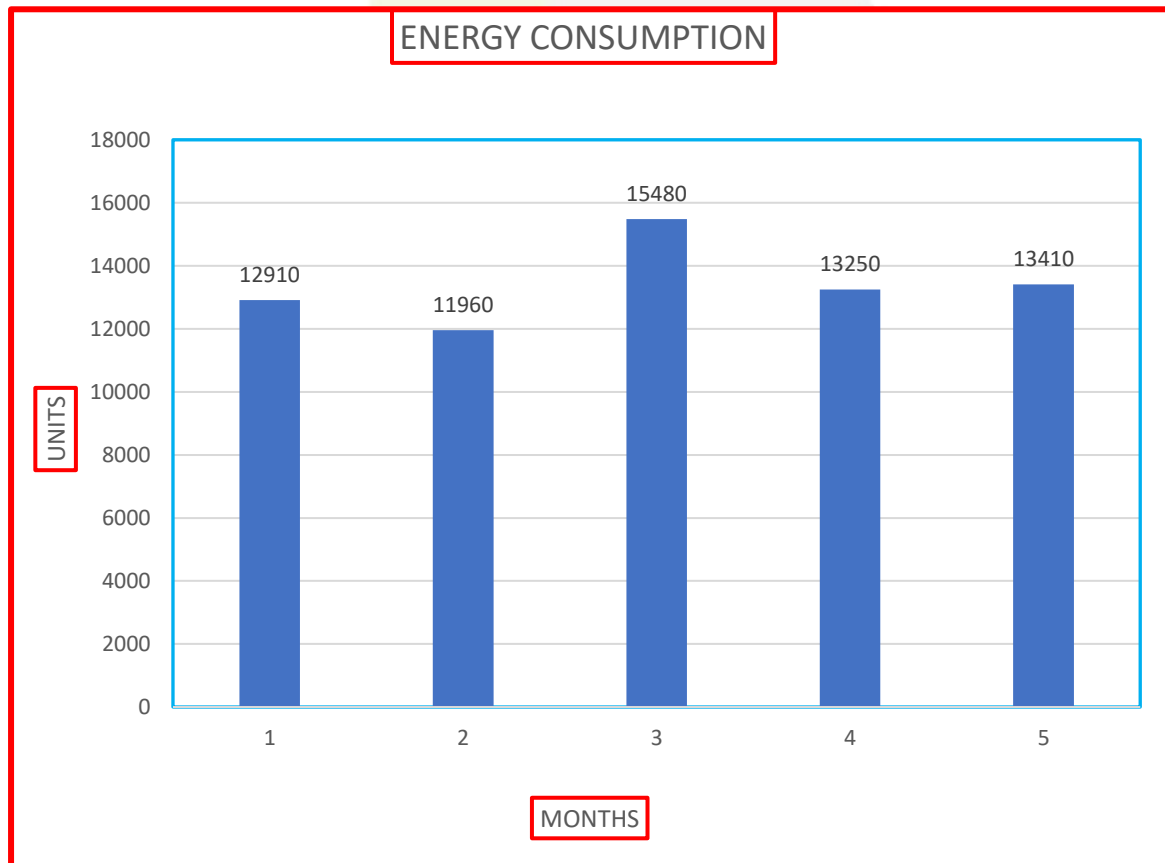
### 3.Total TNEB Electrical Energy Consumption both LT and HT

	HT Service	units
1	HT II B	70,060
2	HT Commercial	0
3	HT Temp	0
	LT SERVICE	
1	14 services	5,87,820
	Total	6,57,880



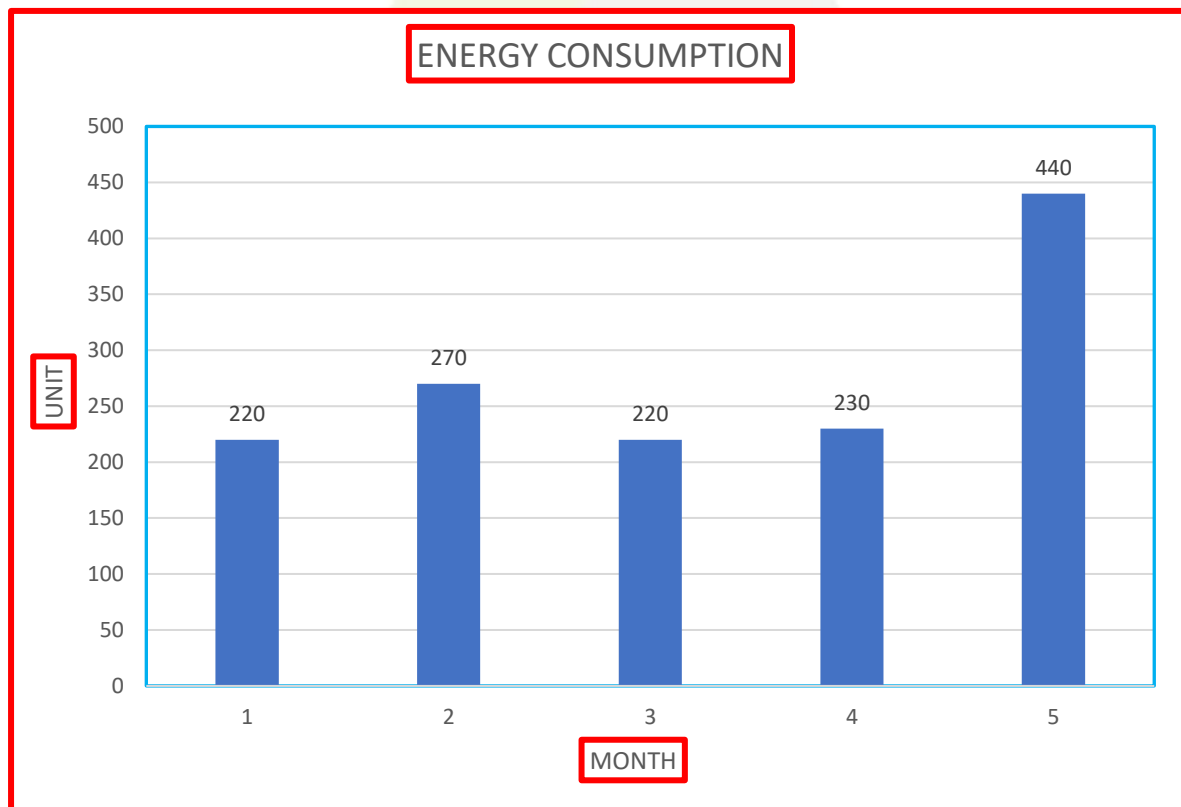
#### 4.LT Service Number wise Energy consumption details

4.1 Service No 06 213 009 305				
Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	12910	82714	6.41
2	10-08-2022	11960	76979	6.44
3	10-10-2022	15480	121867	7.87
4	09-12-2022	13250	124735	9.41
5	09-02-2023	13410	126196	9.41
	<b>Total</b>	<b>67010</b>	<b>532491</b>	<b>7.95</b>



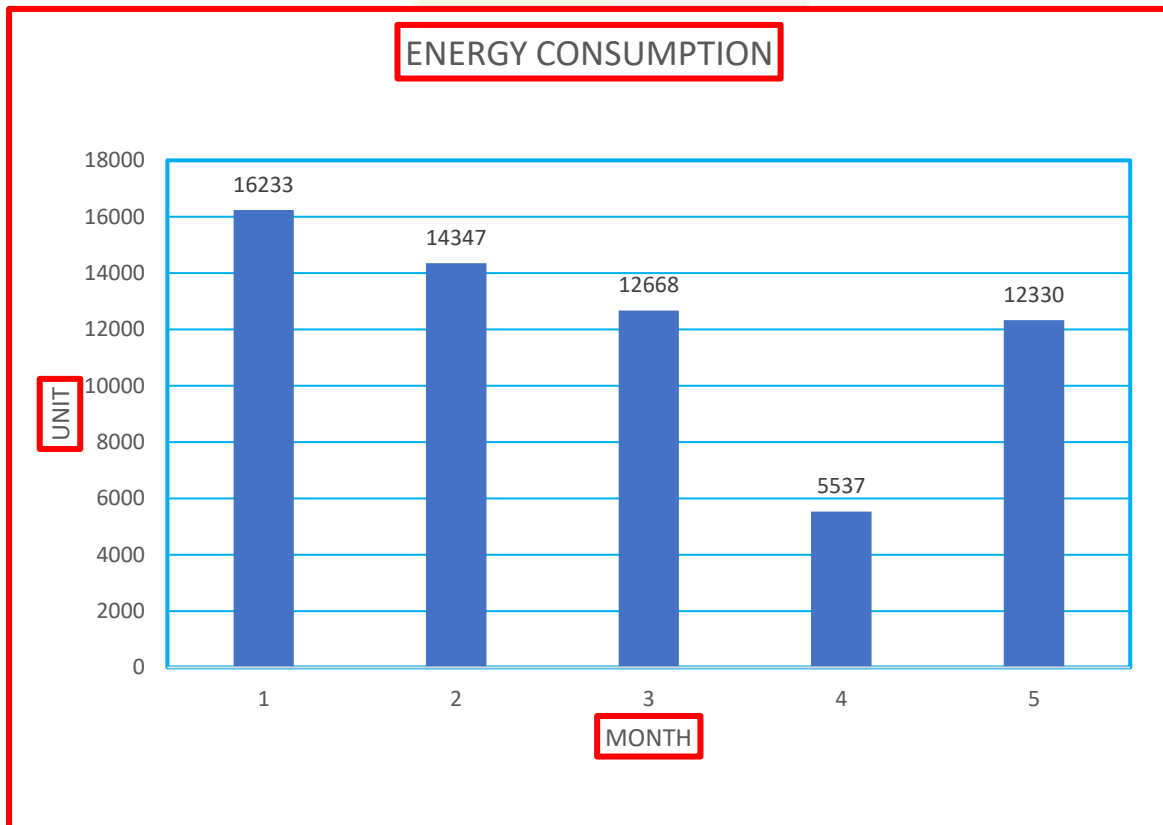
4.2 Service No 06 213 009 306

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	220	1694	7.70
2	10-08-2022	270	1996	7.39
3	10-10-2022	220	2138	9.72
4	09-12-2022	230	2639	11.47
5	09-02-2023	440	4511	10.25
<b>Total</b>		<b>1380</b>	<b>12978</b>	<b>9.40</b>



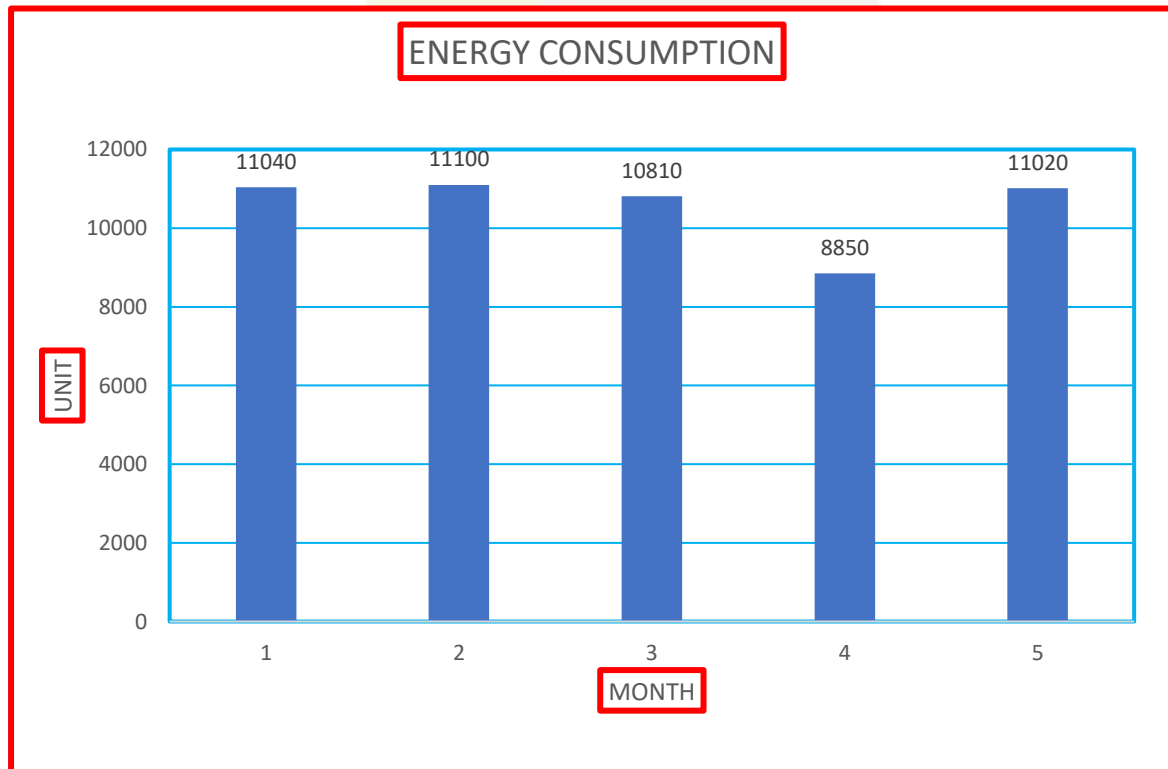
4.3 Service No 06 213 009 307

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	16233	103173	6.36
2	10-08-2022	14347	91786	6.40
3	10-10-2022	12668	120600	9.52
4	09-12-2022	5537	57216	10.33
5	09-02-2023	12330	117321	9.52
<b>Total</b>		<b>61115</b>	<b>490096</b>	<b>8.02</b>



4.4 Service No 06 213 009 308

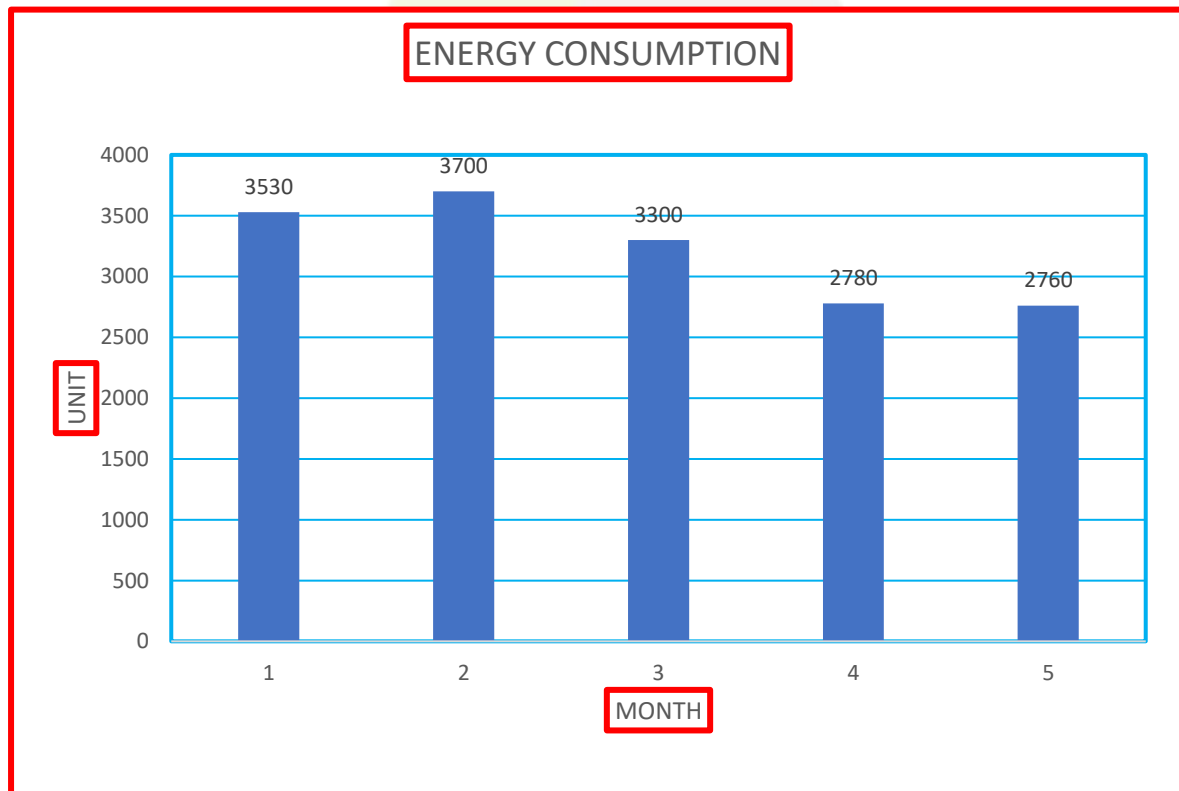
Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	11040	70793	6.41
2	10-08-2022	11100	70793	6.38
3	10-10-2022	10810	86530	8.00
4	09-12-2022	8850	85257	9.63
5	09-02-2023	11020	104426	9.48
<b>Total</b>		<b>52820</b>	<b>417799</b>	<b>7.91</b>





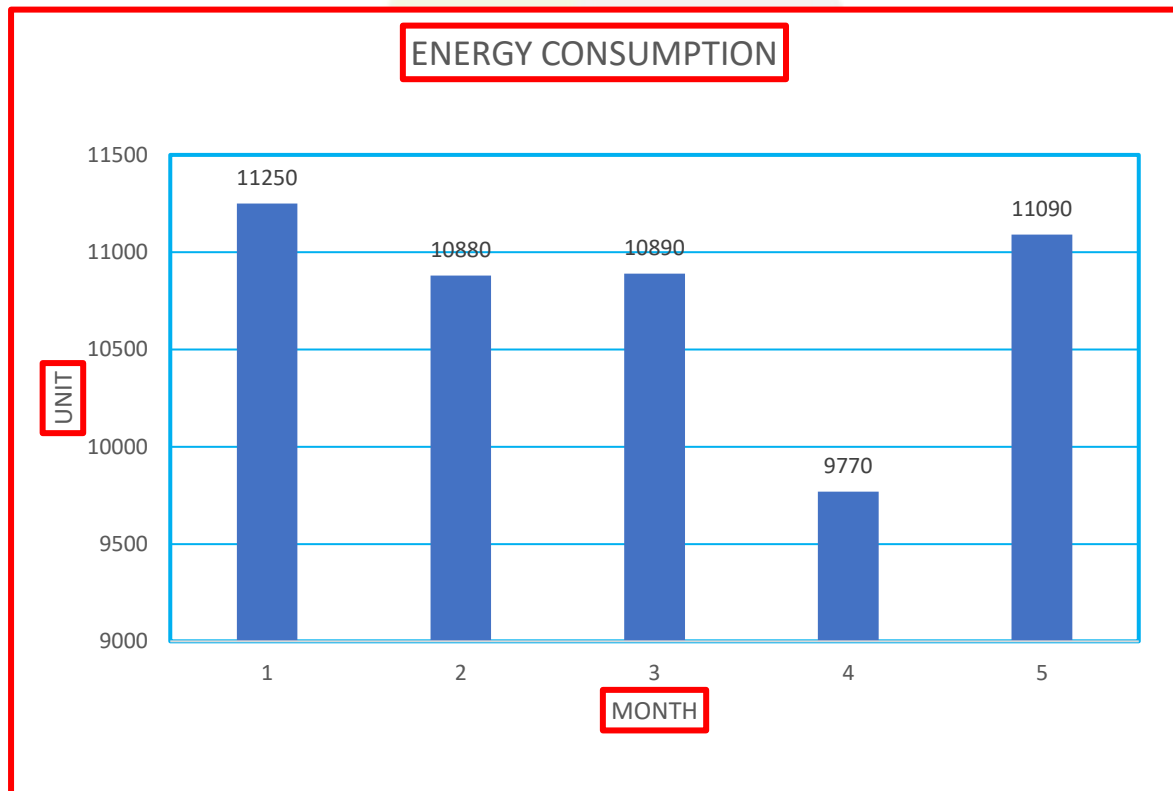
4.5 Service No 06 213 009 309

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	3530	23178	6.57
2	10-08-2022	3700	24223	6.55
3	10-10-2022	3300	27154	8.23
4	09-12-2022	2780	27610	9.93
5	09-02-2023	2760	27423	9.94
	<b>Total</b>	<b>16070</b>	<b>129588</b>	<b>8.06</b>



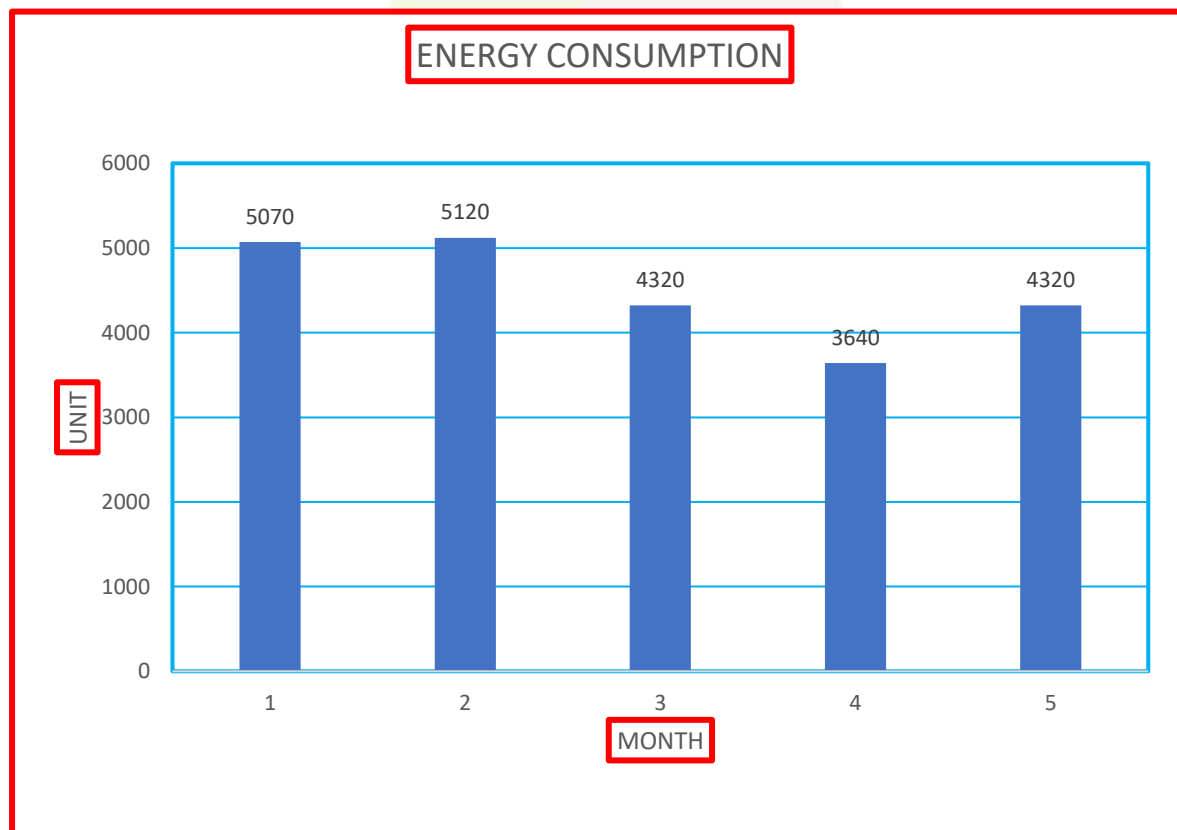
4.6 Service No 06 213 009 310

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	11250	73336	6.52
2	10-08-2022	10880	69708	6.41
3	10-10-2022	10890	86565	7.95
4	09-12-2022	9770	93231	9.54
5	09-02-2023	11090	104914	9.46
	<b>Total</b>	<b>53880</b>	<b>427754</b>	<b>7.94</b>



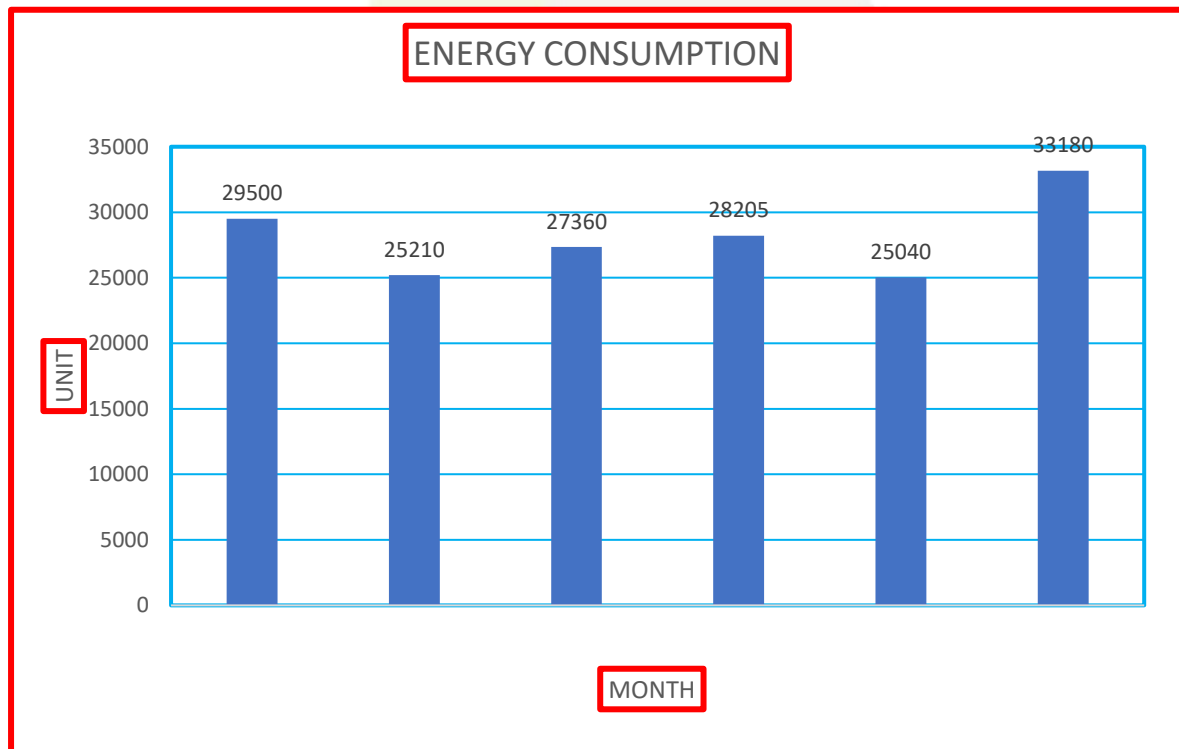
4.7 Service No 06 213 009 311

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	5070	34474	6.80
2	10-08-2022	5120	33162	6.48
3	10-10-2022	4320	35268	8.16
4	09-12-2022	3640	35845	9.85
5	09-02-2023	4320	41862	9.69
	<b>Total</b>	<b>22470</b>	<b>180611</b>	<b>8.04</b>



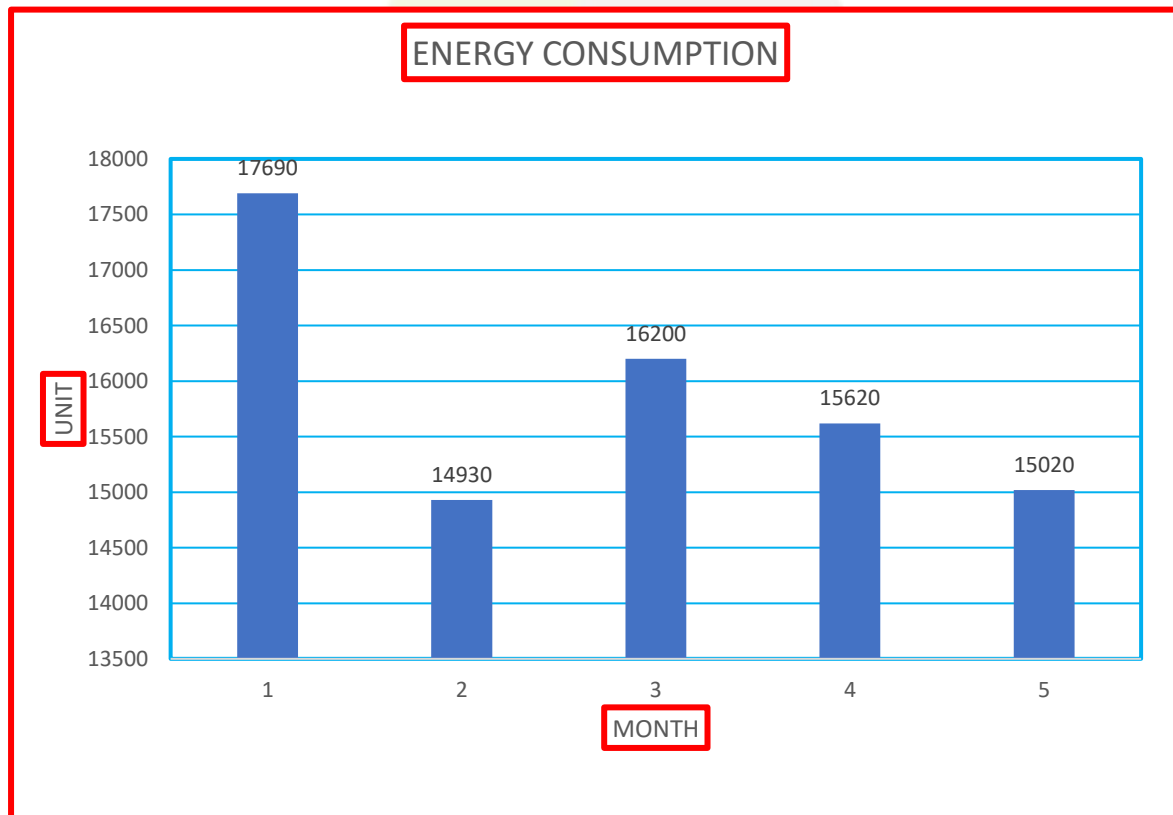
4.8 Service No 06 213 009 14

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	29500	183518	6.22
2	10-08-2022	25210	157605	6.25
3	10-10-2022	27360	211175	7.72
4	09-12-2022	28205	257678	9.14
5	09-02-2023	25040	229843	9.18
6	10-04-2023	33180	301678	9.09
<b>Total</b>		<b>168495</b>	<b>1341497</b>	<b>7.96</b>



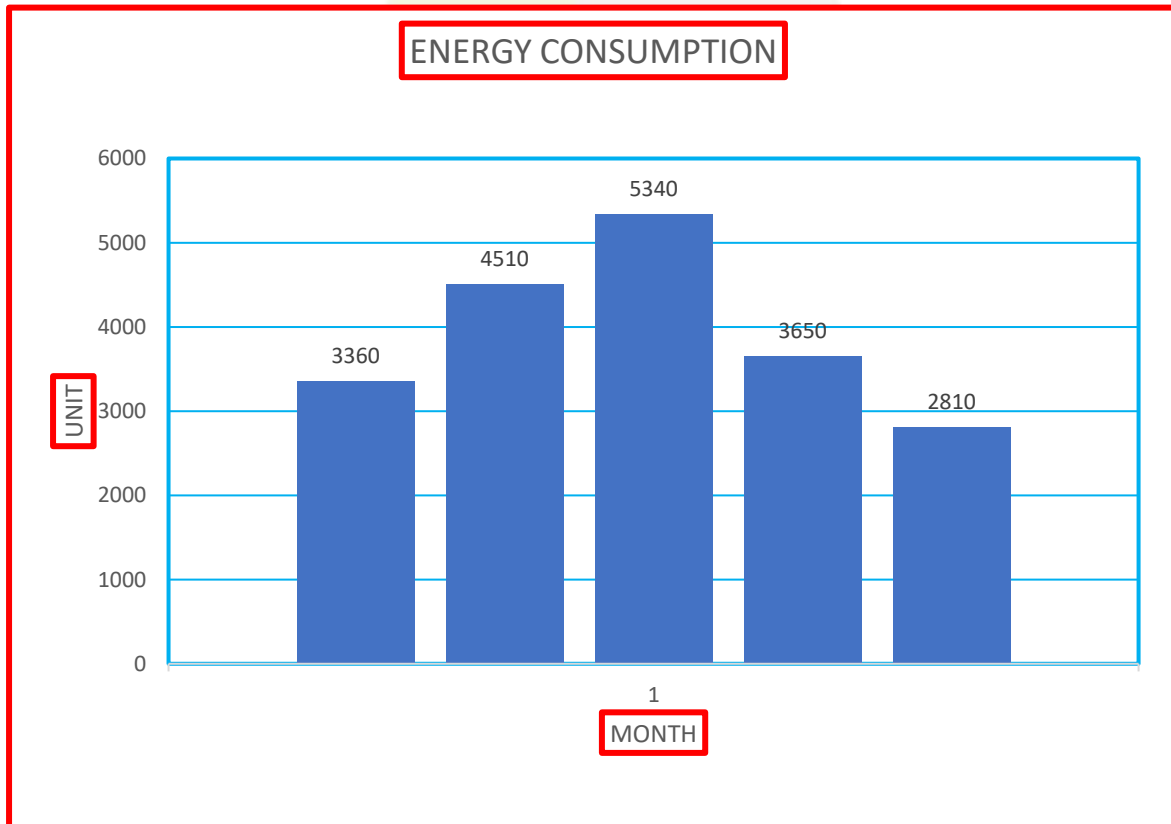
4.9 Service No 06 213 009 753

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	17690	111675	6.31
2	10-08-2022	14930	92912	6.22
3	10-10-2022	16200	124481	7.68
4	09-12-2022	15620	142378	9.12
5	09-02-2023	15020	137096	9.13
	<b>Total</b>	<b>79460</b>	<b>608542</b>	<b>7.66</b>



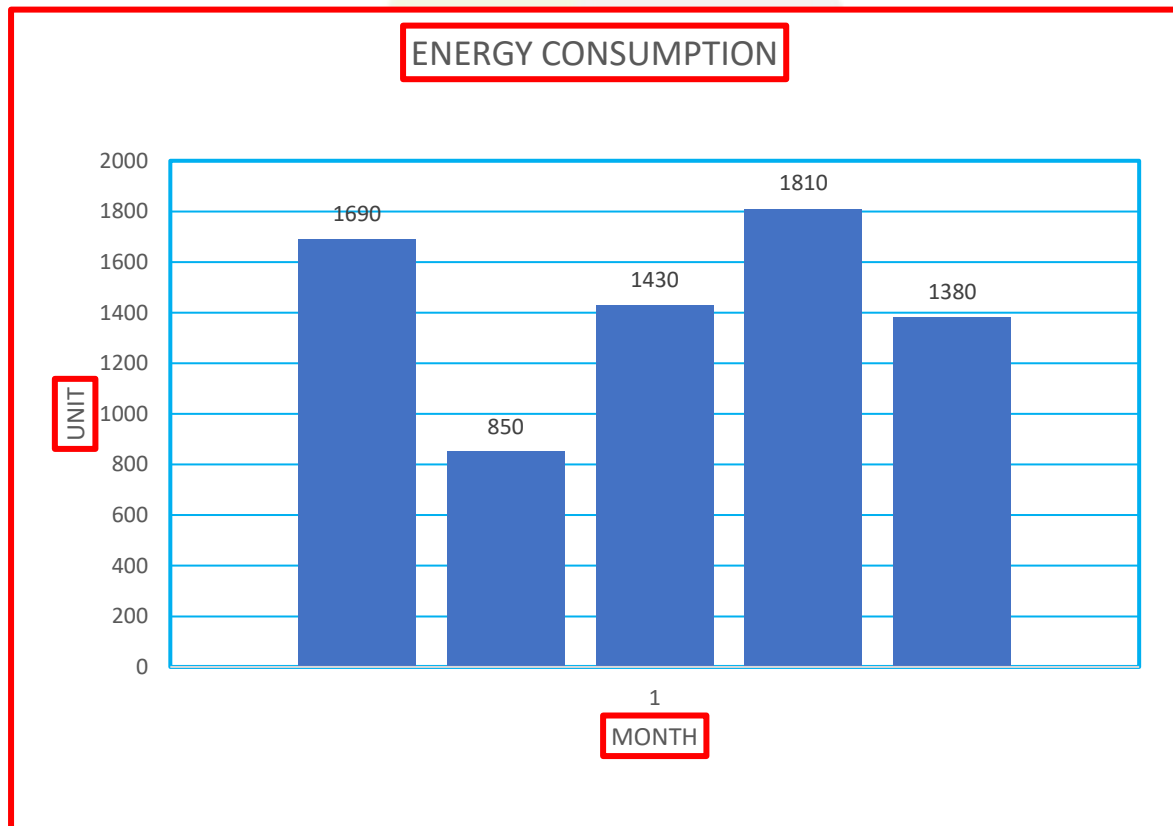
4.10 Service No 06 213 009 754

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	3360	23130	6.88
2	10-08-2022	4510	30085	6.67
3	10-10-2022	5340	43704	8.18
4	09-12-2022	3650	36923	10.12
5	09-02-2023	2810	29544	10.51
	<b>Total</b>	<b>19670</b>	<b>163386</b>	<b>8.31</b>



4.11 Service No 06 213 009 755

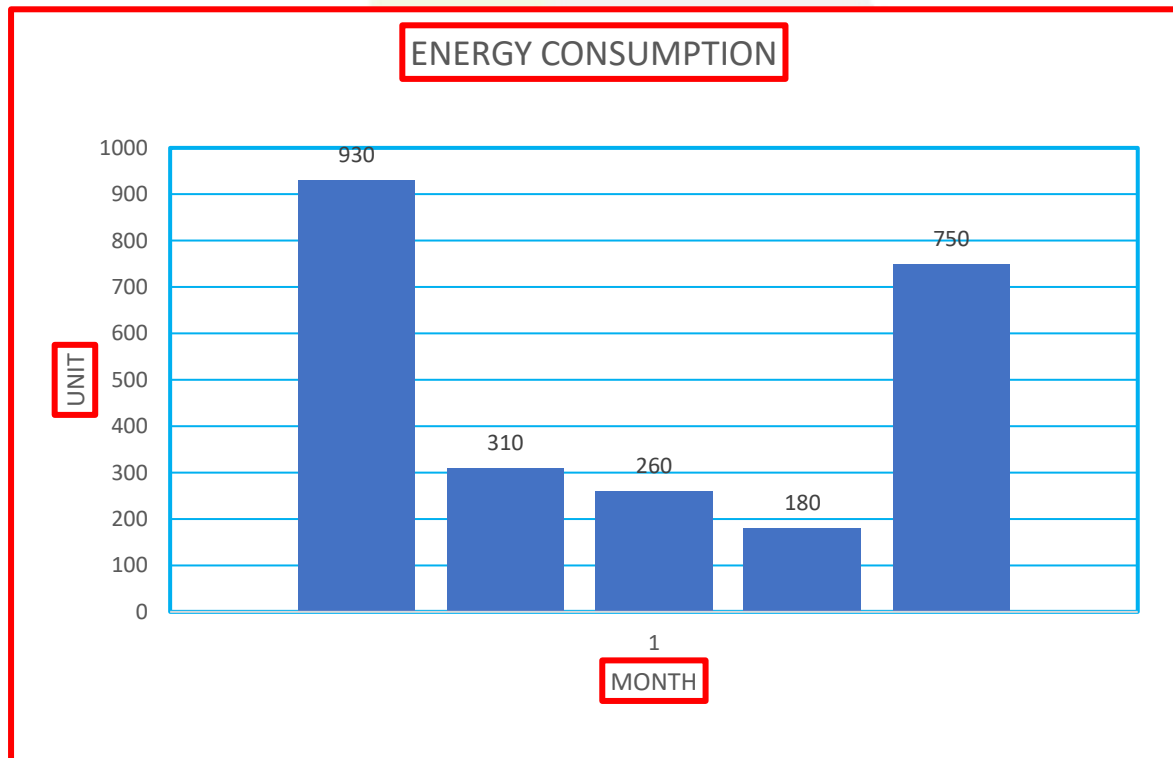
Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2023	1690	10827	6.41
2	10-08-2022	850	5756	6.77
3	10-10-2022	1430	11506	8.05
4	09-12-2022	1810	17014	9.40
5	09-02-2023	1380	13222	9.58
	<b>Total</b>	<b>7160</b>	<b>58325</b>	<b>8.15</b>





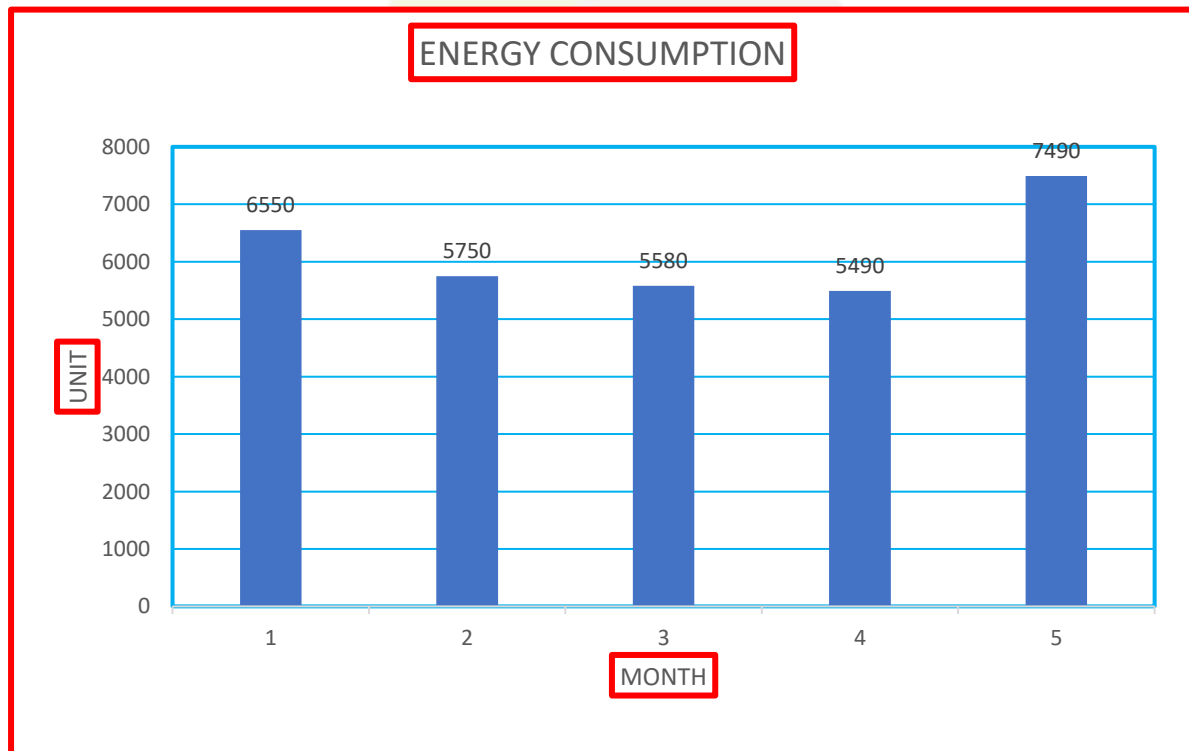
4.12 Service No 06 213 009 756

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	930	6221	6.69
2	10-08-2022	310	2490	8.03
3	10-10-2022	260	2778	10.68
4	09-12-2022	180	2608	14.49
5	09-02-2023	750	7665	10.22
	<b>Total</b>	<b>2430</b>	<b>21762</b>	<b>8.96</b>



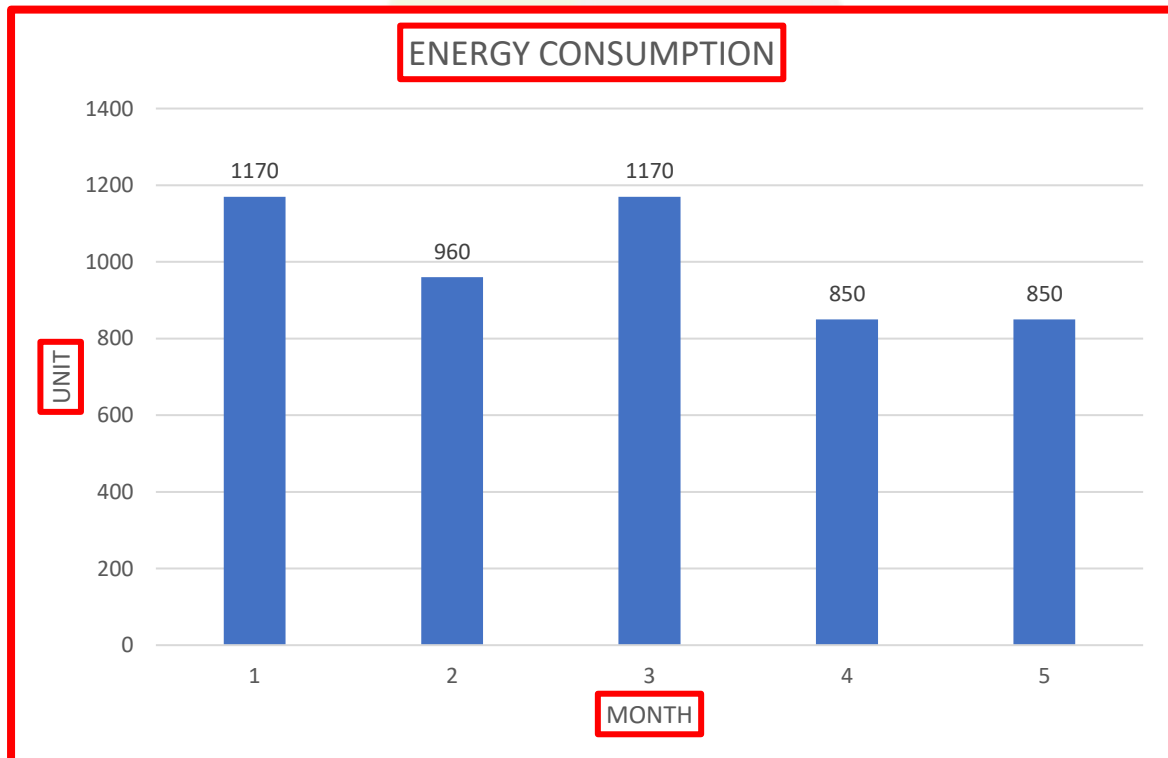
4.13 Service No 06 213 009 771

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	6550	45672	6.97
2	10-08-2022	5750	40830	7.10
3	10-10-2022	5580	49878	8.94
4	09-12-2022	5490	58522	10.66
5	09-02-2023	7490	76882	10.26
	<b>Total</b>	<b>30860</b>	<b>271784</b>	<b>8.81</b>



4.14 Service No 06 213 009 2791

Sl. No.	Assessment Date	Units Consumed	Bill Amount -Rs	Unit cost-Rs
1	09-06-2022	1170	12031	10.28
2	10-08-2022	960	10249	10.68
3	10-10-2022	1170	13727	11.73
4	09-12-2022	850	11943	14.05
5	09-02-2023	850	11943	14.05
	<b>Total</b>	<b>5000</b>	<b>59893</b>	<b>11.98</b>



## 5.DG set Electrical Energy consumption

DG set 82.5 KVA-5 Nos

35 KVA-1 No



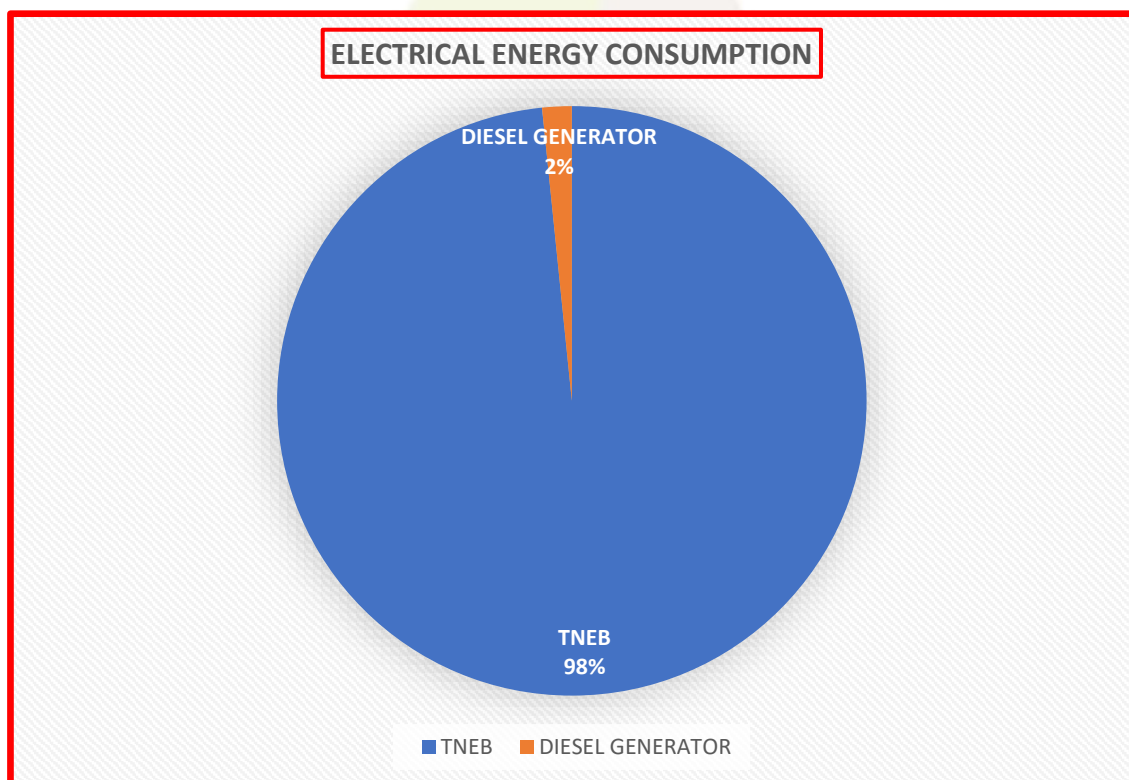
Electrical Energy Consumption from DG sets-10,800 units

## 6.Total Electrical Energy Consumption details

### Electrical Energy Consumption from TNEB and DG in the year 2022-2023

Sl. No	Source	Consumption in units	Percentage
1	College	6,57,880	98.38
2	Diesel Generator	10,800	1.62
	Total	6,68,680	100

Total Electrical Energy consumption from TNEB grid and DG in the College  
6,68,680 units



## 7. Thermal Energy consumption -Liquified Petroleum Gas (LPG)

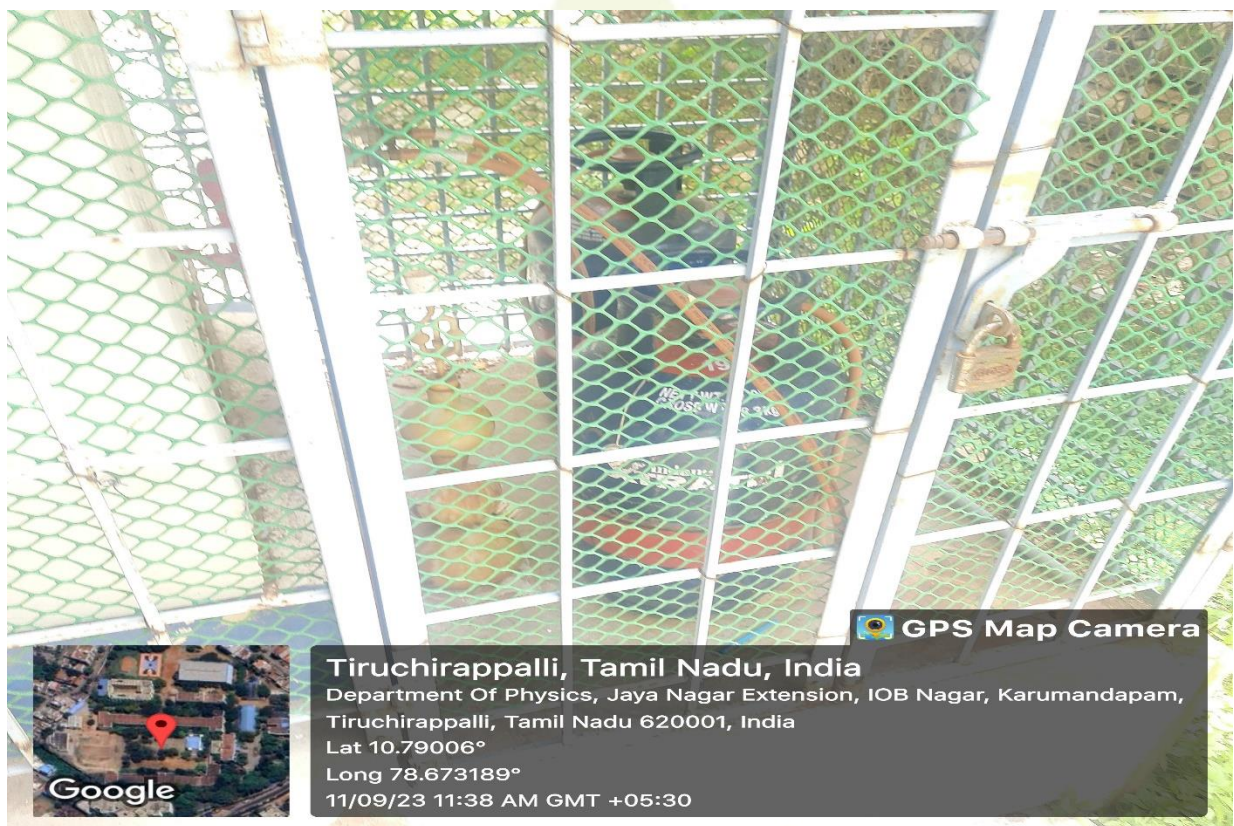
LPG cylinders used- commercial

LPG cylinders consumed in the college during the year 2022-2023-4 Nos

LPG cylinders consumed in the Hostel Kitchen during the year 2022-2023-1800 Nos

LPG cylinders consumed in the college canteen during the year 2022-2023-1260

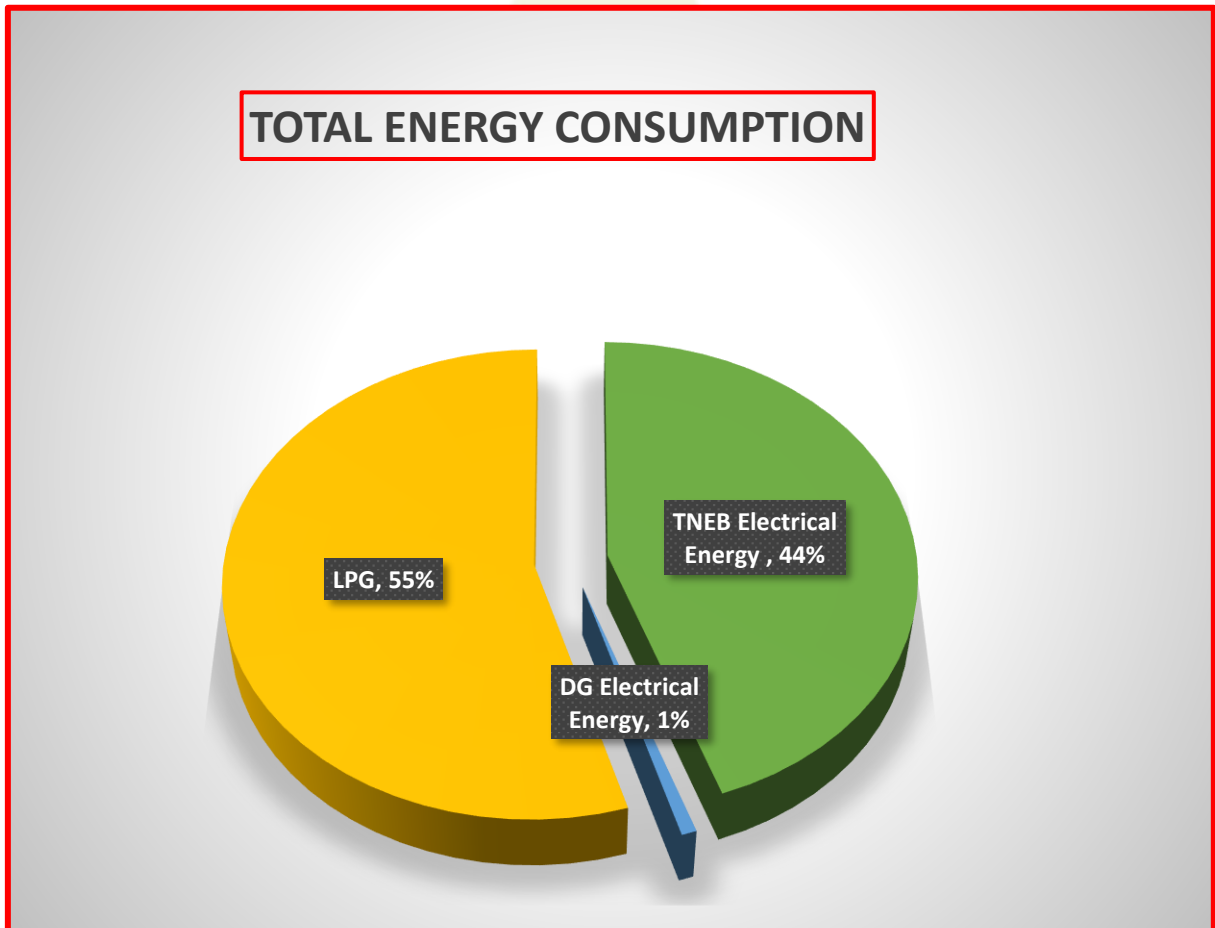
Total LPG consumption during the year 2022-2023- 58,216 Kgs



## 8.Total Energy consumption

### Electrical and Thermal

SL.NO	TYPE OF ENERGY	ENERGY -GCAL	Percentage
1	TNEB Electrical Energy	565.78	44.63
2	DG Electrical Energy	9.29	0.73
3	LPG	692.77	54.64
	Total	1267.8	100





## 9.The energy conservation measures followed

- Regular monitoring of air conditioners is done in order to maintain a temperature of 24°C in all the places that they are installed in
- Replacing conventional electrical light fittings with energy efficient Light-Emitting Diode (LED) bulbs is going on as continuous process.
- Switching off the fans and tube lights in the classroom and faculty rooms are done after the working hours
- Periodical maintenance and overhauling of generators is being carried out.
- Periodical maintenance of UPS and Battery systems are carried out.
- The air-conditioners and other electronic and electrical equipments are switched off when not in use.
- 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.
- Work supervisor and electrician regularly check the usage of lights, fans and all other energy sources during and out of the college hours.
- Lights and fans are switched off by the students whenever they are out of hostel rooms



## 10. Major Electrical loads

- ACs-52 number split Ac
- Fans-48 KW
- Online UPS/inverter- 111 KVA
- Batteries-170 Nos( includes 150AH, 100AH & 50AH)
- Computers -45 KW
- Tube Lights Conventional-24 KW
- Tube Lights LED-10 KW
- Water Coolers-6KW
- Pumps-15 KW (5HP -1, 3HP-3, 2HP -3)
- Voltage stabilizer-92
- Oven-2 Nos
- Refrigerators -10Kw

### Lighting Load

- Max Demand Permitted – 350KVA
- LED power- 20 watts
- LED lighting load- 10 KW
- Conventional Tube Lights power-40 watts
- Conventional Tube light Load- 24 KW
- Total Lighting Load- 34 KW
- Lighting load on total load -10 %
- LED lighting load on total Lighting load -42 %
- LED lighting load on total load-2.8 %

ALGEO

## 11.COMMON OBSERVATION AND FEEDBACK

1. Lightning arrestor was provided all nine buildings at the highest point



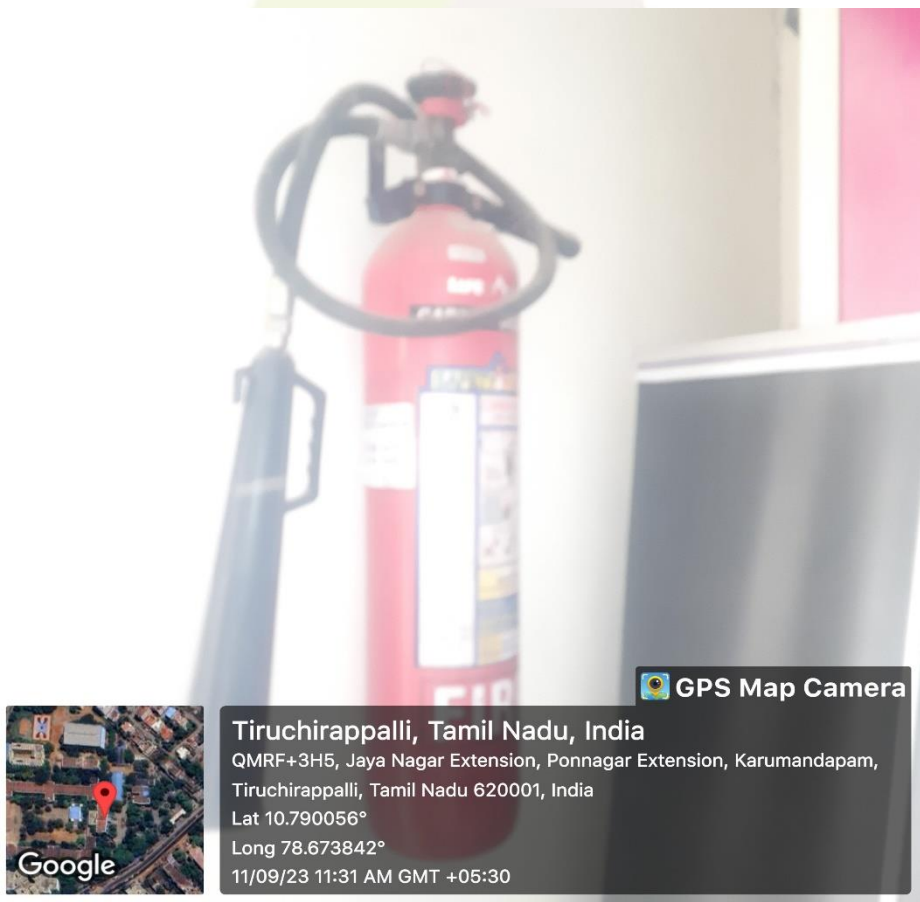
2. Earth pits are well maintained



3. In Power room, unwanted materials not to be kept inside.

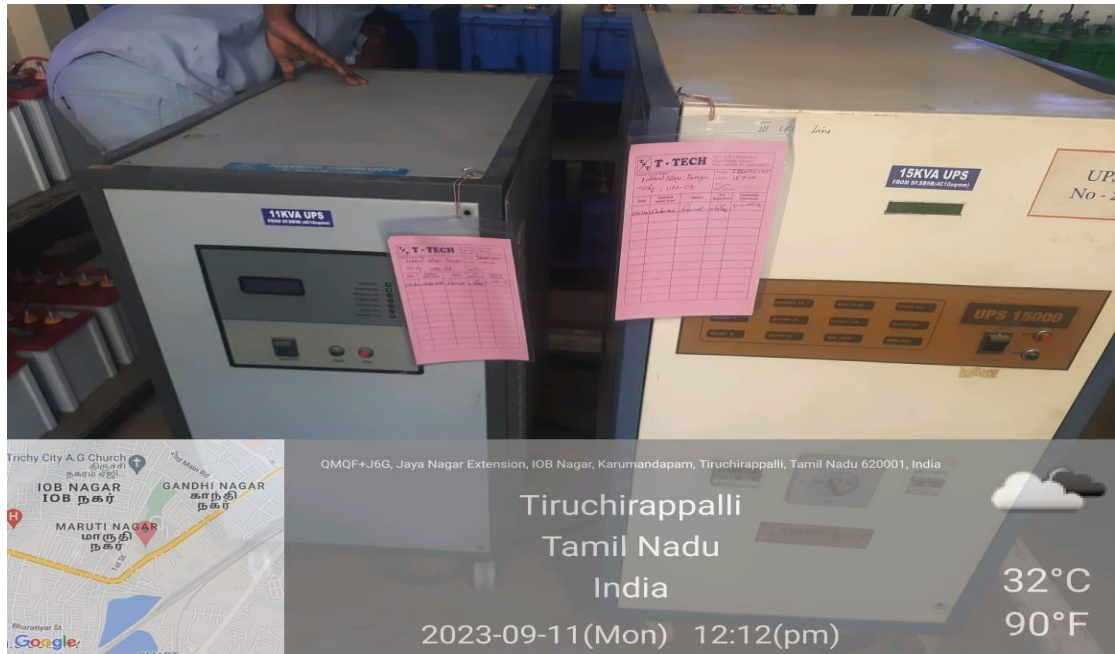


4. Fire Extinguishers kept on college walls are easily accessible and operable





5. Hands on training to operate Fire Extinguishers shall be given to all teaching and non-teaching staffs on periodical manner
6. UPS, Battery Purchase details, Warranty periods to be maintained in all sections



7. Unwanted/non-related materials from UPS and Battery rooms shall be removed



8. Sign board for Energy conservation to be increased

9. Excellent LPG storage arrangement both in College and Hostel



10. Unwanted materials to be removed from DG room





11. Solar water heater to be serviced



12. Maintenance and housekeeping at Computer lab's UPS & Battery are good



## 12.AUDIT FINDINGS & ENERGY SAVING POTENTIAL

### 12.1 Findings

- Electrical Energy consumption from TNEB during the year 2022-2023 –6,57,880 units.
- Electrical Energy consumption from Diesel Generator –10,800 units.
- Total Electrical Energy consumption from EB and DG and–6,68,680 units.
- LPG consumption -58,216 Kgs
- Lot of Energy conservation initiatives are taken.
- Conduct more awareness programs on importance of energy saving for students and staff
- Remaining Conventional Tube lights shall be replaced with LED tube lights in a phased manner
- Procurement of 5 Star rated Energy efficient electrical equipment shall be continued  
Out of 92 split Ac, 40 Acs are star rated energy efficient equipment
- In total Lighting loads, 42 % lighting loads are converted into LED lighting system. Remaining Conventional Tube lights shall be replaced with LED tube lights in a phased manner

### 12.2 Energy saving potentials

#### 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– 8 hrs

No of days hostel occupied with students-300 days

Energy savings per tube light per year - $300 \times 8 \times 20 = 48,000 \text{wh} = 48 \text{ units}$

TNEB Energy cost with Tax and peak hr charges - Rs 9.9/unit

Cost saving per year per tube light- $48 \times 9.9 = \text{Rs } 475$

Cost savings per month-Rs 40

Approximate Cost of LED tube light -Rs 180

**Payback period-4.5 months**



**Replacement cost for 100 LED tube lights-Rs 180x100= RS 18,000**  
**Cost savings for 100 LED tube lights-Rs 47,500 / year**  
**Energy savings for 100 LED tube lights-4,800 units/ year**  
**Payback period-4.5 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-300 days

Energy savings per fan per year -300 x16x32= 128000wh=154 units

TNEB Energy cost with Tax and peak hour charges- Rs 9.9 /unit

Cost saving per year per FAN-154 units x 9.9 = Rs 1524

Cost saving per month-Rs 127

Cost of ENERGY EFFICIENT FAN -Rs 2800

**Payback period 22 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 1,52,400 / year**  
**Energy savings for 100 Nos. ENERGY EFFICIENT FAN -15,400 units/ year**  
**Payback period 22 months**





Estd. 1919

# National College (Autonomous)

Tiruchirappalli - 620001, Tamil Nadu, INDIA

Nationally Re-accredited with 'A+' Grade by NAAC with CGPA of 3.61 on 4.00 scale

College with Potential for Excellence

## GREEN AUDIT REPORT 2022-2023



ALGEO

AUDIT / REPORT BY



**ALCHEME GREEN ENERGY COMPANY** ☎ 73977 64900  
99948 45487

[info@alchemegreenenergy.com](mailto:info@alchemegreenenergy.com)

## **ACKNOWLEDGEMENT**

We at Alcheme Green Energy Company, Madurai are thankful to the principal for giving us the opportunity to carry out Green audit at National College Trichy-620 001. 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 Green Audit.

<b>Name</b>	<b>Qualifications</b>	<b>Certification Number</b>
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. Lakshmana 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

<b>Name</b>	<b>Designation</b>
Dr. KUMAR.K	Principal & Chairperson
Dr. D.E. Benet	Coordinator
Mr. Thangaraj	Estate Manager

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## I. Summary of the Green Audit

Green audit at National College and its Hostel was carried by Alcheme Green Energy Company. The green audit reports assist in the process of attaining an eco- friendly approach to the sustainable development of the College. Green audit report is a very powerful and valuable communications tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

A few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This will lead to a prosperous future in context of Green Campus leading to sustainable environment and community development. It has been proved frequently that the practical suggestions, alternatives and observations that have resulted from audits have added positive value to the audited organisation. It is hoped that the results presented in the Green Audit Report will serve as a guide for educating National College, on the existing environment related practices and resource usage and spawn new activities and innovative practices.

### Noteworthy activities

- Clean, Green and plastic free campus
- Excellent Rainwater harvest system to recharge the ground water

The audit outputs and recommendations are summarised as follows:

- Total water consumption for National College and Hostel –74 KL/Day
- Electrical Energy consumption from TNEB GRID alone –6,57,880 units
- Diesel Generator electrical energy consumption- 10,800 units
- Total Electrical Energy consumption is 6,68,680 units
- Total Green House Gas Emission is 767.59 t CO<sub>2</sub>e
- Green House gas offset due to grown up trees is 16.41 t CO<sub>2</sub> e
- Net Green House Gas emission is 751.18 t CO<sub>2</sub> e

We are happy to submit this detailed green audit report to the National College



For Alcheme Green Energy Company

Madurai

## **1.1 Green Policy**

National College has formulated a Green Policy to guide all its green initiatives. Cleanliness in the campus is maintained through proper disposal of wastes, utilization of eco-friendly supplies and effective recycling program. The concept of eco-friendly culture is disseminated among the students through various seminars/workshops and community-oriented programs. Institution strictly follows reduce, reuse and recycle method to limit energy usages

### **The main objectives are as follows:**

- Adopt and promote the water management measures like rain water harvesting and display water management instruction in the relevant locations in the campus.
- To use the energy efficient appliances to conserve conventional energy.
- To reduce the consumption of plastics and collect the e-waste & hazardous waste appropriately.
- Creating awareness with stakeholders on the need for maintaining greenery in the campus for sustainable ambience.
- To give periodical training in energy and water conservation.
- Conduct of green audit at regular intervals and implement the suggestions towards creating green campus.

### **The Institution vouchsafes:**

- Its commitment to sustainability and environmental management
- It reiterates the stand that managing environmental issues is a high priority for the College
- Its commitment to prevent pollution and to continuously improve upon environmental protection.



## **1.2 Total Campus Area & Building Spread Area**

- Campus area – 1,12,421 sq. mts. (27.78 acres)
- Total Build up area – 29,665 sq. mts.

## **1.3 NAAC Grading**

The College was re-accredited with 'A+' Grade (CGPA 3.61 out of 4.00) by NAAC in November 2016 (III Cycle up to November 2021)

## **1.4 Campus Infrastructure**

National College is located in calm and quiet surroundings that are conducive to learning. It helps to stimulate both personal and professional growth of the students.

The college has one hundred and fifteen classrooms and three auditoria (two air conditioned and one non-airconditioned) to conduct mass programs with varying capacities. It also has an openair auditorium, one amphitheatre, and two stadia – an indoor stadium and an outdoor stadium. Most classrooms are ICT enabled and have portable LCD projectors. Students and Teachers have access to internet.

There are six departments which have laboratories – Chemistry, Physics, Geology, Botany, Computer Science, Zoology and Biotechnology (Computer Lab). In all four hundred and fifty-five computers are available for the use of students.

The college library has a vast collection of books on a wide range of subjects covering 1,00,000 volumes from rare to latest. Besides, it provides access to 105 national as well as international journals both in print as well as online. In tune with the changing times and technology, the library automation programme was initiated in 2010 and networking with the Bharathidasan University Library has been completed. In addition to the conventional sections such as Stacks, Reference, Circulation, Periodicals, Technical Section Thesis and Dissertation, the building houses a large Audio-Visual Theatre, spacious Conference Hall, E-Library, Librarian Chamber and Office.

E-library feature is integrated with ROVAN LMS software in the year 2021. This feature is used to build the digital library. The E-library contains the subscribed journals, open access full text journals, subscribed and open access e-books as well as Newspaper and MOOCs. These e-resources are hyper linked to provide convenient access for students and staff and researchers.

All the one hundred and fifteen classrooms are well maintained and are provided with benches, desks, green boards, fans and LED lights. At least one classroom in each department has a fixed LCD Projector and also a portable projector. Two network engineers and two system administrators provide technical support. Lab

assistants are always on call during the working hours to provide assistance and maintenance of lab equipment. Round the clock services are provided by a team of electricians and plumbers.

In general, college provides all sorts of basic amenities for students and staff on college premises like vehicle parking space, cafeteria, drinking water coolers, first aid, CCTV cameras for security, fire safety and separate washrooms for men and women.

The college promotes cultural activities and preserves ancient singing and dancing traditions. Students are the preservers and purveyors of culture in its varied forms. The Department of Physical Education gives its effort in inculcating cultural values to the students in association with Bharatiya Vidhya Bhavan and Infosys Foundation. This practice is aimed at binding people and culture together in order to have a strong and united community.

The Yoga Centre run by the Physical Education Department gives yoga practices thrice a week and spreads the fitness message not only among the students and staff but also in the neighbourhood.

The gymnasium boasts of fitness equipment of many types – pommel, parallel bar, vaulting table, high bar and still rings.

The indoor stadium has three badminton courts and one basketball court which are regularly utilized by students of physical education and others. Sports and games are popular among students from rural and urban areas and sportspersons have represented the college and the Bharathidasan University in various categories.

The college administrative officer and the estate officer oversee and supervise the campus maintenance.

All the buildings and toilets have ramp facilities to enable the physically challenged to move about freely.

The New Block, Jawaharlal Nehru Block and the Library have lift facilities.



## **2.0 Pre-Audit Stage**

A pre-audit meeting provided an opportunity to reinforce the scope and objectives of the audit and discussions were held on the practicalities associated with the audit. This meeting is an important prerequisite for the green audit because it is the first opportunity to meet the auditee and deal with any concerns.

The meeting was an opportunity to gather information that the audit team can study before arriving on the site. The audit protocol and audit plan was handed over at this meeting and discussed in advance the audit itself.

In National College pre-audit meeting was conducted successfully and necessary documents were collected directly from the College before the initiation of the audit processes. Actual planning of audit processes was discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the College management.

The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself. The audit team worked together, under the leadership of the lead auditor, to ensure completion within the brief and scope of the audit.

### **2.1 Management's Commitment**

The Management of the College has shown the commitment towards the green auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly and planting more trees on the campus etc., after the green auditing.

### **2.2 Scope and Goals of Green Auditing**

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues.

Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economic, financial, social, environmental factor. It is necessary to conduct green audit in the College campus because students become aware of the green audit, its advantages to save the planet and they become good citizens of our country.

A very simple indigenized system has been devised to monitor the environmental performance of National College, Trichy. It comes with a series of questions to be answered. This innovative scheme is user friendly. The aim of this is to help the Institution to set environmental examples for the community and to educate the young learners.

## **2.3 Benefits of the Green Auditing**

- More efficient resource management
- To create a green campus
- To enable waste management through reduction of waste generation, solid-waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and management
- Point out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental management approach and improving environmental standards
- Benchmarking for environmental protection initiatives
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the College and its environment
- Developing an environmental ethic and value systems in youngsters.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the College.

## **2.4 Target Areas of Green Auditing**

Green audit forms part of a resource management process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals and their results can illustrate the improvement.

Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency. All these indicators are assessed in process of “Green Auditing of educational institute”. Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, reduce the institute’s energy and water consumption, reduce wastes to landfill and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.

## **Auditing for Water Management**

Water is a natural resource; all living matters depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. We need to use water wisely to ensure that drinkable water is available for all, now and in future. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible Institution should examine its water use practices.

Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water. It is therefore essential that any environmentally responsible Institution examine its water use practices.

## **Auditing for Energy Management**

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent bulb uses approximately 60 W while an energy efficient light emitting diode (LED) uses only less than 10 W. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

## **Auditing for Waste Management**

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. This indicator addresses waste production and disposal of plastic waste, paper waste, food waste, and recycling.

Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and used oils.

Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse. Thus, the minimization of solid waste is essential to a sustainable College. It is therefore essential that any environmentally responsible institution examine its waste processing practices.

## **Auditing for Green Campus Management**

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's balance and our quality of life. Without this variability in the living world, ecological systems and functions would break down, with detrimental consequences for all forms of life, including human beings.

Newly planted and existing trees decrease the amount of carbon dioxide in the atmosphere. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. The amount of oxygen that a single tree produces is enough to provide one day's supply of oxygen for people. So while the students are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner.

Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which the students feel.

## **Auditing for Carbon Footprint**

Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of fossil fuels (such as petrol). The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising around 420 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions.

An important aspect of doing an audit is to be able to measure your impact so that we can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method travelled between home and College every day. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards sustainable development. It is therefore essential that any environmentally responsible institution examine its carbon footprint.

### **3. Audit Stage**

In National College green auditing was done with the help of Alcheme Green Energy Company involving different student groups, teaching and non-teaching staff. The green audit began with the teams walking through all the different facilities at the College, determining the different types of appliances and utilities as well as measuring the usage per item and identifying the relevant consumption patterns and their impacts.

The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified to clarify the data received through survey and discussions.

#### **3.1 Student Clubs and Forums Involved**

- Enviro Club, National Service Scheme (NSS)

#### **3.2 Comments on Site Tour**

Site inspection was done along with students and staff. Questionnaires were answered during the site tour. Students and staff took much interest in the data collection processes. It was quite interesting and fascinating. It was an environmental awareness program for the students who participated in the green auditing. The experience of green auditing was totally a new experience for most of the students. They have shared their expectations about a green campus and gave suggestions for the audit recommendations.

#### **3.3 Review of Documents and Records**

Documents such as electricity and water charge remittance, laboratory equipment registers, audited statements and office registers were examined and data were collected. College calendars, College magazines, annual report of the College and NAAC self-assessment reports, UGC report etc. were also verified as a part of data collection.

#### **3.4 Review of Policies**

Discussions were made with the College management regarding their policies on environmental management. Future plans of the College were also discussed. The management would formulate an environment /green policy for the College in the light of green auditing. The purpose of the green audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the Institution.

### **3.5 Interviews**

In order to collect information for green auditing different audit groups interviewed teaching and non-teaching staff, students and other stakeholders of the College.

### **3.6 Site inspection**

College and its premises were visited and analysed by the audit-teams several times to gather information. Campus trees were counted and identified. Medicinal /Herbal plants garden, play grounds, canteen, library, office rooms and parking grounds were also visited to collect data. Number and type of vehicles used by the stakeholders were counted. Number of LPG cylinders used in labs, canteen and hostel kitchen were also counted.





## 4. Post Audit Stage

The base of any green audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner.

Green audits form a part of a process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Although green audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit.

The essence of any green audit is to find out how well the environmental organisation, environmental management and environmental equipment are performing. Each of the three components is crucial in ensuring that the organisation's environmental performance meets the goals set in its green policy. The individual functioning and the success of integration will all play a role in the degree of success or failure of the organisation's environmental performance.

### 4.1 Key Findings, Observations and Evaluations

#### a) Water Usage at National College

Total number of students studied during the academic year 2022-2023: 5400

Teaching & non-Teaching staff available during the academic year 2022-2023: 344

Total number of stakeholders: 5744

#### College

Main water uses in the College campus are Drinking, Rest room, Canteen and Lab

#### Water usage at college

Sl. No	Place	Litres / Day
1	Drinking	2,500
2	Rest room	6,000
3	Canteen	5,000
4	Lab	2,000
5	Garden	4,500
	<b>Total</b>	<b>20,000</b>

Water usage in the College- 20 KL / Day

Water usage per day per stakeholder in the college – 3.48 litres

Waste water generation in the college – 13 KL/day

### **Boys Hostel**

Number of students and staff residing in the hostel in the year 2022-2023: 523

Main water uses in the Hostel are Drinking, Washing of clothes, Cooking & Vessel cleaning and for Rest room

Water usage at Hostel – 37 KL / Day

Water consumption per day per stakeholder in the hostel – 70.74 litres

Waste water generation in the Hostel – 32 KL /day

#### **Water usage at Boys Hostel**

<b>Sl. No</b>	<b>Place</b>	<b>Litres / Day</b>
1	Drinking	1,000
2	Cooking	2,000
3	Rest room	10,500
4	Bathing	10,500
5	Clothes washing	10,500
6	Vessel Cleaning	1,500
7	Garden	1,000
	Total	37,000

### **Girls Hostel**

Number of students and staff residing in the hostel in the year 2022-2023: 240

Main water uses in the Hostel are Drinking, Washing of clothes, Cooking & Vessel cleaning and for Rest room

Water usage at Hostel – 17 KL / Day

Water consumption per day per stakeholder in the hostel – 68.75 litres

Waste water generation in the Hostel – 16.5 KL /day



## Water usage at Girls Hostel

Sl. No	Place	Litres / Day
1	Drinking	500
2	Cooking	1000
3	Rest room	5000
4	Bathing	5000
5	Clothes washing	5000
6	Vessel Cleaning	500
	Total	17000

## Rainwater Harvesting

At National College, Rainwater harvesting is done effectively to enhance the ground water. Rainwater from all the buildings is effectively utilised for recharging the ground

Rainwater harvest area covered in the college- 82,500 sq. ft.

Rainwater harvest area covered in the Hostel- 27,350 sq. ft.

No of Rainwater collection pits- 13 numbers

Size of the Rainwater collection pit -1Mx1Mx1M





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### **Water Conservation initiatives**

- Waste water from bath, kitchen and utensil washings are used for gardening
- RO Plant water rejects are used for garden and greenery development
- Periodical preventive maintenance is carried out to avoid leakages of water

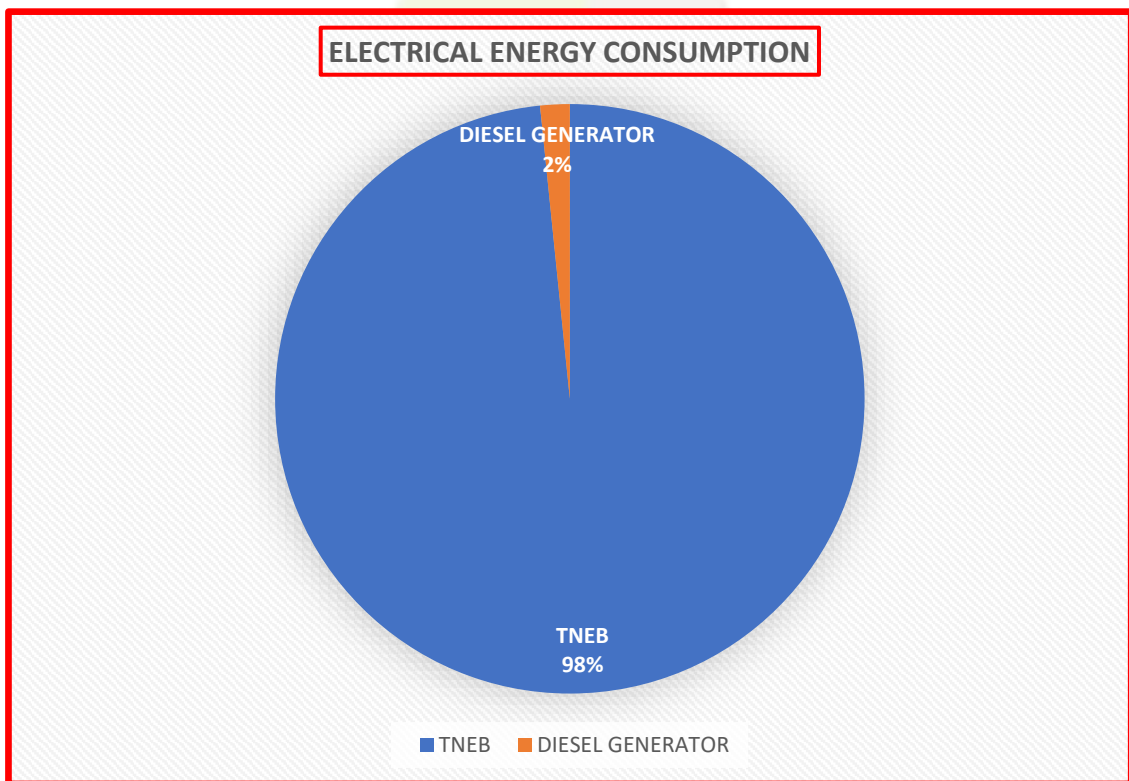


**b) Energy**

**Electrical Energy Consumption from TNEB and DG in the year 2022-2023**

Sl. No	Source	Consumption in units	Percentage
1	College	6,57,880	98.38
2	Diesel Generator	10,800	1.62
	Total	6,68,680	100

**Total Electrical Energy consumption from TNEB grid and DG in the College  
6,68,680 units**

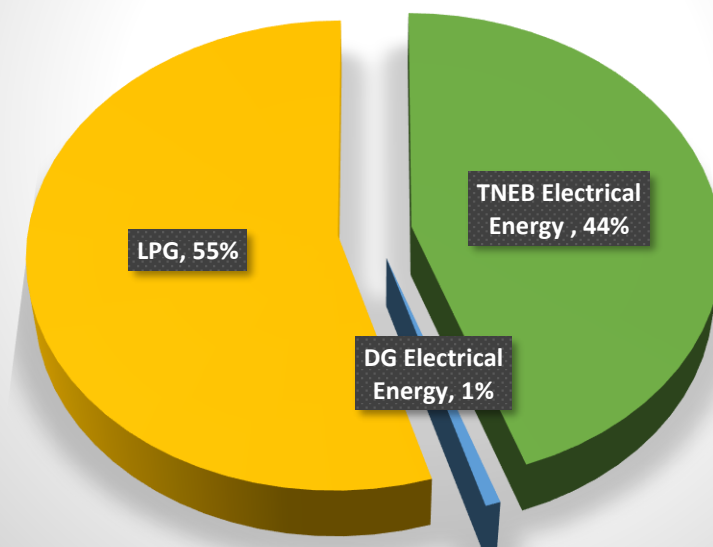


## Total Energy consumption

### Electrical and Thermal

SL.NO	TYPE OF ENERGY	ENERGY -GCAL	Percentage
1	TNEB Electrical Energy	565.78	44.63
2	DG Electrical Energy	9.29	0.73
3	LPG	692.77	54.64
	Total	1267.8	100

### TOTAL ENERGY CONSUMPTION



## The energy conservation measures followed

- Regular monitoring of air conditioners is done in order to maintain a temperature of 24°C in all the places
- Replacing conventional electrical light fittings with energy efficient Light-Emitting Diode (LED) bulbs is going on as continuous process.
- Switching off the fans and tube lights in the classroom and faculty rooms are done after the working hours
- Staff and Students are made aware of using public transport and individual vehicle usage is reduced to the maximum.
- Periodical maintenance and overhauling of generators is being carried out.
- Periodical maintenance of UPS and Battery systems are carried out.
- The air-conditioners and other electronic and electrical equipments are switched off when not in use.
- 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.
- Work supervisor and electrician regularly check the usage of lights, fans and all other energy sources during and out of the College hours.
- Lights and fans are switched off by the students whenever they are out of hostel rooms

## **c) WASTE**

### **Quantity of liquid waste generated: -**

- Waste water generation in the College and Hostel - 61.5 KL /day

### **Quantity of Solid waste generated**

#### **College**

- Biodegradable—<1 kg/day

#### **Canteen**

- Biodegradable (Food waste) - 20-25 kgs / day

#### **Office**

- Non-biodegradable —< 0.1kg/day

#### **Hostel**

- Biodegradable (Food waste) - 50-60 kgs / day
- Non-biodegradable – <0.5kg / day

#### **Open area**

- Biodegradable (Dry leaves)- 50 kgs / day

#### **Plastic waste**

- Less than <0.1kg / day

#### **e-Waste**

- Less than 50 kgs / year

## **Waste Management**

### **Liquid waste Management**

- RO plant reject is used for gardening
- Waste water generated from canteen, kitchen and bath room are used for gardening

### **Bio-degradable waste management**

Food waste is one of the most challenging issues humankind is currently facing worldwide. When every time food is wasted, the water, energy, time, manpower,

fertilizer, fuel, packaging and money put into growing, preparing, storing, transporting, cooking the food is wasted

- ❖ Bio-Degradable and non-biodegradable waste are collected in separate Two - bins system
- ❖ Food waste and Leaf-litter waste collected from the campus is used for composting and the compost is used further for the garden developments within the College

### **Plastic Waste Management**

- The College has been declared as a 'Plastic Free' zone
- Plastic covers are collected separately and disposed properly
- Use of polythene bags, Plastic cups/ straws/ cover/ plates/ are prohibited within the campus
- Students and staff are advised to bring cloth bags
- All the Stakeholders are motivated to use stainless steel plates.
- Tea/Coffee being served in Stainless steel tumblers
- Plastic waste that comes in through lab equipment's package, empty chemical containers etc. are collected separately and disposed periodically for recycling.

### **Used Battery Management**

- Used batteries are disposed through Buy back method

### **e-Waste Management**

- All electronic machineries are purchased under Buy-Back agreement for proper disposal of e waste to recycler

### **Other Solid Waste Management**

- Solid wastes are generated from damaged furniture are sent to waste wood collection centre. Useful furniture and other wooden materials are made from the waste
- Glass wastes are disposed periodically through corporation waste collection system.



## **Waste Reduction**

- ❖ Students are instructed not to waste paper while writing examinations.
- ❖ Reusing one side paper where ever possible, printing on both sides of papers
- ❖ In order to reduce the use of paper the following initiative were taken by E - Governance
  - Attendance and fees payments through Educational Resource Management System (ERMS)
  - Submission of e-assignment through email and Google classroom
  - Digitalisation of Staff profiles and details about students
  - Online Admission Process – Printing of applications reduced & submission of applications through admission portal of ERMS
  - All inter department communications are through intranet and mobile app.
  - Online exams and Optical Mark Recognition (OMR sheet) are conducted to reduce the paper usage.

## **Waste Recycling**

- The answer scripts after the publication of results are sent for recycling.
- e wastes are collected and sent to authorised recycler.



#### **d) Green Campus**

National College, Trichy is overwhelmed with the atmosphere of greenery. The Institution too take meticulous efforts to maintain and retain the Nature given atmosphere with planting of new saplings

The eco-friendly ambience of the campus is a noteworthy feature of National College

- Green belt is developed in all possible open area are being converted into greenery
- The Green campus drive is an initiative of the College to protect the environment.
- Environmental awareness rallies are conducted regularly to spread the message of environment preservation.
- All the plant specimens in the campus are identified and recorded
- Also created faunal database within the College campus digitally and printed materials
- In the College campus, 746 numbers fully grown trees are there.



## GREEN BELT DEVELOPMENT











Tiruchirappalli  
Tamil Nadu  
India

2023-09-11(Mon) 01:00(pm)

33°C  
91°F

## Tree Diversity of National College Campus

Sl. No	Binomial Name	Family	Common Name
1.	<i>Peltophorum trifolium</i> (DC) ex.	Fabaceae	அயல் வாகை
2.	<i>Samanea saman</i> (Jacq.) Merr.	Fabaceae	தூங்கா மூஞ்சி மரம்
	<i>Derris scandens</i> (Roxb.) Benth.	Fabaceae	அதிரல் (or) கொடிப்புன்கு
3.	<i>Bauhinia racemosa</i> . Lam	Fabaceae	ஆத்தி
4.	<i>Cassia siame</i> . Lam	Fabaceae	மலை ஆவாரை
5.	<i>Pongamia pinnata</i> . (L.) Pierre.	Fabaceae	புங்கை
6.	<i>Delonix regia</i> . (Boj. ex Hook.) Raf.	Fabaceae	மயிர்க்கொன்றை
7.	<i>Millingtonia hortensis</i> , Linn.	<u>Bignoniaceae</u>	மரமல்லி
8.	<i>Lanea coromandelica</i> . (Houtt.) Merr.	Anacardiaceae	ஓதியன்
9.	<i>Terminalia catappa</i> .L.	<u>Combretaceae</u>	வாதாம்
10.	<i>Syzygium cumini</i> (L.)	<u>Myrtaceae</u>	நாவல்
11.	<i>Spathodea (Tabebuia Grandis)</i>	Bignoniaceae	நந்தி ஃப்ளேம்
12.	<i>Cassia fistula</i> L.	Fabaceae	சரக்கொன்றை
13.	<i>Swietenia mahagoni</i> (L.)	<u>Meliaceae</u>	மகாகனி
14.	<i>Melia azedarach</i> L.	<u>Meliaceae</u>	மலை வேம்பு
15.	<i>Mimusops elengi</i> L.	<u>Sapotaceae</u>	மஹிலம்
16.	<i>Bambusa bambos</i> (L.)	Poaceae	மூங்கில்
17.	<i>Leucaena leucocephala</i> (Lam.)	<u>Fabaceae</u>	சூபா புல்
18.	<i>Phyllanthus acidus</i> (L.)	<u>Phyllanthacea</u> <u>e</u>	அரைநெல்லி
19.	<i>Coleoptera integrifolia</i>	-	ஆவி மரம்
20.	<i>Dalbergia sissoo</i> Roxb.	<u>Fabaceae</u>	சிசு மரம்
21.	<i>Dalbergia latifolia</i> . Roxb.	<u>Fabaceae</u>	ஈட்டி மரம்
22.	<i>Sterculia foetida</i> L.	<u>Malvaceae</u>	குதிரைப்பிடுக்கு
23.	<i>Pterocarpus marsupium</i> Roxburgh	<u>Fabaceae</u>	வேங்கை
24.	<i>Terminalia arjuna</i> (Roxb.) Wight & Arn.	Combretaceae	வெண் மருது



25.	<i>Albizia lebbbeck</i> (L.) Benth.	Fabaceae	வாகை
26.	<i>Tectona grandis</i> L.f.	<u>Lamiaceae</u>	தேக்கு
27.	<i>Aegle marmelos</i> (L.) Corrêa	<u>Rutaceae</u>	வில்வம்
28.	<i>Mountegenia calabura</i> L.	-	சர்க்கரை பழம்
29.	<i>Ficus benghalensis</i> L. 1753	Moraceae	ஆல மரம்
30.	<i>Ficus religiosa</i> L.	Ficus religiosa	அரச மரம்
31.	<i>Tecoma stans</i> (L.) Juss. ex Kunth	<u>Bignoniaceae</u>	-
32.	<i>Madhuca longifolia</i> (J.Konig) J.F.Macbr.	Sapotaceae	இலுப்பை மரம்
33.	<i>Thespesia populnea</i> (L.) Sol. ex Corrêa	Malvaceae	பூவரசு
34.	<i>Vitex negundo</i> L.	<u>Lamiaceae</u>	நொச்சி
35.	<i>Crateva adanson</i> DC., 1824	Capparaceae	மாவிலங்கு
36.	<i>Pithecellobium dulce</i> (Roxb.) Benth.	<u>Fabaceae</u>	கொடுக்காய்ப்புளி
37.	<i>Santalum album</i> L.	<u>Santalaceae</u>	சந்தனம் மரம்
38.	<i>Tamarindus indica</i>	<u>Fabaceae</u>	புளியமரம்.
39.	<i>Polyalthia longifolia</i> Sonn.	Annonaceae	நெட்டிலிங்கம்
40.	<i>Morinda pubescens</i> Roxb.	<u>Rubiaceae</u>	நூனா
41.	<i>Lawsonia inermis</i> L.	<u>Lythraceae</u>	மருதாணி
42.	<i>Adinandra pavonina</i> L.	Pentaphylacaceae	ஆனை குண்டுமணி
43.	<i>Erythrina variegata</i> L.	<u>Fabaceae</u>	கல்யாண முருங்கை
44.	<i>Couroupita guianensis</i> Aubl.	<u>Lecythidaceae</u>	நாகலிங்கம்
45.	<i>Mangifera indica</i> L.	<u>Anacardiaceae</u>	மாமரம்
46.	<i>Calophyllum inophyllum</i> L.	<u>Calophyllaceae</u>	புன்னை மரம்
47.	<i>Punica granatum</i> L.	<u>Lythraceae</u>	மாதுளை



## **Awareness program conducted**

To create awareness about the significance of water, environment, forest and wildlife various awareness programs/ workshop were conducted both inside and outside the College campus.

### **Inside the campus**

1. World water day on 22<sup>nd</sup> March
2. Environmental Day on 5<sup>th</sup> June
3. International Biological Diversity was observed
4. Celebrated Earth Day in the month of April

### **List of Birds, Butterflies and Dragonflies found on campus during different seasons**

#### **Birds List**

<b>Common Name</b>	-	<b>Scientific Name</b>
Grey Francolin	-	Francolinus pondicerianus
Indian Peafowl	-	Pavo cristatus
Indian Pond Heron	-	Ardeola grayii
Cattle Egret	-	Bubulcus ibis
Black -Winged Kite	-	Elanus caeruleus
Black Kite	-	Milvus migrans
Brhaminy Kite	-	Haliastur indus
Oriental Honey- buzzard	-	Pernis ptilorhynchus
Shikra	-	Accipiter badius
White-breasted Waterhen	-	Amaurornis phoenicurus
Purple Swamphen	-	Porphyrio porphyrio
Common Moorhen	-	Gallinula chloropus
Common Coot	-	Fulica atra
Yellow-wattled Lapwing	-	Vanellus malabaricus
Red-wattled Lapwing	-	Vanellus indicus
Rock Pigeon	-	Columba livia
Spotted Dove	-	Spilopelia chinensis
Rose-ringed Parakeet	-	Psittacula krameri

Jacobin Cuckoo	-	<i>Clamator jacobinus</i>
Common Hawk Cuckoo	-	<i>Hierococcyx varius</i>
Asian Koel	-	<i>Eudynamys scolopaceus</i>
Blue-faced Malkoha	-	<i>Phaenicophaeus viridirostris</i>
Greater Coucal	-	<i>Centropus sinensis</i>
Barn Owl	-	<i>Tyto alba</i>
Indian Scops Owl	-	<i>Otus bakkamoena</i>
Spotted Owlet	-	<i>Athene brama</i>
Asian Palm Swift	-	<i>Cypsiurus balasiensis</i>
Common Hoopoe	-	<i>Upupa epops</i>
Indian Roller	-	<i>Coracias benghalensis</i>
White-throated Kingfisher	-	<i>Halcyon smyrnensis</i>
Common Kingfisher	-	<i>Alcedo atthis</i>
Pied Kingfisher	-	<i>Ceryle rudis</i>
Green Bee-eater	-	<i>Merops orientalis</i>
Coppersmith Barbet	-	<i>Megalaima haemacephala</i>
Black-Rumped Goldenback	-	<i>Dinopium benghalense</i>
Indian Pitta	-	<i>Pitta brachyura</i>
Common Woodshrike	-	<i>Tephrodornis pondicerianus</i>
Ashy Woodswallow	-	<i>Artamus fuscus</i>
Brown Shrike	-	<i>Lanius cristatus</i>
Black Drongo	-	<i>Dicrurus macrocercus</i>
Indian Golden Oriole	-	<i>Oriolus kundoo</i>
Indian Paradise-flycatcher	-	<i>Terpsiphone paradisi</i>
Rufous Treepie	-	<i>Dendrocitta vagabunda</i>
Indian Jungle Crow	-	<i>Corvus culminatus</i>
House Crow	-	<i>Corvus splendens</i>
Barn Swallow	-	<i>Hirundo rustica</i>
Red-rumped Swallow	-	<i>Cecropis daurica</i>
Red-vented Bulbul	-	<i>Pycnonotus cafer</i>
Common Tailorbird	-	<i>Orthotomus sutorius</i>
Booted Warbler	-	<i>Iduna caligata</i>
Green Warbler	-	<i>Phylloscopus nitidus</i>

Yellow-billed Babbler	-	Turdoides affinis
Whiskered Tern	-	Chlidonias hybridus
Brahminy Starling	-	Sturnia pagodarum
Oriental Magpie Robin	-	Copsychus saularis
Indian Robin	-	Saxicoloides fulicatus
Asian Brown Flycatcher	-	Muscicapa latirostris
Pale-billed Flowerpecker	-	Dicaeum erythrorhynchos
Purple Sunbird	-	Cinnyris asiaticus
House Sparrow	-	Passer domesticus
Baya Weaver	-	Ploceus philippinus
Scaly-breasted Munia	-	Lonchura punctulata
White-browed Wagtail	-	Motacilla maderaspatensis

## Butterflies

Common Name	-	Scientific Name
Tailed Jay	-	Graphium agamemnon
Common Mormon	-	Papilio polytes
Blue Mormon	-	Papilio polymnestor
Lime Butterfly	-	Papilio demoleus
Common Banded Peacock	-	Papilio crino
Common Rose	-	Pachliopta aristolochiae
Crimson Rose	-	Pachliopta hector
Common Grass Yellow	-	Eurema hecabe
Common Emigrant	-	Catopsilia pomona
Common Jezebel	-	Delias eucharis
Blue Tiger	-	Tirumala limniace
Dark Blue Tiger	-	Tirumala septentrionis
Glassy Tiger	-	Parantica aglea
Plain Tiger	-	Danaus crysippus
Striped Tiger	-	Danaus genutia
Common Crow	-	Euploea core

Double Branded Crow	-	Euploea sylvester
Common Evening Brown	-	Melanitis leda
Common Bushbrown	-	Mycalesis perseus
Tawny Coster	-	Acraea violae
Angled Caster	-	Ariadne ariadne
Joker	-	Byblia ilithiya
Danaid Eggfly	-	Hypolimnas misippus
Great Eggfly	-	Hypolimnas bolina
Blue Pansy	-	Junonia orithiya
Yellow Pansy	-	Junonia Hierta
Lemon Pansy	-	Junonia lemonias
Chocolate Pansy	-	Junonia iphita
Common Pierrot	-	Castalius rosimon
Common Cerulean	-	Jamides celeno
Forget-me-not	-	Catochrysops strabo
Pea Blue	-	Lampides boeticus
Zebra Blue	-	Leptotes olinius
Gram Blue	-	Euchrysops cnejus
Pale Grass Blue	-	Pseudozizeeria maha
Tiny Grass Blue	-	Zizula hylax
Grass Jewel	-	Freyeria trochylus
Small Grass Jewel	-	Freyeria putli
Plains Cupid	-	Chilades pandava
Plain Pam Dart	-	Cephrenes acalle
Straight Swift	-	Parnara naso / Parnara bada
Grass Demon	-	Udaspes folus
Indian Dartlet	-	Oriens goloides

### **Dragonflies**

Wandering Glider	-	Pantala flavescens
Crimson Marsh Glider	-	Trithemis aurora
Green Marsh Skimmer	-	Orthetrum sabina
Blue Ground Skimmer	-	Diplacodes trivialis
Common Hooktail	-	Paragomphus lineatus

## e) Carbon Footprint

Release of carbon dioxide into the atmosphere is contributes to the global warming and increasing the pace of climate change. More trees in the campus will make a source of sink for the carbon dioxide and for other greenhouse gases

Average distance travelled from home to college and back to home by two wheelers=10 km

Average distance travelled from home to college and back to home by four wheelers=20 km

Average two wheelers efficiency =	60 km/l
Average four wheelers efficiency =	20 km/l
No of two wheelers used by both students and staff=	487
No of cars used by both students and staff=	18
College working days during the year 2022-2023-	180 days
Fuel (Petrol) consumption by two wheelers	14,610 Lits
Fuel (Petrol) consumption by four wheelers	3,240 Lits
Total petrol	17,850 Lits
Fuel consumption by DG sets	3,600 Lits
LPG consumption in the college lab & canteen and Hostel Mess	58,216 Kgs
TNEB power consumed in the college & Hostel	6,57,880 units
Green House gas emission due to diesel	9,612 KgsCO <sub>2eq</sub>
Green House gas emission due to petrol	42,126 KgsCO <sub>2eq</sub>
Green House gas emission due to LPG	1,76,394.5 KgsCO <sub>2eq</sub>
Green House gas emission due to Grid power	5,39,461.6 KgsCO <sub>2eq</sub>
Total GHG emission per year	7,67,594.1 KgsCO <sub>2eq</sub>
	767.59 KgsCO <sub>2eq</sub>

### Green House Gas Emission Avoided

Paper waste disposed	4800 kgs
Green House gas emission avoided due to paper disposal to recycler	20.64 tCO <sub>2eq</sub>

### Green House Gas Off set

No of trees inside the college campus	746
Green House gas offset by grown up trees	16.41 KgsCO <sub>2eq</sub>
Net Green House gas emission	751.18 KgsCO <sub>2eq</sub>

## 4.2 Consolidation of Audit Findings

We hope that students would have developed a greater appreciation and understanding of the impact of their actions on the environment. They have successfully been able to determine the impacts on the environment through the various auditing exercises. Participating in this green auditing procedure they have gained knowledge about the need of sustainability of the College campus. It will create awareness on the use of the Earth's resources in their home, College, local community and beyond.

### General

- Green Policy is stated and objectives are reflected very well in the functioning of the College and Hostel
- Campus is declared plastic free and lot of initiatives and innovative actions are taken to maintain the green policy.

### Water

- Total water consumption -74 KL/day

### Water Conservation

- Periodical Maintenance of water taps are carried out to avoid leakages

### Rain water Harvest system

- Appreciable work has been carried out for harvesting the rainwater both from college buildings & hostel for charging the ground water level and usage.

### Energy

- Total electrical energy consumption from TNEB Grid alone is 6,57,880 units
- More number of conventional tube lights are replaced with LED lights

### Waste to Wealth

### Waste Recycle

- The used papers collected from the departments and centres were recycled  
Paper disposed for recycling is 4800 Kgs
- E - wastes are collected and kept separately to send to authorised recycler
- Plastic wastes generated from packing materials are collected separately and disposed properly to recycler

## **Green Campus**

- Tree cover of the College within the available space is good
- Regular planting of trees inside campus are to be continued
- Usage of water for gardens are to be measured

## **Carbon Foot Print**

- Yearly Greenhouse gas emission is around 767.59 t CO<sub>2</sub>e

## **Reduce Vehicle Emission**

- Usage of more bicycles shall be encouraged to the College community.





### **4.3 Preparation of Action Plan**

Policies referring to College's management and approach towards the use of resources need to be considered. The College green policy for its sustainable development to be monitored consciously.

### **4.4 Follow-up Action and Plans**

Green Audits are exercises which generate considerable quantities of valuable management information. The time, effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and that action plans and implementation programs result from the findings. Audit follow up is part of the wider process of continuous improvement.

### **4.5 Environmental Education**

The following environmental education program may be implemented in the College:

-

- Training programs in Water & Waste management, Solids and e-Waste Management, Carbon footprint concepts, Awareness on Global warming
- Increase the number of display boards on environmental awareness such as no wastage of food/water, switch off light and fan after use, plastic free campus etc.

### **Awareness on Carbon Emission**

- Students and Staff members are made totally aware of pollution caused by use of vehicles.
- The awareness programs on carbon emission at individual as well as social level will help to avoid air and noise pollution due to vehicles.

## **4.6 Recommendations**

### **Common Recommendations**

- Targets for Green policy shall be fixed

### **Criteria Wise Recommendations**

#### **Water**

- Water consumption monitoring system has to be implemented in the College campus and hostel
- Water Flow meter to be introduced to measure the quantity of water used
- More awareness programs on water conservation to be conducted.
- More display on water conservation shall be displayed

#### **Energy**

- Target for more percentage of Renewable Energy contribution
- Remaining old Tube lights shall be replaced with LED tube lights.
- Conventional fans shall be replaced with BLDC fan
- Conduct more awareness programs on importance of energy saving for students and staff
- More display on energy conservation shall be displayed
- Five star rated energy efficient appliances to be procured in the future

#### **Waste**

- Conduct exhibition of recyclable waste products
- Every six months e-waste to be disposed as per e-waste Management rules 2016.
- Register to be maintained for collection, storage and disposal of E waste & used batteries
- Biodiesel project shall be given to students from used cooking oil

#### **Green Campus**

- Keep continuously encouraging students for making the campus green
- Roof garden for building shall be planned in future
- Training/awareness on Global warming, Climate Change shall be given to students

#### **Carbon footprint**

- Fix a target to reduce Green House Gas emission

- **Present Net Green House** gas emission per year is 751.18 t CO<sub>2</sub> e
- Aim for Net Zero emission from the institution in the coming years
- Training/ awareness on Carbon foot print concepts to be given to students and staffs





Estd. 1919

# National College (Autonomous)

Tiruchirappalli - 620001, Tamil Nadu, INDIA

Nationally Re-accredited with 'A+' Grade by NAAC with CGPA of 3.61 on 4.00 scale

College with Potential for Excellence

## ENVIRONMENTAL AUDIT REPORT 2022-2023



ALGEO

AUDIT/REPORT BY



ALCHEME GREEN ENERGY COMPANY

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info@alchemegreenenergy.com

## **ACKNOWLEDGEMENT**

We at Alcheme Green Energy Company, Madurai are thankful to the principal for giving us the opportunity to carry out Environmental audit at National College, Trichy -620 001. 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 Environmental Audit.

<b>Name</b>	<b>Qualifications</b>	<b>Certification Number</b>
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. Lakshmana Kumaran	B.Tech., MSc., (Env. Science), MBA., IRCA Certified Lead Auditor ISO 14001 EMS	UID - 351851

The following staff from the Institution were participated in the audit process

<b>Name</b>	<b>Designation</b>
Dr. KUMAR.K	Principal & Chairperson
Dr. D.E. Benet	Coordinator
Mr. Thangaraj	Estate Manager

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# Summary of Environment Audit

Environment audit of National College and its Hostel was carried by Alcheme Green Energy Company. Audit team has gone through the data related to Water and Electrical Energy, Waste generation, Waste Management, Waste Recycling and Reuse, Green Belt Development in and around National College campus. The team also carried out the study of Pollution abatement measures, Rainwater harvesting, Water and Energy Conservation measures taken to reduce the pollution, noise level, Greenhouse gas emission and maintain Ambient Air quality.

During the visit, it is observed that cleanliness in the campus is well maintained through proper disposal of wastes, utilization of eco-friendly supplies and effective recycling program. The concept of eco-friendly culture is disseminated among the students through various seminars/workshops and community-oriented programs. The Institution strictly follows reduce, reuse and recycle method to limit energy usage and partially replace non-renewable energy sources with renewable energy resources.

The environment audit report is a very powerful and valuable communications tool to use while working with various stakeholders who need to be convinced that systems and procedures in place are suited to cope with natural changes and modifications.

It is hoped that the results presented in the environment audit report will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new activities and innovative practices.

The audit outputs and recommendations are summarised as follows:

## **Noteworthy activities**

- Clean, Green and plastic free campus

The audit outputs and recommendations are summarised as follows:

- Air pollution impact on Ambient Air quality is negligible since the quantity of fuel used for combustion in the institution is very less
- Noise levels inside the campus are within the prescribed limit
- Very good initiative is taken by the institution for rainwater harvesting
- Lot of initiatives are taken to conserve Water and Energy by the Institution.
- Flow meters are to be provided for better water management
- Total water consumption for National College and Hostel –74 KL/Day
- Electrical Energy consumption from TNEB GRID alone –6,57,880 units
- Diesel Generator electrical energy consumption- 10,800 units



- Total Electrical Energy consumption is 6,68,680 units
- Total Green House Gas Emission is 767.59 t CO<sub>2</sub>e
- Green House gas offset due to grown up trees is 16.41 t CO<sub>2</sub> e
- Net Green House Gas emission is 751.18 t CO<sub>2</sub> e

We are happy to submit this detailed Environmental audit report to the National College



For Alcheme Green Energy Company  
Madurai



# 1. Introduction

## 1.1 Environmental Policy

National College has well formulated Environmental Policy to guide all its activities.

### **The main objectives are as follows:**

- ❖ To promote sound environmental management policies and practices throughout the College activities
- ❖ To create awareness among the stake holders about the conservation of natural resources and preserve them at their best.
- ❖ To enhance the quality of natural resources and development of sustainable environments by various promotional activities for national prosperity.
- ❖ To establish a baseline information about the available faunal and floral composition and their environment within college premises.
- ❖ To implement sustainable resource management practices, based on reduce, reuse and recycle principles
- ❖ To adopt fair, ethical and eco-friendly approaches, this incorporates everything from implementation to training of students in the college activities.

### **The Institution vouchsafes:**

- ❖ Establishing environment programs that are consistent with commitment to the continual improvement of the environment management system.
- ❖ Compliance with applicable environmental policies and prevention of pollution by applying the best available practices

## 2. WATER

### 2.1 Water usage at College & Hostel

Total number of students studied during the academic year 2022-2023: 5400

Teaching & non-Teaching staff available during the academic year 2022-2023: 344

Total number of stakeholders: 5744

#### College

Main water uses in the College campus are Drinking, Rest room, Canteen and Lab

Water usage in the College- 20 KL / Day

Water usage per day per stakeholder in the college – 3.48 litres

Waste water generation in the college – 13 KL/day

#### Water usage at college

Sl. No	Place	Litres / Day
1	Drinking	2,500
2	Rest room	6,000
3	Canteen	5,000
4	Lab	2,000
5	Garden	4,500
	<b>Total</b>	<b>20,000</b>

#### Boys Hostel

Number of students and staff residing in the hostel in the year 2022-2023: 523

Main water uses in the Hostel are Drinking, Washing of clothes, Cooking & Vessel cleaning and for Rest room

Water usage at Hostel – 37 KL / Day

Water consumption per day per stakeholder in the hostel – 70.74 litres

Waste water generation in the Hostel – 32 KL /day

### Water usage at Boys Hostel

Sl. No	Place	Litres / Day
1	Drinking	1,000
2	Cooking	2,000
3	Rest room	10,500
4	Bathing	10,500
5	Clothes washing	10,500
6	Vessel Cleaning	1,500
7	Garden	1,000
	Total	37,000

### Girls Hostel

Number of students and staff residing in the hostel in the year 2022-2023: 240

Main water uses in the Hostel are Drinking, Washing of clothes, Cooking & Vessel cleaning and for Rest room

Water usage at Hostel – 17 KL / Day

Water consumption per day per stakeholder in the hostel – 68.75 litres

Waste water generation in the Hostel – 16.5 KL /day

### Water usage at Girls Hostel

Sl. No	Place	Litres / Day
1	Drinking	500
2	Cooking	1000
3	Rest room	5000
4	Bathing	5000
5	Clothes washing	5000
6	Vessel Cleaning	500
	Total	17000

### 3. Electrical Energy

#### Electrical Energy Consumption from TNEB and DG both in college and Hostel in the year 2022-2023

Sl. No	Source	Consumption in units
1	College	6,57,880
2	Diesel Generator	10,800
	Total	6,68,680

#### Total Electrical Energy consumption from TNEB grid and DG in the College 6,68,680 units

Electrical Energy consumption per stakeholder per year – 116 units

### 4. FUEL CONSUMPTION

#### 4.1 LPG

LPG gas is used in the hostel and college canteen for cooking and used in the college lab for doing scientific practical & Experiments

LPG cylinders used- commercial cylinders of 19 kgs capacity

LPG consumption in the College-76 Kgs

LPG consumption in the hostel mess-34,200 Kgs

LPG consumption in the college canteen-23,940 Kgs

Total LPG consumption during the year 2022-2023- 58,216 KGs

## 5. Waste Generations and Management

### 5.1 Liquid and Solid Waste Generation

#### Quantity of liquid waste generated: -

- Waste water generation in the College and Hostel - 61.5 KL /day

#### Quantity of Solid waste generated

##### College

- Biodegradable—<1 kg/day

##### Canteen

- Biodegradable (Food waste) - 20-25 kgs / day

##### Office

- Non-biodegradable —< 0.1kg/day

##### Hostel

- Biodegradable (Food waste) - 50-60 kgs / day
- Non-biodegradable – <0.5kg / day

##### Open area

- Biodegradable (Dry leaves)- 50 kgs / day

##### Plastic waste

- **Less than** <0.1kg / day

##### e-Waste

- **Less than 50 kgs / year**

## 5.2 Waste Management

### 5.2.1 Liquid waste Management

- RO plant reject is used for gardening
- Waste water generated from canteen, kitchen and bath room are used for gardening

### 5.2.2 Bio-degradable waste management

Food waste is one of the most challenging issues humankind is currently facing worldwide. When every time food is wasted, the water, energy, time, manpower,

fertilizer, fuel, packaging and money put into growing, preparing, storing, transporting, cooking the food is wasted

- ❖ Bio-Degradable and non-biodegradable waste are collected in separate Two - bins system
- ❖ Food waste and Leaf-litter waste collected from the campus is used for composting and the compost is used further for the garden developments within the College

### **5.2.3 Plastic Waste Management**

- The College has been declared as a 'Plastic Free' zone
- Plastic covers are collected separately and disposed properly
- Use of polythene bags, Plastic cups/ straws/ cover/ plates/ are prohibited within the campus
- Students and staff are advised to bring cloth bags
- All the Stakeholders are motivated to use stainless steel plates.
- Tea/Coffee being served in Stainless steel tumblers
- Plastic waste that comes in through lab equipment's package, empty chemical containers etc. are collected separately and disposed periodically for recycling.

### **5.2.4 Used Battery Management**

- Used batteries are disposed through Buy back method

### **5.2.5 e-Waste Management**

- All electronic machineries are purchased under Buy-Back agreement for proper disposal of e waste to recycler

### **5.2.6 Other Solid Waste Management**

- Solid wastes are generated from damaged furniture are sent to waste wood collection centre. Useful furniture and other wooden materials are made from the waste
- Glass wastes are disposed periodically through corporation waste collection system.



## **6. Pollution abatement measures**

### **6.1 Waste Reduction**

- ❖ Students are instructed not to waste paper while writing examinations.
- ❖ Reusing one side paper where ever possible, printing on both sides of papers
- ❖ In order to reduce the use of paper the following initiative were taken by E - Governance
  - Attendance and fees payments through Educational Resource Management System (ERMS)
  - Submission of e-assignment through email and Google classroom
  - Digitalisation of Staff profiles and details about students
  - Online Admission Process – Printing of applications reduced & submission of applications through admission portal of ERMS
  - All inter department communications are through intranet and mobile app.
  - Online exams and Optical Mark Recognition (OMR sheet) are conducted to reduce the paper usage.

### **6.2 Waste Recycling**

- The answer scripts after the publication of results are sent for recycling.
- e wastes are collected and sent to authorised recycler.

### **6.3 Waste Reuse**

- Reuse one sided paper
- Reuse Envelopes

### **6.4 Waste to wealth**

- Compost from dry leaves and food wastes are used as manure for trees

### **6.5 Water Conservation initiatives**

- RO Plant water rejects are used for garden and greenery development
- Periodical preventive maintenance is carried out to avoid leakages of water in tap

## 6.6 Energy conservation activities followed

- Regular monitoring of air conditioners is done in order to maintain a temperature of 24°C in all the places that they are installed in
- Replacing conventional electrical light fittings with energy efficient Light-Emitting Diode (LED) bulbs is going on as continuous process.
- Switching off the fans and tube lights in the classroom and faculty rooms are done after the working hours
- Periodical maintenance and overhauling of generators is being carried out.
- Periodical maintenance of UPS and Battery systems are carried out.
- The air-conditioners and other electronic and electrical equipments are switched off when not in use.
- 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.
- Work supervisor and electrician regularly check the usage of lights, fans and all other energy sources during and out of the college hours.
- Lights and fans are switched off by the students whenever they are out of hostel rooms

## 7.Green Belt Development

National College, Trichy is overwhelmed with the atmosphere of greenery. The Institution too take meticulous efforts to maintain and retain the Nature given atmosphere with planting of new saplings

The eco-friendly ambience of the campus is a noteworthy feature of National College

- Green belt is developed in all possible open area are being converted into greenery
- The Green campus drive is an initiative of the College to protect the environment.
- Environmental awareness rallies are conducted regularly to spread the message of environment preservation.
- All the plant specimens in the campus are identified and recorded
- Also created faunal database digitally within the College campus
- In the College campus, 746 numbers fully grown trees are there.



## GREEN BELT DEVELOPMENT













## Tree Diversity of National College Campus

Sl. No	Binomial Name	Family	Common Name
1.	<i>Peltophorum trifolium</i> (DC) ex.	Fabaceae	அயல் வாகை
2.	<i>Samanea saman</i> (Jacq.) Merr.	Fabaceae	தூங்கா மூஞ்சி மரம்
	<i>Derris scandens</i> (Roxb.) Benth.	Fabaceae	அதிரல் (or) கொடிப்புன்கு
3.	<i>Bauhinia racemosa</i> . Lam	Fabaceae	ஆத்தி
4.	<i>Cassia siamea</i> . Lam	Fabaceae	மலை ஆவாரை
5.	<i>Pongamia pinnata</i> . (L.) Pierre.	Fabaceae	புங்கை
6.	<i>Delonix regia</i> . (Boj. ex Hook.) Raf.	Fabaceae	மயிர்க்கொன்றை
7.	<i>Millingtonia hortensis</i> , Linn.	<u>Bignoniaceae</u>	மரமல்லி
8.	<i>Lanea coromandelica</i> . (Houtt.) Merr.	Anacardiaceae	ஓதியன்
9.	<i>Terminalia catappa</i> .L.	<u>Combretaceae</u>	வாதாம்
10.	<i>Syzygium cumini</i> (L.)	<u>Myrtaceae</u>	நாவல்
11.	<i>Spathodea (Tabebuia Grandis)</i>	Bignoniaceae	நந்தி ஃப்ளேம்
12.	<i>Cassia fistula</i> L.	Fabaceae	சரக்கொன்றை
13.	<i>Swietenia mahagoni</i> (L.)	<u>Meliaceae</u>	மகாகனி
14.	<i>Melia azedarach</i> L.	<u>Meliaceae</u>	மலை வேம்பு
15.	<i>Mimusops elengi</i> L.	<u>Sapotaceae</u>	மஹிலம்
16.	<i>Bambusa bambos</i> (L.)	Poaceae	மூங்கில்
17.	<i>Leucaena leucocephala</i> (Lam.)	<u>Fabaceae</u>	சூபா புல்
18.	<i>Phyllanthus acidus</i> (L.)	<u>Phyllanthaceae</u>	அரைநெல்லி
19.	<i>Coleoptera integrifolia</i>	-	ஆவி மரம்
20.	<i>Dalbergia sissoo</i> Roxb.	<u>Fabaceae</u>	சிசு மரம்
21.	<i>Dalbergia latifolia</i> . Roxb.	<u>Fabaceae</u>	ஈட்டி மரம்
22.	<i>Sterculia foetida</i> L.	<u>Malvaceae</u>	குதிரைப்பிடுக்கு
23.	<i>Pterocarpus marsupium</i> Roxburgh	<u>Fabaceae</u>	வேங்கை
24.	<i>Terminalia arjuna</i> (Roxb.) Wight & Arn.	Combretaceae	வெண் மருது

25.	<i>Albizia lebbbeck</i> (L.) Benth.	Fabaceae	வாகை
26.	<i>Tectona grandis</i> L.f.	<u>Lamiaceae</u>	தேக்கு
27.	<i>Aegle marmelos</i> (L.) Corrêa	<u>Rutaceae</u>	வில்வம்
28.	<i>Mountegenia calabura</i> L.	-	சர்க்கரை பழம்
29.	<i>Ficus benghalensis</i> L. 1753	Moraceae	ஆல மரம்
30.	<i>Ficus religiosa</i> L.	Ficus religiosa	அரசு மரம்
31.	<i>Tecoma stans</i> (L.) Juss. ex Kunth	<u>Bignoniaceae</u>	-
32.	<i>Madhuca longifolia</i> (J.Konig) J.F.Macbr.	Sapotaceae	இலுப்பை மரம்
33.	<i>Thespesia populnea</i> (L.) Sol. ex Corrêa	Malvaceae	பூவரசு
34.	<i>Vitex negundo</i> L.	<u>Lamiaceae</u>	நொச்சி
35.	<i>Crateva adanson</i> DC., 1824	Capparaceae	மாவிலங்கு
36.	<i>Pithecellobium dulce</i> (Roxb.) Benth.	<u>Fabaceae</u>	கொடுக்காய்ப்புளி
37.	<i>Santalum album</i> L.	<u>Santalaceae</u>	சந்தனம் மரம்
38.	<i>Tamarindus indica</i>	<u>Fabaceae</u>	புளியமரம்.
39.	<i>Polyalthia longifolia</i> Sonn.	Annonaceae	நெட்டிலிங்கம்
40.	<i>Morinda pubescens</i> Roxb.	<u>Rubiaceae</u>	நூனா
41.	<i>Lawsonia inermis</i> L.	<u>Lythraceae</u>	மருதாணி
42.	<i>Adinandra pavonina</i> L.	Pentaphylacaceae	ஆனை குண்டுமணி
43.	<i>Erythrina variegata</i> L.	<u>Fabaceae</u>	கல்யாண முருங்கை
44.	<i>Couroupita guianensis</i> Aubl.	<u>Lecythidaceae</u>	நாகலிங்கம்
45.	<i>Mangifera indica</i> L.	<u>Anacardiaceae</u>	மாமரம்
46.	<i>Calophyllum inophyllum</i> L.	<u>Calophyllaceae</u>	புன்னை மரம்
47.	<i>Punica granatum</i> L.	<u>Lythraceae</u>	மாதுளை

## 8.Rainwater Harvesting

At National College, rainwater harvesting is done effectively to enhance the ground water. Rainwater from all the buildings is effectively utilised for recharging the ground

Rainwater harvest area covered in the college- 82,500 sq. ft.

Rainwater harvest area covered in the Hostel- 27,350 sq. ft.

No of Rainwater collection pits- 13 numbers

Size of the Rainwater collection pit -1Mx1Mx1M







## 9. AMBIENT AIR

### 9.1 Green House Gas Emission

Release of carbon dioxide into the atmosphere is contributes to the global warming and increasing the pace of climate change. More trees in the campus will make a source of sink for the carbon dioxide and for other greenhouse gases

Average distance travelled from home to college and back to home by two wheelers=10 km

Average distance travelled from home to college and back to home by four wheelers=20 km

Average two wheelers efficiency =	60 km/l
Average four wheelers efficiency =	20 km/l
No of two wheelers used by both students and staff=	487
No of cars used by both students and staff=	18
College working days during the year 2022-2023-	180 days
Fuel (Petrol) consumption by two wheelers	14,610 Lits
Fuel (Petrol) consumption by four wheelers	3,240 Lits
Total petrol	17,850 Lits
Fuel consumption by DG sets	3,600 Lits
LPG consumption in the college lab & canteen and Hostel Mess	58,216 Kgs
TNEB power consumed in the college & Hostel	6,57,880 units
Green House gas emission due to diesel	9,612 KgsCO <sub>2eq</sub>
Green House gas emission due to petrol	42,126 KgsCO <sub>2eq</sub>
Green House gas emission due to LPG	1,76,394.5 KgsCO <sub>2eq</sub>
Green House gas emission due to Grid power	5,39,461.6 KgsCO <sub>2eq</sub>
Total GHG emission per year	7,67,594.1 KgsCO <sub>2eq</sub>
	767.59 KgsCO <sub>2eq</sub>

#### Green House Gas Emission Avoided

Paper waste disposed	4800 kgs
Green House gas emission avoided due to paper disposal to recycler	20.64 tCO <sub>2eq</sub>

#### Green House Gas Off set

No of trees inside the college campus	746
Green House gas offset by grown up trees	16.41 KgsCO <sub>2eq</sub>
Net Green House gas emission	751.18 KgsCO <sub>2eq</sub>

## 9.2 Ambient Air Quality

### Flue gas emission sources

- LPG combustion at hostel, canteen and laboratory
- Diesel generator at College and Hostel

### Fuel consumption per year

- LPG -58,216 Kgs
- Diesel for generator –3600 litres

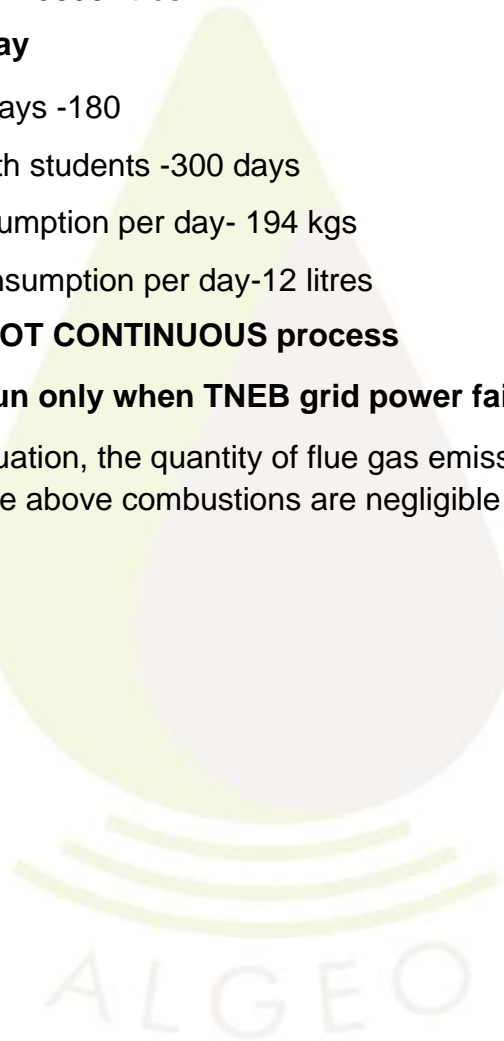
### Fuel consumption per day

- College workings days -180
- Hostel occupied with students -300 days
- Average LPG consumption per day- 194 kgs
- Average Diesel consumption per day-12 litres

### Combustion of LPG is NOT CONTINUOUS process

### DIESEL Generator will run only when TNEB grid power fails

Considering the above situation, the quantity of flue gas emission and the impact on ambient air quality from the above combustions are negligible





### 9.3 Noise level

#### Noise level inside the campus

SI. No	Location	Max value in dB	Average Value in dB
1	Main Entrance	72	68
2	Near Generator Room	64	57
3	Near Library	61	53
4	Near stadium	59	54
5	Near Canteen	63	59
6	Main Office	67	60

- Diesel Generators (DG) sets do not run on a continuous basis. Only during power failure, DG sets are operated during the working hours of the College.
- Generally, Power failure occurs for a very short time period.
- During planned shutdown hours, DGs run continuously based on the load
- Noise disturbance due to DG set is negligible.

## 10. Audit Findings & Recommendations

### Noteworthy activities

- Clean, Green and plastic free campus

### The audit outputs and recommendations are summarised as follows:

- Air pollution impact on Ambient Air quality is negligible since the quantity of fuel used for combustion in the institution is very less
- Noise levels inside the campus are within the prescribed limit
- Lot of initiatives are taken to conserve Water and Energy by the Institution.
- Flow meters are to be provided for better water management
- Total water consumption for National College and Hostel – 74 KL/Day
- Electrical Energy consumption from TNEB GRID alone –6,57,880 units
- Diesel Generator electrical energy consumption- 10,800 units
- Total Electrical Energy consumption is 6,68,680 units
- Total Green House Gas Emission is 767.59 t CO<sub>2</sub>e
- Green House gas offset due to grown up trees is 16.41 t CO<sub>2</sub> e
- Net Green House Gas emission is 751.18 t CO<sub>2</sub> e

### Recommendations

- Electrical Energy reduction through Solar PV Power Plant Shall be planned
- Flow meter to be installed to know the exact usage of water.
- Training programs in Carbon footprint concepts, Awareness on Global warming & Climate change, E -vehicle usage, Alternative Fuel usage, Renewable Energy shall be given
- Increase the number of display boards on environmental awareness such as no wastage of food, switch off light and fan after use etc
- Register to be maintained for collection, storage and disposal of E waste & used batteries